รายการอ้างอิง

ภาษาไทย

กิตติ โสภณศักดิ์ , "การบำบัดน้ำเสียจากโรงงานสุราโดยขบวนการอาร์บีซีที่มีการหมุนเวียนน้ำทิ้ง" , วิทยานิพนธ์ปริญญามหาบัณฑิต , ภาควิชาวิศวกรรมสุขาภิบาล บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย , 2524.

พิพัฒน์ ภูริปัญญาคุณ , "การศึกษาเพื่อเปรียบเทียบประสิทธิภาพในการกำจัดน้ำทิ้งของไบโอดิสช์และสับเมอจดรัม" , วิทยานิพนธ์ปริญญามหาบัณฑิต , ภาควิชาวิศวกรรมสิ่งแวดล้อม บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย , 2523.

วรวุฒิ ชัยศิริรัตน์ , "การกำจัดน้ำเสียของโรงพยาบาลราชวิถีด้วยระบบจานหมุนชีวภาพ" , วิทยานิพนธ์ปริญญามหาบัณฑิต , ภาควิชาเทคโนโลยีสิ่งแวดล้อม บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล , 2531.

ศุภมิตร จันทร์คำอ้าย , "การกำจัดน้ำเสียที่มีพีเอชต่ำโดยใช้ไบโอดรัม." วิทยานิพนธ์ปริญญามหาบัณฑิต , ภาควิชาวิศวกรรมสิ่งแวดล้อม บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย , 2535.

สุเมธ ขวเดช "ลักษณะสมบัติเมือกจุลินทรีย์" , สัมมนาทางวิชาการระดับชาติ เทคโนโลยีน้ำและน้ำเสีย (รศ.ดร.ธงชัย พรรณสวัสดิ์) , คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย , 2530.

ภาษาอังกฤษ

Abraham Pano and Middlebrooks Joe, E., "Kinetics of Carbon and Ammonia Nitrogen Removal in RBCs," Jour. Water Poll. Control Fed. 55 (July 1983) 956.

Alexander Regent, "Small RCBs Logging Hours in Yukoslavia", Water and Sewage Works (August 1980) 42.

American Public Health Association, Standard Methods for the Examination of Water and Wastewater Ed, American Public (Helth Association Washington, D.C 1992

Antonie, R.L., "Response of the Bio-Disc Process to Fluctuating Wastewater Flows", Proc.25th Industrial Waste Conference (Purdue University : Lafayette, 1970) P. 427.

_____ R.L. and Hynek, R.j., "Operating Experience with Bio-Surf Process Treatment of Food-Processing Wastes", Proc. 28th Industrial Waste Conference" (Purdue University : Lafayette, 1973) P. 849.

_____ R.L., Klage, D.L. and Mielke, J.H., "Evaluation of a Rotating Disk Wastewater Treatment Plant" Jour Water Poll. Control Fed. 46 (1974) 498.

_____ R.l., "Nitrification of Activated Sludge Effluent : Bio-Surf Process", Water and Sewage Works 121 (November 1974) 44.

_____ R.L., "Nitrification of Activated Sludge Effluent : Bio-Surf Process", Water and Sewage Works 121 (December 1974) 55.

_____ R.L., Fixed Biological Surface-Wastewater Treatment (Ohio : CRC Press Inc., 1976)

Bandy, J.T. and Scholze, R.J., "Effects of Periodically reversing the Direction of flow through an RBC", Jour Water Poll. Control Fed. 55 (December 1983) 1457.

Barnnes, D., Bliss, P.J., Gould, B. Wand Vallentine , H.R. Water and Wastewater Engineering Systems (Pitman Pubishing inc., 1981

Bintanja, H.H.J., Brunsmam, J.J. and Boelhouwer, C., "The Use of Oxygen in a Rotating Disc Process," Water Research 10 (1976) 561.

Birks, C.W. and Hynek, R.J. "Treatment of Cheese Processing Wastes by the Bio-Disc Process," Proc. 26th Industrial waste Conference (Purdue University : Lafayette, 1971) P. 89.

Blanc, C.F. O'Shaughnessy, J.C. and Miller, C.H., "Treatment of Bottling Plant Wastewater with Rotating Biological Contactors" Proc. 33rd Industrial Waste Conference (Purdue University : Lafayette,) P. 614.

Busch, A.W. and Hughmark, G.A., "Trickling Filter Theories" Proc. 23rd Industrial Waste Conference (Purdue University : Lafayette, 1968) P. 766.

Ching-San Huang, "Nitrification Kinetics and Itd RBC Application," ASCE of Environmental Engineering 108 (June 1982) 473.

Chittenden, J.A. and Wells, W.J., "Rotating Biological Contactors Following Anaerobic Lagoons," Jour Water Poll. Control Fed. 43 (1971) 746.

Choung, Y.K., Bae, B.H. , and Ahn, K.H,, "Treatment of Phenolic Wastewater using Rotation Biological Contactors" Water Poll Control in Asia P. 685

Chudoba, J.W., Kucman, K. and Proske, L., "Control of Activated Sludge Filamentous Bulking-VII. Effect of anoxic Condition," Water Research 21 (1987) 1447.

Clark, J.H., Moseng, E.M., Asano, T., Washington State University and Pullman, "Performance of a Rotating Biological Contactor under Varying Wastewater Flow." Jour. Water Poll. Control Fed. 50 (May 1978) 896.

Collins, A.G., Clarkson, W.,W. and Vrona, M., " Fixed-Film Biological Nitrification of a Strong Industrial Waste", Jour Water Poll. Control Fed. 60 (April 1988) 499.

Enayatullah, "Perfomance of a Rotating Drum Filter in Treatment of Wastewater in the Tropics, "Master's Thesis, Department of Environmental Engineering, AIT , 1995

Friedman, A.A., Robbins, L.E. and Woods, R.C., "Effect of Disk Rotational Speed on Biological Contactor Efficiency ", Jour. Water Poll. Control Fed. 51(November 1979) 2678.

_____ A.A. Woods, R.C. and Wilkey, R.C., "Kinetics Response of Rotating Biological Contactors", Proc. 31st Industrial Waste Conference (Purdue University : Lafayette, 1976) P. 420.

_____ A.A., Robbins, L.E. and Woods, R.C., "Effects of Disk Rotational Speed on RBC Efficiency," Proc. 33rd Industrial Waste Conference (Purdue University : Lafayette, 1978) P. 73'

Gillespie, W.J., Marshall, D.W. and Springer, A.M., "A Pilot Scale Evaluation of Rotating Biological Surface Treatment of Pulp and Paper Mill Wastes," Proc. 29th Industrial waste Conference (Purdue University : Lafayette, 1974) P. 1026.

Graves, B,Q., Scott David. JR., Cook, E.E. and Dabra, Y.A., "Aerobic sludge Digestion at a Trickling Filter Waste Treatment Plant", Proc. 27th Industrial Waste Conference (Purdue University : Lafayette, 1972) P. 501.

Hammer, M.J., "Rotating Biological Contactors Treating Combined Domestic and Cheese - Processing Wasterwaters", Proc. 37th Industrial Waste Conference (Purdue University : Lafayette, 1982) P. 29

Hao, O. and Hendricks, G.F., "Rotating Biological Reactors Remove Nutrients Part I Water and Sewage works 122 (October 1975) 70.

_____ and Hendricks, G.F., "Retating Biological Reactors Remove Nutrients Part II", Water and Sewage Works 122 (November 1975) 48.

Hitdelbaugh, J.A. and Miller, R.D., "Operational Problems with Rotating Biological Contactors," Jour Water Poll Control Fed. 53 (August 1981) 1283.

Hseish Chi Nan , "Variables Affecting the Performance of Biological Disch Filtration Units, "Master's Thesis, Department of Environmental Engineering, AIT. 1992

Hudson, J.W., Smith, J.P. and Pohland F.G., " Rotating Biological Contactor Treatment of Shellfish Processing Wastewaters," Proc. 31st Industrial Waste Conference (Purdue University : Lafayette, 1976) P. 193

Jebens, H.J. and Boyle, W.C., "Enhanced Phosphorus Removal in Trickling Filters," Proc. 26th Industrial Waste (Purdue University : Lafayette, 1971) P. 463.

Johnson, D.B. and Krill, W.p., " RBC Pilot Plant Treatment of Pretreated Meat Slaughtering/Processing Waste", Proc. 31st Industrial Waste Conference (Purdue University : Lafayette, 1976) P. 733

Joost, R.H., "Systemation in using the Rotating Biological Surface (RBS) Waste Treatment Process," Proc. 24th Industrial Waste Conference (Purdue University : Lafayette, 1969) P. 365.

Kehrberger, G.J. and Busch, A.W., "The Effects of Recirculation on the Performance of Trickling Filter Models," Proc. 24th Industrial Waste Conference (Purdue University : Lafayette, 1969) P. 37

Kinner, N.E. and Eighmy, T.T., "Biological Fixed-Film Systems," Jour Water Poll. Control Fed. 57 (June 1985) 526.

_____ N.E. and Eighmy, T.T., "Biological Fixed-Film System," Jour. water Poll. Control Fed. 58 (June 1986) 498.

_____ N.E. and Eighmy, T.T., "Biological Fixed-Film Systems," Jour Water Poll. Control Fed. 60 (1988) 824.

Klemetson, S.L., "Biological Filters," Jour. Water Poll. Control Fed. 49 (June 1977) 1001.

_____ and Lang, M.E., "Biological Filters," Jour Water Poll Control Fed. 51 (June 1979) 1183.

_____ Klemetson, S.L., and Lang, M.E., "Treatment of Saline Wastewaters, Using a Rotating Bilogical Contactor," Jour. Water Poll. Control Fed. 56 (December 1984) 1254'

Kornegay, B.H. and Andrews, J.F., "Kinetics of Fixed-Film Biological Reactors," Jour. Water Poll. Control Fed. 40 (November 1968) R. 460.

_____ and Andrews, J.F., "Kinetics of Fixed Film Biological Reactors," Proc. 22nd Industrial Waste Conference (Purdue University : Lafayette, 1967) P. 620.

Labella, S.a., Thaker, I.H. and Tehan, J.E., "Treatment of Winery Wastes by Aerated Lagoon, Activated Sludge and Rotating Biological Contactor", Proc. 27th Industrial Waste Conference (Purdue University : Lafayette, 1972) P. 803

Lacroix, P.G., and Blood good, D.E., "Computer Simulation of Activated Sludge Plant Operation," Jour Water Poll. Control Fed. 44 (1972) 1778.

Lue-Hing,C., Obayashi, A.W., Zeng, D.R., Washington, B. and Sawger, B.M., "Biological Nitrification of Sludge Supernatant by Rotating Disks," Jour Water Poll. Control Fed. 48 (1976 25.

Miller, R.D., Ryczak, R.S. and Ostrofsky, A., "Phosphorus Removal in a Pilot P.H. Scale Trickling Filter System by Low-level lime Addition to Raw Wastewater," Proc. 32nd Industrial Waste Conference (Purdue University : Lafayette, 1977) P. 325.

Nair, J.V., "Biologidal Disc Filtration for Tropical Waste Treatment, "master's Thesis, Department of Environmental Engineer, AIT 1971

Nishidome, Kusuda, T ., K. and Tetsuya, K., "Measuremente of Dissolved Oxygen in Attached Microbial Films of Rotating Biological Contactor by Oxygen microelectrode Water Pollution Control in Asia P. 305 (Bangkok : T. Panswad, C. Polprasert and k. Yamamoto

Omen, D.T.M. and Williamson, K.J., "Oxygen Limitation in Heterotrophic Biofilms," Proc. 31st Industrial Waste Conference (Purdue University : Lafayette, 1976) P. 267.

Patrick J. Lehman, "Start - up and Operating Characteristics of an RBC Facility in a Cold Climate," Jour. Water Poll. Control Fed. 55 (October 1983) 1233.

Pike, E.B, Carlton-smith, C.H., Evans, R.H. and Harrington, D.W., "Performance of a Rotating Biological Contactors under Field Conditions," Jour Water Poll. Control Fed. (1982) 10.

Poon Calvin P.C., Chao Ya-Len and Mikucki , W.J., "Factor Controlling Rotating Biological Contactor Performance", Jour. Water Poll Control Fed. 51 (March 1979) 601.

_____ Chin, H.K., Smith, E.D and Mikucki, W.J., "Upgrading with Rotating Biological Contactor for Ammonia Nitrogen Removal". Jour Water Poll. Control Fed. 53 (July 1981) 1158.

Reiber, S. and Stensel, S., "Biologically Enhanced Oxygen Transfer in a Fixed-Film System," Jour Water Poll Control fed. 57 (February 1985) 135.

Roesler, J.F., Smith, R. and Taft, R.A., " A Mathematical Model for a Trickling Filter," Proc. 24th Industrial Waste Conference (Purdue University : Lafayette, 1969) P. 550

Sack, W.A., Cutright, J. A., Neely, R.g., Soccorsi, P.M. and Caroll, t.a.," Operation of Air Drive Rotating Biological Contactors". Jour Water Control Fed. 58 (November 1986) 1050.

Shoon - Yuh Chang, Ju-Chang Huang and Yow - Chyun Liu, " Effects of Cd (II) and Cu (II) on a Biofilm System," ASCE of Environmental Engineering 112 (February 1986) 94.

Shun Dar Lin, Schnepper, D.H. and Evan, R.L. "A Close look at Changes of BOD 5 in an RBC System," Jour. Water Poll, Control Fed. 58 (July 1986) 757.

Steimer, B.C.G., "Take a \new Look at the RBG Process Water and Wastes Engineering (May 1979) 41. 103.

Stover, E.L. and Kincannon, D.F., "Evaluating Rotating Biological Contactor Performance', Water and Sewage Works 123 (March 1976) 88.

Switzenbaum, M.S., "Biological Filters," Jour Water Poll. Control Fed. 54 (June 1982) 592.

Tchobanoglous, G, Westewater Enigneering /Treatment : Disposal , Reused 2nd ed (New Delhi : Metcalf and Eddy Inc., 1982

Torpey, W.N., Heukelekiam, H., Kaplovsky, A.J.and Epstein, R., "Rotating Disks. with Biological Growths Prepare Wastewater for Disposal or Reuse", Jour Water Poll. control Fed. 43 (1971) 2181.

Wanner, J., Kucman, K., Ottava, V. and Grau, P., "Effect of Anaerobic Conditions on Activated Sludge Filamentous Bulking in Laboratory Systems," Water Research 21 (1987) 1541.

Weng, C.N. and Molof, A.H., "Nitrification in the Biological Fixed-Film Rotating Disk System", Jour. Water Poll. Control Fed. 46 (1974) 1674.

Welch, F,M, " Preliminary Results of a New Approach in the Aerobic Biological Treatment of Highly Concentrated Wastes," Proc. 23rd Industrial Waste Conference (Purdue University; Lafayette, 1968), P. 428.

Wilson, R.W., Murphy, K.L. and Stephenson, J.P., "Scale up in Rotating Biological Contactor Design," Jour Water Poll Control Fed. 52 (March 1980) 610.

WPCF Manual Practice No.8, ASCE Manual on Engineering Practice No. 36 Wastewater Treatment Plant Design, 2nd ed. (Lancaster : Lancaster Press Inc, 1982) P. 283.

Wu, Y.C. and Smith, E.D., " Rotating Biological Contactor System Design", ASCE of Environmental Engineering 108 (June 1982) 578.

Zeevalkink, J.A., Kelderman, P. and Boelhouwer, C., " Liquid Film Thickness in a Rotating Disc Gas-Liquid Contactor," Water Research 12 (1978) 577.

_____ J.A., Kelderman, P., Visser, D.C. and Boelhouwer, C., "Physical Mass Transfer in a Rotating Disc Gas-Liquid Contactor." Water Research 13 (1979) 913.

ภาคผนวก ก ผลการทดลอง

Result of Biodrum Analysis

28-Sep-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	519		16	3.2	74		7.25			
Day 1	Drum-1	459	11.56			82.6	11.5	7.32	2.0		
	Drum-2	361	30.44			65	11	7.44	2.7		
	Drum-3	332	36.03			85	29	7.61	3.6		
	Drum-4	258	50.29			73	16	7.62	4.0		
	Effluent-Total	207	60.12			62	ND	7.8	3.9		
	Effluent-Filter	107	79.38	3.92	10.4	6					
	Efficiency (%)	79.38		75.50	-225	91.89					

30-Sep-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	517		15	3.6	88		7.31			
Day 3	Drum-1	468	9.48			170	23.5	7.38	2.2		
	Drum-2	306	40.81			125	17.5	7.49	3.0		
	Drum-3	285	44.87			120	30.5	7.65	3.8		
	Drum-4	237	54.16			105	47.4	7.66	4.1		
	Effluent-Total	186	64.02			98	5	7.83	4.0		
	Effluent-Filter	66	87.23	2	2.2	12					
	Efficiency (%)	87.23		86.67	38.89	86.36					

02-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	468		14	3.7	82		7.35			D-1 is the most
Day 5	Drum-1	463	1.07			348	30	7.46	4.1		biofilm thick than others
	Drum-2	272	41.88			246	19	7.72	4.2		
	Drum-3	255	45.51			242	28	8.15	4.4		D-4 is the least
	Drum-4	229	51.07			200	34	7.82	4.6		
	Effluent-Total	128	72.65			184	3	8.05	4.5		
	Effluent-Filter	36	92.31	3	2	16					
	Efficiency (%)	92.31		78.57	45.95	80.49					

04-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	609		18	3.8	86		7.37			
Day 7	Drum-1	616	-1.15			362	35	7.46	3.2		
	Drum-2	340	44.17			233	22	7.83	4.3		
	Drum-3	333	45.32			248	26	7.93	4.6		
	Drum-4	330	45.81			228	21	7.93	4.6		
	Effluent-Total	161	73.56			64	10.5	8	4.2		
	Effluent-Filter	50	91.79	3.4	2	11					
	Efficiency (%)	91.79		81.11	47.37	87.21					

06-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	468		17	3	80		7.36			
Day 9	Drum-1	242	48.29			259	63	7.43	2.9		
	Drum-2	248	47.01			214	30.5	7.84	4.2		
	Drum-3	246	47.44			214	30.5	7.92	4.2		
	Drum-4	166	64.53			180	30	7.95	4.2		
	Effluent-Total	71	84.83			50	15	7.96	4.2		
	Effluent-Filter	25	94.66	5	2	7					
	Efficiency (%)	94.66			33.33	91.25					

08-Oct-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	1	Influent	440		16	3.4	76		7.32			
Day	11	Drum-1	290	34.09			238	68	7.43	3.4		
		Drum-2	287	34.77			148	18	7.78	4.3		
		Drum-3	279	36.59			134	15	7.84	4.6		
		Drum-4	215	51.14			135	16	7.88	4.9		
		Effluent-Total	70	84.09			24	4	7.92	4.8		
		Effluent-Filter	29	93.41	5	0.8	6	0				
		Efficiency (%)	93.41		68.75	76.47	92.11					

10-Oct-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	1	Influent	481		16	2.8	84		7.41			
Day	13	Drum-1	445	7.48			198	41	7.56	3.8		
		Drum-2	281	41.58			176	12	7.88	4.9		
		Drum-3	274	43.04			180	13	7.81	5.0		
		Drum-4	197	59.04			156	11	7.87	5.2		
		Effluent-Total	72	85.03			24	1.4	8.00	5.2		
		Effluent-Filter	32	93.35	2	1	10	0				
		Efficiency (%)	93.35		87.50	64.29	88.10					

12-Oct-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	1	Influent	440		15	3	78		7.30			
Day	15	Drum-1	276	37.27			284	118	7.45	3.7		
		Drum-2	256	41.82			201	85	7.80	4.6		
		Drum-3	127	71.14			196	60	7.92	4.6		
		Drum-4	218	50.45			154	61	7.96	4.8		
		Effluent-Total	65	85.23			49	35	7.96	4.8		
		Effluent-Filter	48	89.09	2	0.9	9					
		Efficiency (%)	89.09		86.67	70.00						

14-Oct-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	1	Influent	452		17	3	80		7.10			D-1 has very good biofilm
Day	17	Drum-1	210	53.54			168	102	7.34	2.5		
		Drum-2	339	25.00			210	84	7.60	4.2		
		Drum-3	221	51.11			174	53	7.78	5.0		
		Drum-4	309	31.64			150	72	7.80	5.1		
		Effluent-Total	56	87.61			43	31	7.97	5.0		
		Effluent-Filter	41	90.93	1.4	0.5	7					
		Efficiency (%)	90.93		91.76	83.33						

16-Oct-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	1	Influent	415		16	3	74		7.08			
Day	19	Drum-1	455	-9.64			236	140	7.18	2.5		
		Drum-2	250	39.76			131	88	7.36	4.2		
		Drum-3	230	44.58			99	50	7.65	4.6		
		Drum-4	392	5.54			97	58	7.79	5.2		
		Effluent-Total	51	87.71			19	20	7.82	5.2		
		Effluent-Filter	30	92.77	3	0.8	4					
		Efficiency (%)	92.7		81.25	73.33						

18-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	571		29	2.8	90		6.96	-		
Day 21	Drum-1	925	-62.00			775	250	7.00	2.5		
	Drum-2	420	26.44			184	81	7.22	4.0		
	Drum-3	167	70.75			99	25	7.64	4.8		
	Drum-4	104	81.79			98	26	7.74	4.9		
	Effluent-Total	49	91.42			15	3	7.77	4.9		
	Effluent-Filter	24	95.80	2	0.8	7		-			
	Efficiency (%)	95.80		93.10	71.43	92.22					

20-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	448		16	3.2	70	-	6.98	5.1		
Day 23	Drum-1	889	-98.4			510	648	7.04	1.6		
	Drum-2	203	54.69			296	113	7.38	3.3		
	Drum-3	117	73.88			129	35	7.52	3.7		
	Drum-4	191	57.37			113	48	7.57	4.2		
	Effluent-Total	43	90.40			18	5	7.65	4.2		
	Effluent-Filter	21	95.31	1	1.9	5	-	-			
	Efficiency (%)	95.31		93.75	40.63	92.86					

22-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	451		18	3	82	-	7.24			
Day 25	Drum-1	818	-81.4			642	680	7.32	1.8		
	Drum-2	148	67.18			48	29	7.50	3.6		
	Drum-3	102	77.38			33	20	7.59	4.2		
	Drum-4	124	72.51			32	10	7.62	4.6		
	Effluent-Total	52	88.47			26	2	7.68	4.6		
	Effluent-Filter	25	94.46	3	1.4	5	-	-			
	Efficiency (%)	94.46		83.33	53.33	93.90					

24-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	533		18	2.6	76	-	6.91	-		
Day 27	Drum-1	496	6.94			151	230	6.97	1.3		
	Drum-2	23	95.68			22	13	7.38	3.6		
	Drum-3	91	82.93			16	8	7.45	3.8		
	Drum-4	151	71.67			14	9	7.47	4.0		
	Effluent-Total	70	86.87			8	1.7	7.51	4.0		
	Effluent-Filter	30	94.37	3	1	3	-	-			
	Efficiency (%)	94.37		83.33	61.54	96.05					

26-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	542		20	3.2	86	-	7.20			
Day 29	Drum-1	943	-74.0			604	430	7.35	1.5		
	Drum-2	107	80.26			72	27	7.87	3.8		
	Drum-3	130	76.01			35	12	7.92	3.8		
	Drum-4	67	87.64			13	3.5	7.96	4.0		
	Effluent-Total	56	89.67			10	0.9	7.97	4.0		
	Effluent-Filter	29	94.65	1.8	1.4	5	-	-			
	Efficiency (%)	94.65		91.00	56.25	94.19					

28-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	430		17	3	72	-	6.86			
Day 31	Drum-1	876	-103.7			360	480	6.99	0.8		
	Drum-2	76	82.33			75	80	7.07	3.4		
	Drum-3	124	71.16			42	50	7.60	3.5		
	Drum-4	369	14.19			76	100	7.70	3.9		
	Effluent-Total	64	85.12			21	10	7.76	4.0		
	Effluent-Filter	28	93.49	1.4	1.1	4	-	-			
	Efficiency (%)	93.49		91.76	63.33	94.44					

30-Oct-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 1	Influent	553		24	3.7	82	-	7.03		362	
Day 33	Drum-1	930	-68.2			605	694	7.16	1.2		
	Drum-2	94	83.00			42	28	7.59	3.6		
	Drum-3	73	86.80			24	22	7.60	3.8		
	Drum-4	100	81.92			52	26	7.61	3.8		
	Effluent-Total	87	84.27			11	2	7.72	4.1		
	Effluent-Filter	31	94.39	4	1.3	3	-	-		10	
	Efficiency (%)	94.39		83.33	64.86	96.34				97.24	

01-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	476		18	3	76	-	6.71			Change Hydraulic Loading
Day 35	Drum-1	766	-60.9			241	200	6.87	0.8		to 50 l/m2.d
	Drum-2	515	-8.19			85	85	7.06	2.8		
	Drum-3	605	-27.10			111	150	7.18	3.2		Film at Drum 1 going to
	Drum-4	820	-72.3			266	200	7.28	3.6		be black
	Effluent-Total	190	60.08			67	80	7.30	3.8		
	Effluent-Filter	120	74.79	5	1.5	6	-	-	-		
	Efficiency (%)	74.79		72.22	50.00	92.11					

03-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	584		26	3.4	88	-	6.70			Film at Drum 2 going to be
Day 37	Drum-1	916	-56.8			627	550	6.74	0.5		black as Drum 1
	Drum-2	282	51.71			132	150	6.97	1.2		
	Drum-3	241	58.73			132	125	7.20	3.0		
	Drum-4	483	17.29			115	125	7.32	3.7		
	Effluent-Total	136	76.71			61	80	7.37	3.8		
	Effluent-Filter	58	90.07	6	1.5	6	-	-			
	Efficiency (%)	90.07		76.92	55.88	93.18					

05-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	678		21	3.5	92	-	7.02			
Day 39	Drum-1	1030	-51.9			660	650	7.04	0.5		
	Drum-2	600	11.50			568	350	7.51	1.2		
	Drum-3	240	64.60			136	114	7.71	2.4		
	Drum-4	420	38.05			139	120	7.76	3.8		
	Effluent-Total	153	77.43			50	40	7.83	4.0		
	Effluent-Filter	89	86.87	8	1.2	6	-	-			
	Efficiency (%)	86.87		61.90	65.71	93.48					

07-Nov-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	2	Influent	640		18	3.2	78	-	7.00			
Day	41	Drum-1	936	-46.25			406	450	7.08	0.5		
		Drum-2	863	-34.84			290	200	7.49	1.2		
		Drum-3	696	-8.75			198	150	7.81	3.0		
		Drum-4	566	11.56			98	130	7.83	4.5		
		Effluent-Total	117	81.72			55	50	7.91	4.7		
		Effluent-Filter	53	91.72	4	1.4	8	-	-			
		Efficiency (%)	91.72		77.78	56.25	89.74					

09-Nov-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	2	Influent	608		18	2.8	96	-	6.90			Film at Drum 1 sloughing
Day	43	Drum-1	1167	-91.9			742	500	7.01	0.4		
		Drum-2	530	12.83			155	180	7.75	1.3		
		Drum-3	266	56.25			189	150	7.85	2.8		
		Drum-4	365	39.97			101	150	7.87	3.9		
		Effluent-Total	190	68.75			43	80	7.99	4.0		
		Effluent-Filter	55	90.95	4	0.9	8	-	-			
		Efficiency (%)	90.95		77.78	67.86	91.67					

11-Nov-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	2	Influent	564		18	3	100	-	7.08			Film at Drum 1 & Drum 2
Day	45	Drum-1	1046	-85.46			595	700	7.19	0.4		sloughing,reason to high
		Drum-2	927	-64.4			490	650	7.73	1.5		COD & SS
		Drum-3	849	-50.53			805	600	7.74	2.2		
		Drum-4	585	-3.72			738	500	7.77	3.4		
		Effluent-Total	464	17.73			302	400	7.88	3.5		
		Effluent-Filter	93	83.51	5	0.8	31	-	-			
		Efficiency (%)	83.51		72.22	73.33	69.00					

13-Nov-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	2	Influent	497		21	3	100	-	7.10			
Day	47	Drum-1	980	-97.18			492	500	7.39	2.4		
		Drum-2	623	-25.35			564	360	7.66	2.8		
		Drum-3	707	-42.25			498	360	7.71	2.9		
		Drum-4	565	-13.68			558	380	7.75	4.1		
		Effluent-Total	483	2.82			398	260	7.86	4.1		
		Effluent-Filter	52	89.54	11	1.2	30	-	-			
		Efficiency (%)	89.54		47.62	60.00	70.00					

15-Nov-93

		Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run	2	Influent	527		20	3.4	86	-	7.27			
Day	49	Drum-1	760	-44.21			520	170	7.60	2.6		
		Drum-2	523	0.76			400	198	7.70	3.6		
		Drum-3	513	2.66			344	140	7.85	3.7		
		Drum-4	387	26.57			292	130	7.88	4.0		
		Effluent-Total	267	49.34			194	81	7.98	4.3		
		Effluent-Filter	46	91.27	7	1	14	-	-			
		Efficiency (%)	91.27		65.00	70.59	83.72					

17-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	527		22	3.2	84	-	7.18			
Day 51	Drum-1	929	-76.28			123	130	7.29	2.3		
	Drum-2	277	47.44			115	47	7.78	3.7		
	Drum-3	217	58.82			190	32	7.82	3.6		
	Drum-4	302	42.69			151	40	7.88	4.4		
	Effluent-Total	155	70.59			294	25	7.93	4.6		
	Effluent-Filter	31	94.12	8	1.2	14	-	-			
	Efficiency (%)	94.12		63.64	62.50	83.33					

19-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	566		22	3.4	88	-	7.19			
Day 53	Drum-1	445	21.38			482	110	7.35	1.0		
	Drum-2	361	36.22			190	66	7.79	3.9		
	Drum-3	232	59.01			135	42	7.84	4.4		
	Drum-4	206	63.60			147	43	7.89	5.0		
	Effluent-Total	255	54.95			145	41	7.93	5.2		
	Effluent-Filter	52	90.81	10	1.3	18	-	-			
	Efficiency (%)	90.81		54.55	61.76	79.55					

21-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	570		20	3	82	-	7.29			
Day 55	Drum-1	955	-67.54			934	195	7.36	1.0		
	Drum-2	488	14.39			291	160	7.61	1.0		
	Drum-3	441	22.63			226	120	7.76	3.5		
	Drum-4	364	36.14			239	115	7.77	4.3		
	Effluent-Total	287	49.65			185	80	7.81	4.4		
	Effluent-Filter	37	93.51	4	1.4	16	-	-			
	Efficiency (%)	93.51		80.00	53.33	80.49					

23-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	483		16	3	80		7.18			
Day 57	Drum-1	490	-1.45			276	60	7.42	1.6		
	Drum-2	306	36.65			144	58	7.70	3.4		
	Drum-3	253	47.62			208	48	7.77	3.6		
	Drum-4	294	39.13			215	56	7.79	4.0		
	Effluent-Total	263	45.55			169	37	7.85	4.1		
	Effluent-Filter	35	92.75	3	1	12					
	Efficiency (%)	92.75		81.25	66.67	85.00					

25-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 2	Influent	514		17	3.1	90		7.17		340	
Day 59	Drum-1	518	-0.78			317	152	7.36	1.4		
	Drum-2	360	29.96			342	120	7.69	3.3		
	Drum-3	335	34.82			230	110	7.75	3.4		
	Drum-4	329	35.99			292	135	7.74	4.2		
	Effluent-Total	232	54.86			186	82	7.93	4.3		
	Effluent-Filter	36	93.00	3	1.2	14				11	
	Efficiency (%)	93.00		82.35	61.29	84.44					

27-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	540		15	3	98		7.14			Change Hydraulic Loading
Day 61	Drum-1	378	30.00			270	80	7.25	0.8		to 75 l/m2.d
	Drum-2	270	50.00			175	70	7.64	3.0		
	Drum-3	293	45.74			147	43	7.74	3.2		Film at Drum 1 going to be
	Drum-4	199	63.15			180	42	7.78	3.9		yellow (light brown)
	Effluent-Total	154	71.48			102	25	7.81	4.0		
	Effluent-Filter	30	94.44	4	1.6	26					
	Efficiency (%)	94.44		73.33	46.67	73.47					

29-Nov-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	525		18	3.1	75		7.17			Film at Drum 1 going to be
Day 63	Drum-1	863	-64.38			326	170	7.25	1.3		light brown with black spot
	Drum-2	1108	-111.0			343	280	7.58	2.7		
	Drum-3	423	19.43			251	200	7.70	3.0		
	Drum-4	535	-1.90			309	250	7.76	4.0		
	Effluent-Total	499	4.95			200	200	7.75	4.1		
	Effluent-Filter	103	80.38	5	1	19					
	Efficiency (%)	80.38		72.22	67.74	74.67					

01-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	585		17	3.4	78		7.18			
Day 65	Drum-1	1200	-105.1			362	240	7.26	0.7		
	Drum-2	625	-6.84			339	250	7.57	3.7		
	Drum-3	375	35.90			219	170	7.66	4.3		
	Drum-4	488	16.58			252	210	7.71	4.4		
	Effluent-Total	403	31.11			169	140	7.71	4.6		
	Effluent-Filter	68	88.38	6	1.4	22					
	Efficiency (%)	88.38		64.71	58.82	71.79					

03-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	471		16	3.5	76		7.20			
Day 67	Drum-1	507	-7.64			250	260	7.27	0.9		
	Drum-2	544	-15.50			413	250	7.61	2.8		
	Drum-3	635	-34.82			339	240	7.72	3.2		
	Drum-4	823	-74.73			416	240	7.74	4.0		
	Effluent-Total	433	8.07			320	145	7.76	4.0		
	Effluent-Filter	75	84.08	6	1.3	31					
	Efficiency (%)	84.08		62.50	62.86	59.21					

05-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	521		17	3.5	61		7.22			
Day 69	Drum-1	1074	-106.1			320	120	7.27	0.6		
	Drum-2	544	-4.41			214	160	7.6	2.3		
	Drum-3	606	-16.31			187	190	7.7	2.9		
	Drum-4	544	-4.41			248	200	7.74	3.5		
	Effluent-Total	376	27.83			192	150	7.78	3.6		
	Effluent-Filter	69	86.76	4	1.1	20					
	Efficiency (%)	86.76		76.47	68.57	67.21					

07-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	494		16	3.7	83		7.18			
Day 71	Drum-1	486	1.62			244	115	7.27	0.8		
	Drum-2	396	19.84			203	108	7.58	2.9		
	Drum-3	291	41.09			158	88	7.73	3.5		
	Drum-4	257	47.98			180	96	7.79	3.8		
	Effluent-Total	230	53.44			141	80	7.85	4.0		
	Effluent-Filter	46	90.69	2.8	1.9	12					
	Efficiency (%)	90.69		82.50	48.65	85.54					

09-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	466		20	3	93		7.20			
Day 73	Drum-1	604	-29.61			404	150	7.23	0.3		
	Drum-2	309	33.69			219	120	7.61	3.0		
	Drum-3	222	52.36			146	100	7.72	3.8		
	Drum-4	235	49.57			194	110	7.75	4.0		
	Effluent-Total	159	65.88			147	88	7.81	4.2		
	Effluent-Filter	39	91.63	3	1.2	9					
	Efficiency (%)	91.63		85.00	60.00	90.32					

11-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	460		17	3.3	86		7.16			D-1 is light brown
Day 75	Drum-1	416	9.57			216	110	7.22	0.3		with dark spot
	Drum-2	284	38.26			159	108	7.58	3.2		
	Drum-3	338	26.52			171	100	7.67	3.9		D-2, D-3, D-4 have
	Drum-4	293	36.30			143	100	7.78	4.3		scatter dark spot
	Effluent-Total	219	52.39			124	88	7.82	4.3		
	Effluent-Filter	36	92.17	4	1.6	10					
	Efficiency (%)	92.17		76.47	51.52	88.37					

13-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	549		17	3.7	70		7.10			
Day 77	Drum-1	735	-33.88			318	70	7.20	0.5		
	Drum-2	368	32.97			208	78	7.45	3.3		
	Drum-3	390	28.96			185	64	7.58	4.0		
	Drum-4	518	5.65			204	78	7.70	4.6		
	Effluent-Total	192	65.03			90	62	7.91	4.6		
	Effluent-Filter	41	92.53	4	1.8	7					
	Efficiency (%)	92.53		76.47	51.35	90.00					

15-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 3	Influent	494		16	3.5	78		7.15		330	
Day 79	Drum-1	1051	-112.75			528	195	7.17	0.6		
	Drum-2	812	-64.4			216	158	7.41	2.9		
	Drum-3	392	20.65			183	150	7.66	3.9		
	Drum-4	360	27.13			182	155	7.69	4.0		
	Effluent-Total	240	51.42			152	115	7.71	4.0		
	Effluent-Filter	39	92.11	3	1.6	9				11.5	
	Efficiency (%)	92.11		81.25	54.29	88.46				96.52	

17-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	573		20	5	75		7.09			Change Hydraulic Loading
Day 81	Drum-1	505	11.87			326	210	7.14	0.5		to be 100 l/m2.d
	Drum-2	428	25.31			463	250	7.46	2.0		
	Drum-3	304	46.95			259	155	7.67	3.7		
	Drum-4	324	43.46			214	130	7.70	3.9		
	Effluent-Total	392	31.59			182	115	7.72	4.2		Film at Drum 1 thicker
	Effluent-Filter	96	83.25	5	2.5	17		7.65	3.6		
	Efficiency (%)	83.25		75.00	50.00	77.33					

19-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	533		17	4.4	68		7.14			Film at D-1 going
Day 83	Drum-1	1135	-112.95			252	135	7.22	0.6		to be black
	Drum-2	965	-81.05			248	170	7.4	2.2		
	Drum-3	352	33.96			150	110	7.56	3.4		
	Drum-4	733	-37.52			226	120	7.64	3.9		
	Effluent-Total	416	21.95			124	75	7.69	3.9		
	Effluent-Filter	60	88.74	4	2.5	25		7.62	3.5		
	Efficiency (%)	88.74		76.47	43.18	63.24					

21-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	535		20	4.5	64		7.06		355	Film at D-1 black
Day 85	Drum-1	448	16.26			250	84	7.20	0.7		D-2 going to be black
	Drum-2	716	-33.83			342	130	7.35	2.0		
	Drum-3	461	13.83			294	115	7.46	3.0		
	Drum-4	417	22.06			184	78	7.59	4.0		
	Effluent-Total	140	73.83			162	60	7.67	4.0		
	Effluent-Filter	35	93.46	3.8	2.1	28		7.59	3.8	12	
	Efficiency (%)	93.46		81.00	53.33	56.25				96.62	

23-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	462		19	4.3	70		7.04			Film at D-1 & D-2 black
Day 87	Drum-1	763	-65.15			398	160	7.19	0.6		
	Drum-2	802	-73.59			282	170	7.41	2.0		
	Drum-3	606	-31.17			234	125	7.61	3.7		
	Drum-4	645	-39.61			254	100	7.68	4.1		
	Effluent-Total	472	-2.16			190	82	7.75	4.2		
	Effluent-Filter	41	91.13	4	1.8	18		7.61	3.9		
	Efficiency (%)	91.13		78.95	58.14	74.29					

25-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	484		18	4.9	62		7.05		323	
Day 89	Drum-1	665	-37.40			498	145	7.19	0.4		
	Drum-2	881	-82.02			456	220	7.34	1.7		Film at Drum1 & Drum 2
	Drum-3	900	-85.95			464	270	7.49	2.8		sloughing
	Drum-4	987	-103.9			396	250	7.54	2.8		
	Effluent-Total	983	-103.1			276	170	7.62	3.4		
	Effluent-Filter	41	91.53	3.6	2.3	20		7.31	2.2	12	
	Efficiency (%)	91.53		80.00	53.06	75.61				96.28	

27-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	520		19	4.9	78		7.10			Film at Drum1 & Drum 2
Day 91	Drum-1	695	-33.65			536	120	7.14	0.2		sloughing
	Drum-2	735	-41.35			442	145	7.32	1.2		
	Drum-3	444	14.62			252	120	7.52	3.0		
	Drum-4	409	21.35			200	81	7.59	3.7		
	Effluent-Total	218	58.08			156	70	7.63	3.7		
	Effluent-Filter	43	91.73	3.2	2.3	16		7.32	3.3		
	Efficiency (%)	91.73		83.16	53.06	79.49					

29-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	545		17	4.7	76		7.13		333	
Day 93	Drum-1	680	-24.77			444	145	7.17	0.3		Film at Drum 4 is the most
	Drum-2	885	-62.39			312	180	7.32	1.5		thick
	Drum-3	537	1.47			260	150	7.52	3.0		
	Drum-4	802	-47.16			340	140	7.61	3.8		
	Effluent-Total	553	-1.47			208	98	7.70	3.8		
	Effluent-Filter	41	92.48	3.6	2.3	16		7.45	3.4	12	
	Efficiency (%)	92.48		78.82	51.06	76.32				96.40	

31-Dec-93

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 4	Influent	496		16	4.4	72		7.12			
Day 95	Drum-1	592	-19.35			477	160	7.16	0.3		
	Drum-2	638	-28.63			386	140	7.33	1.4		
	Drum-3	401	19.15			243	130	7.51	3.3		
	Drum-4	438	11.69			187	110	7.60	3.7		
	Effluent-Total	365	26.41			146	76	7.68	3.8		
	Effluent-Filter	41	91.73	3.5	1.9	14		7.28	3.4		
	Efficiency (%)	91.73		78.13	56.82	80.56					

02-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1137		35	7.7	160		7.15		642	
Day 97	Drum-1	965	15.13			694	210	7.67	2.6		COD influent = 1000 mg/l
	Drum-2	1221	-7.39			864	205	7.8	3.0		Change Hydraulic Loading
	Drum-3	1024	9.94			782	160	7.85	3.2		to be 25 l/m2.d
	Drum-4	961	15.48			866	200	7.79	2.7		Organic Loading=25g/m2.
	Effluent-Total	804	29.29			846	170	7.73	2.5		
	Effluent-Filter	72	93.67	9	2.4	30		7.63	2.4	24	
	Efficiency (%)	93.67		74.29	68.83	81.25				96.26	

04-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1064		35	7.4	152		7.11			
Day 99	Drum-1	481	54.79			264	148	7.70	2.4		
	Drum-2	399	62.50			368	120	7.86	3.8		
	Drum-3	265	75.09			322	110	7.87	4.1		
	Drum-4	465	56.30			334	110	7.80	4.4		
	Effluent-Total	296	72.18			280	120	7.76	4.4		
	Effluent-Filter	71	93.33	4.7	1.3	38		7.65	3.8		
	Efficiency (%)	93.33		86.57	82.43	75.00					

06-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1111		36	8.3	164		7.20			
Day 101	Drum-1	407	63.37			314	66	7.57	2.6		
	Drum-2	436	60.76			284	52	7.61	4.2		
	Drum-3	468	57.88			260	47	7.83	4.2		
	Drum-4	475	57.25			254	45	7.92	4.4		
	Effluent-Total	412	62.92			212	43	7.89	4.2		
	Effluent-Filter	67	93.97	4.9	1.6	48		7.82	3.9		
	Efficiency (%)	93.97		87.11	80.72	70.73					

08-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1032		34	7.2	156		7.18		670	
Day 103	Drum-1	780	24.42			614	180	7.53	1.4		
	Drum-2	678	34.30			496	130	7.79	3.0		
	Drum-3	544	47.29			398	105	7.85	3.4		
	Drum-4	564	45.35			542	102	7.98	4.0		
	Effluent-Total	315	69.48			322	90	8.03	4.0		
	Effluent-Filter	67	93.51	4.2	1.6	26		7.73	3.6	24	
	Efficiency (%)	93.51		87.65	77.78	83.33				96.42	

10-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	946		32	6.7	150		7.17		615	
Day 105	Drum-1	725	23.36			506	93	7.61	2.1		
	Drum-2	520	45.03			488	84	7.74	2.6		
	Drum-3	772	18.39			488	80	7.85	2.8		
	Drum-4	953	-0.74			510	74	7.96	3.9		
	Effluent-Total	697	26.32			454	84	7.99	4.0		
	Effluent-Filter	96	89.85	7.3	2.1	39		7.75	3.0	42	
	Efficiency (%)	89.85		77.19	68.66	74.00				93.17	

12-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1147		37	7.2	146		7.25			
Day 107	Drum-1	735	35.92			536	135	7.66	1.4		
	Drum-2	751	34.52			396	110	7.87	3.0		
	Drum-3	743	35.22			310	105	7.95	3.4		
	Drum-4	839	26.85			330	98	8.00	3.9		
	Effluent-Total	511	55.45			214	78	8.05	4.0		
	Effluent-Filter	65	94.33	4.3	1.2	24		7.83	3.2		
	Efficiency (%)	94.33		88.38	83.33	83.56					

14-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	1045		38.5	7.6	140		7.19	1.6	695	
Day 109	Drum-1	847	18.95			532	122	7.61	1.2		
	Drum-2	759	27.37			344	80	7.82	2.8		
	Drum-3	815	22.01			392	85	7.99	3.8		
	Drum-4	791	24.31			358	86	7.98	4.0		
	Effluent-Total	366	64.98			262	64	7.98	4.2		
	Effluent-Filter	48	95.41	6.7	2.8	20		7.84	3.3	15	
	Efficiency (%)	95.41		82.60	63.16	85.71				97.84	

16-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	954		34	7.5	160		7.16		636	
Day 111	Drum-1	791	17.09			486	70	7.64	1.3		
	Drum-2	652	31.66			252	49	7.83	2.9		
	Drum-3	716	24.95			320	50	7.89	3.7		
	Drum-4	538	43.61			248	48	7.91	4.1		
	Effluent-Total	303	68.24			184	25	7.98	4.2		
	Effluent-Filter	45	95.28	5.2	2.4	14		7.82	3.5	14	
	Efficiency (%)	95.28		84.71	68.00	91.25				97.81	

18-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 5	Influent	967		36	6.8	162		7.15		665	
Day 113	Drum-1	823	14.89			454	100	7.60	1.4		
	Drum-2	598	38.16			288	70	7.79	2.8		
	Drum-3	626	35.26			342	72	7.88	3.6		
	Drum-4	475	50.88			260	68	7.92	4.0		
	Effluent-Total	321	66.80			176	40	7.97	4.1		
	Effluent-Filter	46	95.24	4.8	2.3	16		7.85	3.4	14	
	Efficiency (%)	95.24		86.67	66.18	90.12				97.89	

20-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	959		35	7.9	154		7.11			
Day 115	Drum-1	440	54.12			408	92	7.44	1.6		
	Drum-2	422	56.00			336	80	7.82	3.4		
	Drum-3	546	43.07			302	80	7.99	4.3		
	Drum-4	703	26.69			328	90	7.98	3.9		
	Effluent-Total	557	41.92			324	72	7.98	4.0		
	Effluent-Filter	86	91.03	4.8	2.5	26		7.86	3.8		
	Efficiency (%)	91.03		86.29	68.35	83.12					

22-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	984		33	7.8	156		7.14		640	
Day 117	Drum-1	472	52.03			388	220	7.50	1.6		
	Drum-2	450	54.27			336	195	7.79	3.2		
	Drum-3	440	55.28			278	175	7.9	4.4		
	Drum-4	325	66.97			266	160	7.91	4.3		
	Effluent-Total	442	55.08			276	160	7.99	4.0		
	Effluent-Filter	82	91.67	5	3.2	24		7.84	3.6	14	
	Efficiency (%)	91.67		84.65	58.97	84.61				97.81	

24-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	1127		37	7.6	168		7.28			
Day 119	Drum-1	771	31.59			434	180	7.42	0.2		
	Drum-2	883	21.65			344	220	7.58	2.9		
	Drum-3	591	47.56			360	235	7.75	3.4		
	Drum-4	595	47.20			430	250	7.79	4		
	Effluent-Total	983	12.78			322	220	7.84	4.1		
	Effluent-Filter	48	95.74	3.6	2.5	20		7.79	3.6		
	Efficiency (%)	95.74		90.27	67.11	88.10					

26-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	947		29	6.9	164	-	7.26		674	
Day 121	Drum-1	822	13.20			514	300	7.52	0.3		
	Drum-2	667	29.57			414	275	7.76	2.5		
	Drum-3	647	31.68			428	300	8.01	3.5		
	Drum-4	739	21.96			442	295	8.02	3.8		
	Effluent-Total	667	29.57			404	260	8.03	3.7		
	Effluent-Filter	49	94.83	3.2	2.4	16	-	7.89	3.5	15	
	Efficiency (%)	94.83		88.97	65.22	90.24				97.77	

28-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	938		34	6.6	156	-	7.22			
Day 123	Drum-1	762	18.76			420	220	7.54	0.6		
	Drum-2	804	14.29			354	200	7.69	2.6		
	Drum-3	310	66.95			242	175	7.95	3.6		
	Drum-4	556	40.72			278	160	7.87	3.3		
	Effluent-Total	596	36.46			176	120	7.87	4.0		
	Effluent-Filter	52	94.46	5	2.1	14	-	7.92	3.7		
	Efficiency (%)	94.46		85.29	68.18	91.03					

30-Jan-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	1001		43	8.4	152	-	7.24		790	
Day 125	Drum-1	731	26.97			384	175	7.56	0.4		
	Drum-2	512	48.85			244	140	7.78	2.0		
	Drum-3	328	67.23			212	125	7.96	3.0		
	Drum-4	620	38.06			216	120	7.92	3.2		
	Effluent-Total	346	65.43			154	85	8.02	3.6		
	Effluent-Filter	49	95.10	7	3.8	18	-	7.79	3.8	15	
	Efficiency (%)	95.10		83.72	54.76	88.16				98.10	

01-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 6	Influent	945		39	8.2	158	-	7.20			
Day 127	Drum-1	922	7.89			362	45	7.51	0.8		
	Drum-2	532	46.85			222	39	7.73	2.8		
	Drum-3	581	41.96			286	30	7.80	3.7		
	Drum-4	310	69.03			290	23	7.86	3.6		
	Effluent-Total	369	63.14			200	16	7.90	3.5		
	Effluent-Filter	50	95.00	9	4.1	22	-	7.83	3.0		
	Efficiency (%)	94.71		76.92	50.00	86.08					

03-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1125		37	7.2	146	-	7.12		704	Film at D-1 black
Day 129	Drum-1	826	26.58			370	155	7.35	0.2		
	Drum-2	1057	6.04			752	200	7.52	0.8		
	Drum-3	707	37.16			716	155	7.67	1.8		
	Drum-4	584	48.09			726	140	7.72	2.6		
	Effluent-Total	882	21.60			572	170	7.82	2.4		
	Effluent-Filter	56	95.02	5	4	28	-	7.68	2.8	17	
	Efficiency (%)	95.02		86.49	44.44	80.82				97.59	

05-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1096		36	6.9	154	–	7.21			
Day 131	Drum-1	822	25.00			508	190	7.56	0.2		Film at D-1 & D-2 black
	Drum-2	798	27.19			552	280	7.71	0.2		
	Drum-3	862	21.35			606	300	7.82	0.3		
	Drum-4	1005	8.30			662	340	7.89	0.4		
	Effluent-Total	973	11.22			436	350	7.97	0.5		
	Effluent-Filter	326	70.26	17	2.6	94	–	7.78	0.3		
	Efficiency (%)	70.26		52.78	62.32	38.96					

07-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1144		33	7.8	176	–	7.15			
Day 133	Drum-1	671	41.35			396	275	7.31	0.2		
	Drum-2	1092	4.55			360	360	7.49	0.3		
	Drum-3	639	44.14			340	410	7.6	1.2		Film at D-3 black
	Drum-4	703	38.55			354	430	7.71	1.9		
	Effluent-Total	544	52.45			250	450	7.76	2.0		
	Effluent-Filter	115	89.95	7	3.1	30	–	7.53	1.8		
	Efficiency (%)	89.95		78.79	60.26	82.95					

09-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	942		39	7.4	160	–	7.21		625	
Day 135	Drum-1	535	43.21			332	175	7.42	0.2		Film at D-1, D-2 &
	Drum-2	606	35.67			552	360	7.60	0.4		D-3 black
	Drum-3	645	31.53			192	170	7.77	2.0		
	Drum-4	287	69.53			256	170	7.97	3.2		
	Effluent-Total	215	77.18			168	175	7.99	3.2		
	Effluent-Filter	76	91.93	10.4	4.1	16	–	7.90	3.1	21	
	Efficiency (%)	91.93		73.33	44.59	90.00				96.64	

11-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	957		34	7.5	166	–	7.29			Film at D-1 & D-3 black
Day 137	Drum-1	482	49.63			220	125	7.4	0.3		
	Drum-2	490	48.80			274	185	7.6	0.6		
	Drum-3	565	40.96			240	160	7.71	2.0		
	Drum-4	310	67.61			200	155	7.94	3.1		
	Effluent-Total	251	73.77			178	180	7.97	3.2		
	Effluent-Filter	64	93.31	9	3.6	20	–	7.88	2.9		
	Efficiency (%)	93.31		73.53	52.00	87.95					

13-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1109		35	7.1	156	–	7.23	1.5	621	
Day 139	Drum-1	399	64.02			192	72	7.44	0.4		
	Drum-2	332	70.06			324	130	7.63	0.7		
	Drum-3	507	54.28			224	140	7.74	2.1		
	Drum-4	346	68.80			196	125	7.95	3.3		
	Effluent-Total	291	73.76			148	120	7.96	3.3		
	Effluent-Filter	59	94.68	8	3.7	14	–	7.90	2.8	17	
	Efficiency (%)	94.68		77.14	47.89	91.03				97.26	

15-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1045		36	6.9	162	-	7.27			
Day 141	Drum-1	633	39.43			336	140	7.46	0.3		
	Drum-2	566	45.84			412	300	7.64	0.8		
	Drum-3	484	53.68			380	250	7.85	2.0		
	Drum-4	535	48.80			364	250	7.97	3.1		
	Effluent-Total	515	50.72			288	280	8.03	3.2		
	Effluent-Filter	62	94.07	8.4	3	22	-	7.94	2.9		
	Efficiency (%)	94.07		76.67	56.52	86.42					

17-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 7	Influent	1140		33	7.2	170	-	7.10		616	
Day 143	Drum-1	582	48.95			436	175	7.30	0.2		
	Drum-2	550	51.75			472	270	7.56	1.0		
	Drum-3	391	65.70			372	280	7.72	1.9		
	Drum-4	519	54.47			292	255	7.85	2.6		
	Effluent-Total	606	46.84			308	260	7.91	2.8		
	Effluent-Filter	61	94.65	5.9	2.7	18	-	7.77	2.7	17	
	Efficiency (%)	94.65		82.12	62.50	89.41				97.24	

19-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	1106		33.5	6.9	172	-	7.22			
Day 145	Drum-1	868	21.52			716	350	7.38	0.3		
	Drum-2	752	32.01			868	250	7.50	0.3		
	Drum-3	748	32.37			924	400	7.46	0.4		
	Drum-4	1075	2.80			904	448	7.52	0.6		
	Effluent-Total	277	74.95			780	280	7.82	0.8		
	Effluent-Filter	201	81.83	13	3	76	-	7.51	0.7		
	Efficiency (%)	81.83		61.19	56.52	55.81					

21-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	1045		35	7.3	152	-	7.19		735	
Day 147	Drum-1	1136	-8.71			600	80	7.40	0.3		
	Drum-2	1274	-21.91			728	130	7.46	0.5		
	Drum-3	1154	-10.43			528	120	7.49	0.8		
	Drum-4	816	21.91			464	125	7.65	2.0		
	Effluent-Total	613	41.34			356	110	7.80	2.2		
	Effluent-Filter	209	80.00	13.4	3.2	62	-	7.60	1.8	85	
	Efficiency (%)	80.00		61.71	56.16	59.21				88.44	

23-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	951		36	7.2	170	-	7.01			
Day 149	Drum-1	593	37.64			220	58	7.22	0.3		
	Drum-2	448	52.89			384	85	7.46	0.4		
	Drum-3	625	34.26			256	110	7.71	1.6		
	Drum-4	468	50.79			292	130	7.80	2.2		
	Effluent-Total	368	61.30			248	170	7.86	3.6		
	Effluent-Filter	100	89.48	7	3.4	16	-	7.69	2.8		
	Efficiency (%)	89.48		80.56	52.78	90.59					

25-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	963		46	7.8	158	–	7.10			
Day 151	Drum-1	1361	-41.33			336	120	7.26	0.2		
	Drum-2	1616	-67.81			424	200	7.46	0.3		
	Drum-3	720	25.23			356	150	7.69	0.6		
	Drum-4	489	49.22			316	175	7.66	1.7		
	Effluent-Total	299	68.95			296	210	7.68	2.9		
	Effluent-Filter	86	91.07	12	3.4	28	–	7.65	1.8		
	Efficiency (%)	91.07		73.91	56.41	82.28					

27-Feb-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	939		34	7.5	160	–	7.14		639	
Day 153	Drum-1	474	49.52			244	80	7.27	0.2		
	Drum-2	494	47.39			330	86	7.51	0.3		
	Drum-3	448	52.29			240	90	7.67	0.8		
	Drum-4	438	53.35			264	120	7.80	2.0		
	Effluent-Total	273	70.93			212	95	7.91	3.1		
	Effluent-Filter	68	92.76	9.5	3	28	–	7.68	2.1	34	
	Efficiency (%)	92.76		72.06	60.00	84.44				94.68	

01-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	962		35.5	9.3	182	–	7.16			
Day 155	Drum-1	456	52.60			320	120	7.29	0.4		
	Drum-2	509	47.09			304	150	7.54	0.6		
	Drum-3	503	47.71			260	165	7.60	1.3		
	Drum-4	341	64.55			288	225	7.72	2.2		
	Effluent-Total	334	65.28			240	250	7.78	3.0		
	Effluent-Filter	71	92.62	6.3	4.5	26	–	7.65	2.8		
	Efficiency (%)	92.62		82.25	51.61	85.71					

03-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	955		35	9.8	202	–	7.17			
Day 157	Drum-1	594	37.80			368	56	7.28	0.7		
	Drum-2	708	25.86			372	120	7.46	1.0		
	Drum-3	704	26.28			480	125	7.68	1.4		
	Drum-4	417	56.34			476	160	7.79	1.8		
	Effluent-Total	354	62.93			308	120	7.87	2.4		
	Effluent-Filter	74	92.25	5.9	4.6	26	–	7.67	1.6		
	Efficiency (%)	92.25		83.14	53.06	87.13					

05-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 8	Influent	944		36	9.8	210		7.15		657	
Day 159	Drum-1	535	43.33			340	95	7.28	0.4		
	Drum-2	433	54.13			288	130	7.56	0.8		
	Drum-3	429	54.56			292	150	7.63	2.1		
	Drum-4	460	51.27			332	200	7.70	3.0		
	Effluent-Total	339	64.09			260	180	7.83	3.2		
	Effluent-Filter	73	92.27	10	5.2	20		7.75	2.8	21	
	Efficiency (%)	92.27		72.22	46.94	90.48				96.80	

07-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	330		11.8	3.3	52		7.29			Film at D-1 & D-3 black
Day 161	Drum-1	304	7.88			196	46	7.52	1.3		and begin to slough
	Drum-2	288	12.73			176	56	7.67	2.2		
	Drum-3	210	36.36			136	52	7.66	3.0		Film at D-4 looks pale
	Drum-4	224	32.12			112	48	7.89	3.8		
	Effluent-Total	144	56.36			90	25	7.96	3.8		
	Effluent-Filter	63	80.91	5.8	1.6	18		7.85	3.3		
	Efficiency (%)	80.91		50.85	51.52	65.38					

09-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	363		10.5	3	56		7.23		220	Film at D-1 & D-2 brown
Day 163	Drum-1	287	20.94			182	54	7.42	1.2		with black
	Drum-2	120	66.94			84	45	7.59	2.0		
	Drum-3	169	53.44			70	28	7.91	3.2		Film at D-3 & D-4 are
	Drum-4	102	71.90			118	30	7.9	4.1		light brown
	Effluent-Total	94	74.10			50	8.5	7.95	4.3		
	Effluent-Filter	43	88.15	4.8	1.5	12		7.91	4.0	11	
	Efficiency (%)	88.15		54.29	50.00	78.57				95.00	

11-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	359		13	1.9	48		7.25			Film at D-1 & D-2 are
Day 165	Drum-1	277	22.84			212	80	7.41	1.1		brown with black spot
	Drum-2	193	46.24			112	80	7.56	2.1		
	Drum-3	313	12.81			246	110	7.7	3.0		Film at D-3 & D-4 are
	Drum-4	124	65.46			146	114	7.82	3.9		light brown
	Effluent-Total	114	68.25			94	60	7.92	4.0		
	Effluent-Filter	39	89.14	3.7	1.3	8		7.88	3.2		
	Efficiency (%)	89.14		71.54	31.58	83.33					

13-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	338		11.2	2.5	60		7.26		210	Film at D-1 is brown
Day 167	Drum-1	277	18.05			200	55	7.49	1.8		with black
	Drum-2	322	4.73			116	48	7.58	2.8		
	Drum-3	191	43.49			114	32	7.70	3.5		Film at D-2, D-3 & D-4
	Drum-4	208	38.46			76	22	7.88	4.1		are brown
	Effluent-Total	122	63.91			86	26	7.96	4.2		
	Effluent-Filter	38	88.76	4.9	1.1	8		7.91	4.0	11.5	
	Efficiency (%)	88.76		56.25	56.00	86.67				94.52	

15-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	358		12	2.9	54		7.24		218	Film at D-1 is dark
Day 169	Drum-1	320	10.61			234	29	7.43	1.7		brown with black
	Drum-2	292	18.44			202	28	7.60	2.9		Film at D-2, D-3 & D-4
	Drum-3	320	10.61			174	23	7.78	3.7		are brown
	Drum-4	267	25.42			170	25	7.89	4.1		
	Effluent-Total	190	46.93			154	26	7.95	4.0		
	Effluent-Filter	42	88.27	5	1.1	16		7.89		12	
	Efficiency (%)	88.27		58.33	62.07	70.37				94.50	

17-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	263		11.6	3	58		7.30			
Day 171	Drum-1	305	-15.97			206	60	7.55	1.8		
	Drum-2	300	-14.07			154	58	7.69	3.2		
	Drum-3	245	6.84			130	42	7.83	3.9		
	Drum-4	247	6.08			116	48	7.92	4.1		
	Effluent-Total	205	22.05			108	40	7.98	4.2		
	Effluent-Filter	43	83.65	2.3	1.1	14		7.93	4.1		
	Efficiency (%)	83.65		80.17	63.33	75.86					

19-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	259		12	2.8	50		7.23		190	Film at D-1 is dark
Day 173	Drum-1	340	5.03			188	60	7.45	1.9		brown with black
	Drum-2	363	-1.40			132	58	7.63	3.4		Film at D-2, D-3 & D-4
	Drum-3	219	38.83			100	34	7.80	4.2		are brown
	Drum-4	158	55.87			82	31	7.88	4.4		
	Effluent-Total	192	46.37			78	33	8.04	4.4		
	Effluent-Filter	42	88.27	3.5	1	10		8.00	4.2	12	
	Efficiency (%)	83.78		70.83	64.29	80.00				93.68	

21-Mar-94

	Sampling Point	COD	Eff.(%)	TKN	T-PO4	SS	SV30	pH	DO	BOD5	Remark
Run 9	Influent	293		10.4	2.9	52		7.20			
Day 175	Drum-1	317	-20.53			192	60	7.43	2.0		
	Drum-2	189	28.14			124	50	7.68	3.6		
	Drum-3	203	22.81			116	38	7.78	4.2		
	Drum-4	193	26.62			140	35	7.85	4.2		
	Effluent-Total	162	38.40			86	28	7.96	4.3		
	Effluent-Filter	40	84.79	2.4	0.9	6		7.92			
	Efficiency (%)	86.35		76.92	68.97	88.46					

ภาคผนวก ข ผลการทดลองแยกตามตัวแปร

pH

	Date	Day	Influent	Stage 1	2	3	4 Effluent	Remark
Run 1	28-Sep-93	1	7.25	7.32	7.44	7.61	7.62	7.80 Org.Loading=12.5g/m2.c
	30-Sep-93	3	7.31	7.38	7.49	7.65	7.66	7.83
	02-Oct-93	5	7.35	7.46	7.72	8.15	7.82	8.05
	04-Oct-93	7	7.37	7.46	7.83	7.93	7.93	8.00
	06-Oct-93	9	7.36	7.43	7.84	7.92	7.95	7.96
	08-Oct-93	11	7.32	7.43	7.78	7.84	7.88	7.92
	10-Oct-93	13	7.41	7.56	7.88	7.81	7.87	8.00
	12-Oct-93	15	7.30	7.45	7.80	7.92	7.96	7.96
	14-Oct-93	17	7.10	7.34	7.60	7.78	7.80	7.97
	16-Oct-93	19	7.09	7.28	7.51	7.70	7.79	7.82
	18-Oct-93	21	6.94	7.00	7.22	7.64	7.74	7.77
	20-Oct-93	23	6.98	7.04	7.38	7.52	7.57	7.65
	22-Oct-93	25	7.24	7.32	7.50	7.59	7.62	7.68
	24-Oct-93	27	6.91	6.97	7.38	7.45	7.47	7.51
	26-Oct-93	29	7.20	7.35	7.87	7.92	7.96	7.97
	28-Oct-93	31	6.86	6.99	7.07	7.60	7.70	7.76
	30-Oct-93	33	7.03	7.16	7.59	7.60	7.61	7.72
Avg			7.18	7.29	7.58	7.74	7.76	7.85
Run 2	01-Nov-93	35	6.71	6.87	7.06	7.18	7.28	7.30 Org.Loading=25g/m2.d
	03-Nov-93	37	6.70	6.74	6.97	7.20	7.32	7.37
	05-Nov-93	39	7.02	7.04	7.51	7.71	7.76	7.83
	07-Nov-93	41	7.00	7.08	7.49	7.81	7.83	7.91
	09-Nov-93	43	6.90	7.01	7.75	7.85	7.87	7.99
	11-Nov-93	45	7.08	7.19	7.73	7.74	7.77	7.88
	13-Nov-93	47	7.10	7.39	7.66	7.71	7.75	7.86
	15-Nov-93	49	7.27	7.60	7.70	7.85	7.88	7.98
	17-Nov-93	51	7.18	7.29	7.78	7.82	7.88	7.93
	19-Nov-93	53	7.19	7.35	7.79	7.84	7.89	7.93
	21-Nov-93	55	7.29	7.36	7.61	7.76	7.77	7.81
	23-Nov-93	57	7.18	7.42	7.70	7.77	7.79	7.85
	25-Nov-93	59	7.17	7.36	7.69	7.75	7.74	7.93
Avg			7.06	7.21	7.57	7.69	7.73	7.81
Run 3	27-Nov-93	61	7.14	7.25	7.64	7.74	7.78	7.81 Org.Loading=37.5g/m2.c
	29-Nov-93	63	7.17	7.25	7.58	7.70	7.76	7.75
	01-Dec-93	65	7.18	7.26	7.57	7.66	7.71	7.71
	03-Dec-93	67	7.20	7.27	7.61	7.72	7.74	7.76
	05-Dec-93	69	7.22	7.27	7.60	7.70	7.74	7.78
	07-Dec-93	71	7.18	7.27	7.58	7.73	7.79	7.85
	09-Dec-93	73	7.20	7.23	7.61	7.72	7.75	7.81
	11-Dec-93	75	7.16	7.22	7.58	7.67	7.78	7.82
	13-Dec-93	77	7.10	7.20	7.45	7.58	7.70	7.91
	15-Dec-93	79	7.15	7.17	7.41	7.66	7.69	7.71
Avg			7.17	7.23	7.56	7.68	7.74	7.79
Run 4	17-Dec-93	81	7.09	7.14	7.46	7.67	7.70	7.72 Org.Loading=50g/m2.d
	19-Dec-93	83	7.14	7.22	7.40	7.56	7.64	7.69
	21-Dec-93	85	7.08	7.20	7.35	7.46	7.59	7.67
	23-Dec-93	87	7.04	7.19	7.41	7.61	7.68	7.75
	25-Dec-93	89	7.05	7.19	7.34	7.49	7.54	7.62
	27-Dec-93	91	7.10	7.14	7.32	7.52	7.59	7.63
	29-Dec-93	93	7.13	7.17	7.32	7.52	7.61	7.70
	31-Dec-93	95	7.12	7.16	7.33	7.51	7.60	7.68
Avg			7.09	7.18	7.37	7.54	7.62	7.68

pH

			Stage					
	Date	Day	Influent	1	2	3	4 Effluent	Remark
Run 5	02-Jan-94	97	7.15	7.67	7.80	7.85	7.79	7.73 Org.Loading=25g/m2.d
	04-Jan-94	99	7.11	7.70	7.86	7.87	7.80	7.76
	06-Jan-94	101	7.20	7.57	7.81	7.83	7.92	7.89
	08-Jan-94	103	7.18	7.53	7.79	7.85	7.98	8.03
	10-Jan-94	105	7.17	7.61	7.74	7.85	7.96	7.99
	12-Jan-94	107	7.25	7.66	7.87	7.95	8.00	8.05
	14-Jan-94	109	7.19	7.61	7.82	7.99	7.98	7.98
	16-Jan-94	111	7.18	7.64	7.83	7.89	7.91	7.98
	18-Jan-94	113	7.15	7.60	7.79	7.88	7.92	7.97
Avg			7.18	7.62	7.81	7.88	7.92	7.93
Run 6	20-Jan-94	115	7.11	7.44	7.82	7.99	7.98	7.98 Org.Loading=50g/m2.d
	22-Jan-94	117	7.14	7.50	7.79	7.90	7.91	7.99
	24-Jan-94	119	7.28	7.42	7.58	7.75	7.79	7.84
	26-Jan-94	121	7.26	7.52	7.76	8.01	8.02	8.03
	28-Jan-94	123	7.22	7.54	7.69	7.95	7.87	7.87
	30-Jan-94	125	7.24	7.56	7.78	7.96	7.92	8.02
	01-Feb-94	127	7.20	7.51	7.73	7.80	7.86	7.90
Avg			7.21	7.50	7.74	7.91	7.91	7.95
Run 7	03-Feb-94	129	7.12	7.35	7.52	7.67	7.72	7.82 Org.Loading=75g/m2.d
	05-Feb-94	131	7.21	7.56	7.71	7.82	7.89	7.97
	07-Feb-94	133	7.15	7.31	7.49	7.60	7.71	7.76
	09-Feb-94	135	7.21	7.42	7.60	7.77	7.97	7.99
	11-Feb-94	137	7.29	7.40	7.60	7.71	7.94	7.97
	13-Feb-94	139	7.23	7.44	7.63	7.74	7.95	7.98
	15-Feb-94	141	7.27	7.46	7.64	7.85	7.97	8.03
	17-Feb-94	143	7.10	7.30	7.56	7.72	7.85	7.91
Avg			7.20	7.41	7.59	7.74	7.88	7.93
Run 8	19-Feb-94	145	7.22	7.38	7.50	7.46	7.52	7.82 Org.Loading=100g/m2.d
	21-Feb-94	147	7.19	7.40	7.46	7.49	7.65	7.80
	23-Feb-94	149	7.01	7.22	7.46	7.71	7.80	7.86
	25-Feb-94	151	7.10	7.26	7.46	7.69	7.66	7.68
	27-Feb-94	153	7.14	7.27	7.75	7.67	7.80	7.91
	01-Mar-94	155	7.16	7.29	7.54	7.60	7.72	7.78
	03-Mar-94	157	7.17	7.28	7.46	7.68	7.79	7.87
	05-Mar-94	159	7.15	7.28	7.56	7.63	7.70	7.83
Avg			7.14	7.30	7.52	7.62	7.71	7.82
Run 9	07-Mar-94	161	7.29	7.52	7.67	7.66	7.89	7.96
	09-Mar-94	163	7.23	7.42	7.59	7.91	7.90	7.95 Org.Loading=30g/m2.d
	11-Mar-94	165	7.25	7.41	7.75	7.70	7.82	7.92
	13-Mar-94	167	7.26	7.49	7.58	7.70	7.88	7.96
	15-Mar-94	169	7.24	7.43	7.60	7.78	7.89	7.95
	17-Mar-94	171	7.30	7.55	7.69	7.83	7.92	7.98
	19-Mar-94	173	7.23	7.45	7.63	7.80	7.88	8.04
	21-Mar-94	175	7.20	7.43	7.68	7.78	7.85	7.96
Avg			7.24	7.45	7.65	7.79	7.88	7.97

COD

	Date	Day	Influent	Drum Stage				Effluent	
				1	2	3	4	Total	Settled
Run 1	28-Sep-93	1	519	459	361	332	258	207	107
	30-Sep-93	3	517	468	306	285	237	186	66
	02-Oct-93	5	468	463	272	255	229	128	36
	04-Oct-93	7	609	616	340	333	330	161	50
	06-Oct-93	9	468	242	248	246	166	71	25
	08-Oct-93	11	440	290	287	279	215	70	29
	10-Oct-93	13	481	445	281	274	197	72	32
	12-Oct-93	15	440	276	256	127	218	65	48
	14-Oct-93	17	452	210	339	221	309	56	41
	16-Oct-93	19	415	455	250	230	392	51	30
	18-Oct-93	21	571	925	420	167	104	49	24
	20-Oct-93	23	448	889	203	117	191	43	21
	22-Oct-93	25	451	818	148	102	124	52	25
	24-Oct-93	27	533	496	23	91	151	70	30
	26-Oct-93	29	542	943	107	130	67	56	29
	28-Oct-93	31	430	876	76	124	369	64	28
	30-Oct-93	33	553	930	94	73	100	87	31
Avg			490	577	236	199	215	88	38
Run 2	01-Nov-93	35	476	766	515	605	820	190	120
	03-Nov-93	37	584	916	282	241	483	136	58
	05-Nov-93	39	678	1030	600	240	420	153	89
	07-Nov-93	41	640	936	863	696	566	117	53
	09-Nov-93	43	608	1167	530	266	365	190	55
	11-Nov-93	45	564	1046	927	849	585	464	93
	13-Nov-93	47	497	980	623	707	565	483	52
	15-Nov-93	49	527	760	523	513	387	267	46
	17-Nov-93	51	527	929	277	217	302	155	31
	19-Nov-93	53	566	445	361	232	206	255	52
	21-Nov-93	55	570	955	488	441	364	287	37
	23-Nov-93	57	483	490	306	253	294	263	35
	25-Nov-93	59	514	518	360	335	329	232	36
Avg			556	841	512	430	437	246	58
Run 3	27-Nov-93	61	540	378	270	293	199	154	30
	29-Nov-93	63	525	863	1108	423	535	499	103
	01-Dec-93	65	585	1200	625	375	488	403	68
	03-Dec-93	67	471	507	544	635	823	433	75
	05-Dec-93	69	521	1074	544	606	544	376	69
	07-Dec-93	71	494	486	396	291	257	230	46
	09-Dec-93	73	466	604	309	222	235	159	39
	11-Dec-93	75	460	416	284	338	293	219	36
	13-Dec-93	77	549	735	368	390	518	192	41
	15-Dec-93	79	494	1051	812	392	360	240	39
Avg			511	731	526	397	425	291	55
Run 4	17-Dec-93	81	573	505	428	304	324	392	96
	19-Dec-93	83	533	1135	965	352	733	416	60
	21-Dec-93	85	535	448	716	461	417	140	35
	23-Dec-93	87	462	763	802	606	645	472	41
	25-Dec-93	89	484	665	881	900	987	983	41
	27-Dec-93	91	520	695	735	444	409	218	43
	29-Dec-93	93	545	680	885	537	802	553	41
	31-Dec-93	95	496	592	638	401	438	365	41
Avg			519	685	756	501	594	442	50

COD

	Date	Day	Influent	Drum Stage				Effluent	
				1	2	3	4	Total	Settled
Run 5	02-Jan-94	97	1137	965	1221	1024	961	804	72
	04-Jan-94	99	1064	481	399	265	465	296	71
	06-Jan-94	101	1111	407	436	468	475	412	67
	08-Jan-94	103	1032	780	678	544	564	315	67
	10-Jan-94	105	946	725	520	772	953	697	96
	12-Jan-94	107	1147	735	751	743	839	511	65
	14-Jan-94	109	1045	847	759	815	791	366	48
	16-Jan-94	111	954	791	652	716	538	303	45
	18-Jan-94	113	967	823	598	626	475	321	46
Avg			1045	728	668	664	673	447	64
Run 6	20-Jan-94	115	959	440	422	546	703	557	86
	22-Jan-94	117	984	472	450	440	325	442	82
	24-Jan-94	119	1127	771	883	591	595	983	48
	26-Jan-94	121	947	822	667	647	739	667	49
	28-Jan-94	123	938	762	804	310	556	596	52
	30-Jan-94	125	1001	731	512	328	620	346	49
	01-Feb-94	127	945	922	532	581	310	369	50
Avg			986	703	610	492	550	566	59
Run 7	03-Feb-94	129	1125	826	1057	707	584	882	56
	05-Feb-94	131	1096	822	798	862	1005	973	326
	07-Feb-94	133	1144	671	1092	639	703	544	115
	09-Feb-94	135	942	535	606	645	287	215	76
	11-Feb-94	137	957	482	490	565	310	251	64
	13-Feb-94	139	1109	399	332	507	346	291	59
	15-Feb-94	141	1045	633	566	484	535	515	62
	17-Feb-94	143	1140	582	550	391	519	606	61
Avg			1070	619	686	600	536	535	102
Run 8	19-Feb-94	145	1106	868	752	748	1075	277	201
	21-Feb-94	147	1045	1136	1274	1154	816	613	209
	23-Feb-94	149	951	593	448	625	468	368	100
	25-Feb-94	151	963	1361	1616	720	489	299	86
	27-Feb-94	153	939	474	494	448	438	273	68
	01-Mar-94	155	962	456	509	503	341	334	71
	03-Mar-94	157	955	594	708	704	417	354	74
	05-Mar-94	159	944	535	433	429	460	339	73
Avg			983	752	779	666	563	357	110
Run 9	07-Mar-94	161	330	304	288	210	224	144	63
	09-Mar-94	163	363	287	120	169	102	94	43
	11-Mar-94	165	359	277	193	313	124	114	39
	13-Mar-94	167	338	277	322	191	208	122	38
	15-Mar-94	169	358	320	292	320	267	190	42
	17-Mar-94	171	263	305	300	245	247	205	43
	19-Mar-94	173	259	340	363	219	158	192	42
	21-Mar-94	175	293	317	189	203	193	162	40
Avg			320	303	258	234	190	153	44

5.4.2 ซีโอดีและประสิทธิภาพการกำจัด

5.4.2.1 ค่าซีโอดีของน้ำเสียที่เข้าสู่ระบบ

การหาค่าซีโอดีของน้ำเสียที่เข้าสู่ระบบและน้ำเสียในระบบไบโอดรัมแต่ละตอนได้วิเคราะห์ออกมาในรูปของซีโอดีรวม ส่วนค่าซีโอดีของน้ำเสียออกจากระบบนั้นได้วิเคราะห์ทั้งในรูปของซีโอดีรวม และซีโอดีของน้ำใสหลังจากทิ้งให้ตะกอนจมตัวแล้ว ค่าซีโอดีของน้ำเสียที่เข้าสู่ระบบได้ทำการเตรียมที่ความเข้มข้น 500 มก./ลิตร , 1,000 มก./ลิตร และ 300 มก./ลิตร สำหรับการทดลองชุดที่ 1, 2 และ 3 ตามลำดับ อย่างไรก็ตามการเตรียมน้ำเสียสังเคราะห์ซึ่งทำขึ้นในห้องปฏิบัติการอาจมีความคลาดเคลื่อนจากค่าที่กำหนดไว้ประมาณ $\pm$ 20% รูปที่ 5.15 เป็นการแสดงค่าซีโอดีที่ทำการป้อนก้นเข้าสู่ระบบไบโอดรัมของการทดลองแต่ละชุด

5.4.2.2 ผลการทดลอง

การทดลองของระบบพบว่าทุกการทดลอง ค่าซีโอดีที่ตำแหน่งต่างๆ ของการเก็บตัวอย่างน้ำเสียมีค่าเปลี่ยนแปลงโดยมีแนวโน้มที่ค่าเฉลี่ยซีโอดีในไบโอดรัมตอนหลังๆ และในน้ำทิ้งจะลดต่ำลงดังแสดงในรูปที่ 5.16 อย่างไรก็ตามเมื่อค่าไฮดรอลิกโหลดดิงเพิ่มสูงขึ้น รูปแบบแนวโน้มของค่าซีโอดีอาจเปลี่ยนแปลงไปบ้างเนื่องจากอิทธิพลของสารแขวนลอยที่เกิดจากการหลุดลอกตัวของฟิล์มชีว

รูปที่ 5.16 แสดงให้เห็นว่าการทดลองทั้ง 3 ชุด มีแนวโน้มของการเปลี่ยนแปลงซีโอดีที่ลดลงในแต่ละจุดเก็บตัวอย่างน้ำเสียตามเส้นทางการไหลของน้ำจนถึงจุดน้ำเสียออกจากระบบ ข้อแตกต่างที่ค่อนข้างชัดเจนของการทดลองทั้ง 3 ชุด ได้แก่ ในการทดลองที่ 1 ค่าซีโอดีของน้ำเสียของตอนที่ 1 เพิ่มสูงขึ้นในขณะที่การทดลองชุดอื่นค่าซีโอดีลดลง สาเหตุที่เกิดขึ้นเนื่องมาจากตอนที่ 1 เป็นตอนที่สารอาหารเริ่มถูกป้อนเข้าสู่ระบบ ดังนั้นจึงเป็นตอนที่มีความเข้มข้นของสารอาหารสูงที่สุด การใช้สารอาหารของจุลชีพจึงสูงที่สุดตามไปด้วย ฟิล์มชีวของจุลชีพในตอนนี้เกิดขึ้นในปริมาณมาก การเก็บตัวอย่างน้ำเสียในการทดลองช่วงแรกไม่มีเทคนิคที่ดีพอเนื่องจากยังไม่มีความชำนาญจึงมีส่วนของฟิล์มชีวติดมาด้วย ประกอบกับไบโอดรัมที่ใช้ในระบบมีขนาดเล็ก ความจุน้อย หากทำการดูดน้ำเสียออกมามากจะทำให้มีส่วนของฟิล์มปะปนมาด้วยจึงเป็นสาเหตุให้ค่าซีโอดีที่วิเคราะห์ในตอนที่ 1 มีค่าสูง อีกสาเหตุหนึ่งซึ่งน่าจะเป็นผลให้ค่าซีโอดีในช่วงแรกสูงเนื่องจากช่วงแรกเกิดจุลชีพแบบเส้นใยขึ้นในตอนแรกของไบโอดรัม เมื่อทำการเก็บตัวอย่างน้ำเสียจึงมีจุลชีพติดออกมาด้วยเป็นผลให้ค่าซีโอดีสูงขึ้นดังกล่าว ในการ

SS

	Date	Day	Influent	Drum Stage				Effluent	
				1	2	3	4	Total	Settled
Run 1	28-Sep-93	1	74	82.6	65	85	73	62	6
	30-Sep-93	3	88	170	125	120	105	98	12
	02-Oct-93	5	82	348	246	242	200	184	16
	04-Oct-93	7	86	362	233	248	228	64	11
	06-Oct-93	9	80	259	214	214	180	50	7
	08-Oct-93	11	76	238	148	134	135	24	6
	10-Oct-93	13	84	198	176	180	156	24	10
	12-Oct-93	15	78	284	201	196	154	49	9
	14-Oct-93	17	80	168	210	174	150	43	7
	16-Oct-93	19	74	236	131	99	97	19	4
	18-Oct-93	21	90	775	184	99	98	15	7
	20-Oct-93	23	70	510	296	129	113	18	5
	22-Oct-93	25	82	642	48	33	32	26	5
	24-Oct-93	27	76	151	22	16	14	8	3
	26-Oct-93	29	86	604	72	35	13	10	5
	28-Oct-93	31	72	360	75	42	76	21	4
	30-Oct-93	33	82	605	42	24	52	11	3
Avg			80	353	146	122	110	43	7
Run 2	01-Nov-93	35	76	241	85	111	266	67	6
	03-Nov-93	37	88	627	132	132	115	61	6
	05-Nov-93	39	92	660	568	136	139	50	6
	07-Nov-93	41	78	406	290	198	98	55	8
	09-Nov-93	43	96	742	155	189	101	43	8
	11-Nov-93	45	100	595	490	805	738	302	31
	13-Nov-93	47	100	492	564	498	558	398	30
	15-Nov-93	49	86	520	400	344	292	194	14
	17-Nov-93	51	84	123	115	190	151	294	14
	19-Nov-93	53	88	482	190	135	147	145	18
	21-Nov-93	55	82	934	291	226	239	185	16
	23-Nov-93	57	80	276	144	208	215	169	12
	25-Nov-93	59	90	317	342	230	292	186	14
Avg			88	493	290	262	258	165	14
Run 3	27-Nov-93	61	98	270	175	147	180	102	26
	29-Nov-93	63	75	326	343	251	309	200	19
	01-Dec-93	65	78	362	339	219	252	169	22
	03-Dec-93	67	76	250	413	339	416	320	31
	05-Dec-93	69	61	320	214	187	248	192	20
	07-Dec-93	71	83	244	203	158	180	141	12
	09-Dec-93	73	93	404	219	146	194	147	9
	11-Dec-93	75	86	216	159	171	143	124	15
	13-Dec-93	77	70	318	208	185	204	90	7
	15-Dec-93	79	78	528	216	183	182	152	9
Avg			80	324	249	199	231	164	17
Run 4	17-Dec-93	81	75	326	463	259	214	182	17
	19-Dec-93	83	68	252	248	150	226	124	25
	21-Dec-93	85	64	250	342	294	184	162	28
	23-Dec-93	87	70	398	282	234	254	190	18
	25-Dec-93	89	82	498	456	464	396	276	20
	27-Dec-93	91	78	536	442	252	200	158	16
	29-Dec-93	93	80	444	312	260	340	208	18
	31-Dec-93	95	72	477	386	243	187	146	14
Avg			74	398	366	270	250	181	20

SS

	Date	Day	Influent	Drum Stage				Effluent	
				1	2	3	4	Total	Settled
Run 5	02-Jan-94	97	160	694	864	782	866	846	30
	04-Jan-94	99	152	264	368	322	334	280	38
	06-Jan-94	101	164	314	284	260	254	212	48
	08-Jan-94	103	156	614	496	398	542	322	26
	10-Jan-94	105	150	506	488	488	510	454	39
	12-Jan-94	107	146	536	396	310	330	214	24
	14-Jan-94	109	140	532	344	392	358	262	20
	16-Jan-94	111	60	486	252	320	248	184	14
	18-Jan-94	113	162	454	288	342	260	176	16
Avg			143	489	420	402	411	328	28
Run 6	20-Jan-94	115	154	408	336	302	328	324	26
	22-Jan-94	117	158	388	338	278	266	276	24
	24-Jan-94	119	168	434	344	360	430	322	20
	26-Jan-94	121	164	514	414	428	442	404	16
	28-Jan-94	123	156	420	354	242	278	176	14
	30-Jan-94	125	152	384	244	212	216	154	18
	01-Feb-94	127	158	362	222	286	290	200	22
Avg			159	416	322	301	321	265	20
Run 7	03-Feb-94	129	146	370	752	716	726	572	28
	05-Feb-94	131	154	508	552	606	662	436	94
	07-Feb-94	133	176	396	360	340	354	250	30
	09-Feb-94	135	160	332	552	192	256	168	16
	11-Feb-94	137	166	220	274	240	200	178	20
	13-Feb-94	139	156	192	324	224	196	148	14
	15-Feb-94	141	162	336	412	380	364	288	22
	17-Feb-94	143	170	436	472	372	292	308	18
Avg			161	349	462	384	381	294	30
Run 8	19-Feb-94	145	172	716	868	924	904	780	76
	21-Feb-94	147	152	600	728	528	464	356	62
	23-Feb-94	149	170	220	384	256	292	248	16
	25-Feb-94	151	158	336	424	356	316	296	28
	27-Feb-94	153	180	244	330	240	264	212	28
	01-Mar-94	155	182	320	304	280	288	240	26
	03-Mar-94	157	202	368	372	480	476	308	26
	05-Mar-94	159	210	340	288	292	332	260	20
Avg			178	393	462	420	417	338	35
Run 9	07-Mar-94	161	52	196	176	136	112	90	18
	09-Mar-94	163	56	182	84	70	118	50	12
	11-Mar-94	165	48	212	112	246	146	94	8
	13-Mar-94	167	60	200	116	114	76	86	8
	15-Mar-94	169	54	234	202	174	170	154	16
	17-Mar-94	171	58	206	154	130	116	108	14
	19-Mar-94	173	50	188	132	100	82	78	10
	21-Mar-94	175	52	192	124	116	140	86	6
Avg			54	202	132	136	121	94	11

DO

	Organic Loading	Date	Day	Stage 1	Stage 2	Stage 3	Stage 4	Effluent Total
Run 1	12.5 g COD/m2.d	28-Sep-93	1	2.0	2.7	3.6	4.0	3.9
		30-Sep-93	3	2.2	3.0	3.8	4.1	4.0
		02-Oct-93	5	4.1	4.2	4.4	4.6	4.5
		04-Oct-93	7	3.2	4.3	4.6	4.6	4.2
		06-Oct-93	9	2.9	4.2	4.2	4.2	4.2
		08-Oct-93	11	3.4	4.3	4.6	4.9	4.8
		10-Oct-93	13	3.8	4.9	5.0	5.2	5.2
		12-Oct-93	15	3.7	4.6	4.6	4.8	4.8
		14-Oct-93	17	2.5	4.2	5.0	5.1	5.0
		16-Oct-93	19	2.5	4.2	4.6	5.2	5.2
		18-Oct-93	21	2.5	4.0	4.8	4.9	4.9
		20-Oct-93	23	1.6	3.3	3.7	4.2	4.2
		22-Oct-93	25	1.8	3.6	4.2	4.6	4.6
		24-Oct-93	27	1.3	3.6	3.8	4.0	4.0
		26-Oct-93	29	1.5	3.8	3.8	4.0	4.0
		28-Oct-93	31	0.8	3.4	3.5	3.9	4.0
		30-Oct-93	33	1.2	3.6	3.8	3.8	4.1
Avg				2.4	3.9	4.2	4.5	4.4
Run 2	25 g COD/m2.d	01-Nov-93	35	0.8	2.8	3.2	3.6	3.8
		03-Nov-93	37	0.5	1.2	3.0	3.7	3.8
		05-Nov-93	39	0.5	1.2	2.4	3.8	4.0
		07-Nov-93	41	0.5	1.2	3.0	4.5	4.7
		09-Nov-93	43	0.4	1.3	2.8	3.9	4.0
		11-Nov-93	45	0.4	1.5	2.2	3.4	3.5
		13-Nov-93	47	2.4	2.8	2.9	4.1	4.1
		15-Nov-93	49	2.6	3.6	3.7	4.0	4.3
		17-Nov-93	51	2.3	3.7	3.6	4.4	4.6
		19-Nov-93	53	1.0	3.9	4.4	5.0	5.2
		21-Nov-93	55	1.0	1.0	3.5	4.3	4.4
		23-Nov-93	57	1.6	3.4	3.6	4.0	4.1
		25-Nov-93	59	1.4	3.3	3.4	4.2	4.3
Avg				1.2	2.4	3.2	4.1	4.2
Run 3	37.5 g COD/m2.d	27-Nov-93	61	0.8	3.0	3.2	3.9	4.0
		29-Nov-93	63	1.3	2.7	3.0	4.0	4.1
		01-Dec-93	65	0.7	3.7	4.3	4.4	4.6
		03-Dec-93	67	0.9	2.8	3.2	4.0	4.0
		05-Dec-93	69	0.6	2.3	2.9	3.5	3.6
		07-Dec-93	71	0.8	2.9	3.5	3.8	4.0
		09-Dec-93	73	0.3	3.0	3.8	4.0	4.2
		11-Dec-93	75	0.3	3.2	3.9	4.3	4.3
		13-Dec-93	77	0.5	3.3	4.0	4.6	4.6
		15-Dec-93	79	0.6	2.9	3.9	4.0	4.0
Avg				0.7	3.0	3.6	4.1	4.1
Run 4	50 g COD/m2.d	17-Dec-93	81	0.5	2.0	3.7	3.9	4.2
		19-Dec-93	83	0.6	2.2	3.4	3.9	3.9
		21-Dec-93	85	0.7	2.0	3.0	4.0	4.0
		23-Dec-93	87	0.6	2.0	3.7	4.1	4.2
		25-Dec-93	89	0.4	1.7	2.8	2.8	3.4
		27-Dec-93	91	0.2	1.2	3.0	3.7	3.7
		29-Dec-93	93	0.3	1.5	3.0	3.8	3.8
		31-Dec-93	95	1.1	1.8	3.3	3.7	3.8
Avg				0.6	1.8	3.2	3.7	3.9

DO

	Organic Loading	Date	Day	Stage 1	Stage 2	Stage 3	Stage 4	Effluent Total
Run 5	25 g COD/m2.d	02-Jan-94	97	2.6	3.0	3.2	2.7	2.5
		04-Jan-94	99	2.4	3.8	4.1	4.4	4.4
		06-Jan-94	101	2.6	4.2	4.2	4.4	4.2
		08-Jan-94	103	1.4	3.0	3.4	4.0	4.0
		10-Jan-94	105	2.1	2.6	2.8	3.3	3.3
		12-Jan-94	107	1.4	3.0	3.4	3.9	4.0
		14-Jan-94	109	1.2	2.8	3.8	4	4.2
		16-Jan-94	111	1.3	2.9	3.7	4.1	4.2
		18-Jan-94	113	1.4	2.8	3.6	4.0	4.1
Avg				1.8	3.1	3.6	3.9	3.9
Run 6	50 g COD/m2.d	20-Jan-94	115	1.6	3.4	4.3	3.9	4.0
		22-Jan-94	117	1.6	3.2	4.4	4.3	4.0
		24-Jan-94	119	0.2	2.9	3.4	4.0	4.1
		26-Jan-94	121	0.3	2.5	3.5	3.8	3.7
		28-Jan-94	123	0.6	2.6	3.6	3.3	4.0
		30-Jan-94	125	0.4	2.0	3.0	3.2	3.6
		01-Feb-94	127	0.8	2.8	3.7	3.6	3.5
Avg				0.8	2.8	3.7	3.7	3.8
Run 7	75 g COD/m2.d	03-Feb-94	129	0.2	0.8	1.8	2.6	2.4
		05-Feb-94	131	0.2	0.2	0.3	0.4	0.5
		07-Feb-94	133	0.2	0.3	1.2	1.9	2.0
		09-Feb-94	135	0.2	0.4	2.0	3.2	3.2
		11-Feb-94	137	0.3	0.6	2.0	3.1	3.2
		13-Feb-94	139	0.4	0.7	2.1	3.3	3.3
		15-Feb-94	141	0.3	0.8	2.0	3.1	3.2
		17-Feb-94	143	0.2	1.0	1.9	2.6	2.8
Avg				0.0	0.6	1.7	2.5	2.6
Run 8	100 g COD/m2.d	19-Feb-94	145	0.3	0.3	0.4	0.6	0.8
		21-Feb-94	147	0.3	0.5	0.8	2.0	2.2
		23-Feb-94	149	0.3	0.4	1.6	2.2	3.6
		25-Feb-94	151	0.2	0.3	0.6	1.7	2.9
		27-Feb-94	153	0.2	0.3	0.8	2.0	3.1
		01-Mar-94	155	0.4	0.6	1.3	2.2	3.0
		03-Mar-94	157	0.7	1.0	1.4	1.8	2.4
		05-Mar-94	159	0.4	0.8	2.1	3.0	3.2
Avg				0.4	0.5	1.1	1.9	2.7
Run 9	30 g COD/m2.d	07-Mar-94	161	1.3	2.2	3.0	3.8	3.8
		09-Mar-94	163	1.2	2.0	3.2	4.1	4.3
		11-Mar-94	165	1.1	2.1	3.0	3.9	4.0
		13-Mar-94	167	1.8	2.8	3.5	4.1	4.2
		15-Mar-94	169	1.7	2.9	3.7	4.1	4.0
		17-Mar-94	171	1.8	3.2	3.9	4.1	4.2
		19-Mar-94	173	1.9	3.4	4.2	4.4	4.4
		21-Mar-94	175	2.0	3.6	4.2	4.2	4.3
Avg				1.6	2.8	3.6	4.1	4.2

SV 30

	Date	Day	Stage 1	Stage 2	Stage 3	Stage 4 Effluent	
Run 1	28-Sep-93	1	11.5	11	29	16	ND
	30-Sep-93	3	23.5	17.5	30.5	47.4	5
	02-Oct-93	5	30	19	28	34	3
	04-Oct-93	7	35	22	26	21	10.5
	06-Oct-93	9	63	30.5	30.5	30	15
	08-Oct-93	11	68	18	15	16	4
	10-Oct-93	13	41	12	13	11	4
	12-Oct-93	15	118	85	60	61	35
	14-Oct-93	17	102	84	53	70	31
	16-Oct-93	19	140	88	50	58	20
	18-Oct-93	21	250	81	25	26	3
	20-Oct-93	23	648	113	35	48	5
	22-Oct-93	25	680	29	20	10	2
	24-Oct-93	27	230	13	8	9	1.7
	26-Oct-93	29	430	27	12	3.5	0.9
	28-Oct-93	31	480	80	50	100	10
	30-Oct-93	33	694	28	22	26	2
Avg			238	45	30	35	9
Run 2	01-Nov-93	35	200	85	150	200	80
	03-Nov-93	37	550	150	125	125	80
	05-Nov-93	39	650	350	114	120	40
	07-Nov-93	41	450	200	150	130	50
	09-Nov-93	43	500	180	150	150	80
	11-Nov-93	45	700	650	600	500	400
	13-Nov-93	47	500	360	360	380	260
	15-Nov-93	49	170	198	140	130	81
	17-Nov-93	51	130	47	32	40	25
	19-Nov-93	53	110	66	42	43	41
	21-Nov-93	55	195	160	120	115	80
	23-Nov-93	57	60	58	48	56	37
	25-Nov-93	59	152	120	110	135	82
Avg			336	202	165	163	103
Run 3	27-Nov-93	61	80	70	43	42	25
	29-Nov-93	63	170	280	200	250	200
	01-Dec-93	65	240	250	170	210	140
	03-Dec-93	67	260	250	240	240	145
	05-Dec-93	69	120	160	190	200	150
	07-Dec-93	71	115	108	88	96	80
	09-Dec-93	73	150	120	100	110	88
	11-Dec-93	75	110	108	100	100	88
	13-Dec-93	77	70	78	64	78	62
	15-Dec-93	79	195	158	150	155	115
Avg			151	158	135	148	109
Run 4	17-Dec-93	81	107	141	119	121	96
	19-Dec-93	83	135	170	110	120	75
	21-Dec-93	85	84	130	115	78	60
	23-Dec-93	87	160	170	125	100	82
	25-Dec-93	89	145	220	270	250	170
	27-Dec-93	91	120	145	120	81	70
	29-Dec-93	93	145	180	150	140	98
	31-Dec-93	95	160	140	130	110	76
Avg			132	162	142	125	91

SV 30

	Date	Day	Stage 1	Stage 2	Stage 3	Stage 4	Effluent
Run 5	02-Jan-94	97	210	205	180	200	170
	04-Jan-94	99	148	120	110	110	120
	06-Jan-94	101	66	52	47	45	43
	08-Jan-94	103	180	130	105	102	90
	10-Jan-94	105	93	84	80	74	84
	12-Jan-94	107	135	110	105	98	78
	14-Jan-94	109	122	80	85	86	64
	16-Jan-94	111	70	49	50	48	25
	18-Jan-94	113	100	70	72	68	40
Avg			125	100	93	92	79
Run 6	20-Jan-94	115	92	80	80	90	72
	22-Jan-94	117	220	195	175	160	160
	24-Jan-94	119	180	220	235	250	220
	26-Jan-94	121	300	275	300	295	260
	28-Jan-94	123	220	200	175	160	120
	30-Jan-94	125	175	140	125	120	85
	01-Feb-94	127	45	39	30	23	16
Avg			176	164	160	157	133
Run 7	03-Feb-94	129	155	200	155	140	170
	05-Feb-94	131	190	280	300	340	350
	07-Feb-94	133	275	360	410	430	450
	09-Feb-94	135	175	360	170	170	175
	11-Feb-94	137	125	185	160	155	180
	13-Feb-94	139	72	130	140	125	120
	15-Feb-94	141	140	300	250	250	280
	17-Feb-94	143	175	270	280	255	260
Avg			163	261	233	233	248
Run 8	19-Feb-94	145	350	250	400	448	280
	21-Feb-94	147	80	130	120	125	110
	23-Feb-94	149	58	85	110	130	170
	25-Feb-94	151	120	200	150	175	210
	27-Feb-94	153	80	86	90	120	95
	01-Mar-94	155	120	150	185	225	250
	03-Mar-94	157	56	120	125	160	120
	05-Mar-94	159	105	155	200	300	210
Avg			121	147	173	210	181
Run 9	07-Mar-94	161	95	130	150	200	180
	09-Mar-94	163	46	56	52	48	25
	11-Mar-94	165	54	45	28	30	8.5
	13-Mar-94	167	80	80	110	114	60
	15-Mar-94	169	55	48	32	22	26
	17-Mar-94	171	29	28	23	25	26
	19-Mar-94	173	60	58	34	31	33
	21-Mar-94	175	60	50	38	35	28
Avg			60	62	58	63	48

TKN

	Date	Day	Influent	Effluent Settled	%Remove Settled
Run 1	28-Sep-93	1	16	3.92	76
	30-Sep-93	3	15	2	87
	02-Oct-93	5	14	3	79
	04-Oct-93	7	18	3.4	81
	06-Oct-93	9	17	5	71
	08-Oct-93	11	16	5	69
	10-Oct-93	13	16	2	88
	12-Oct-93	15	15	2	87
	14-Oct-93	17	17	1.4	92
	16-Oct-93	19	16	3	81
	18-Oct-93	21	29	2	93
	20-Oct-93	23	16	1	94
	22-Oct-93	25	18	3	83
	24-Oct-93	27	18	3	83
	26-Oct-93	29	20	1.8	91
	28-Oct-93	31	17	1.4	92
	30-Oct-93	33	24	4	83
Avg			18	3	84
Run 2	01-Nov-93	35	18	5	72
	03-Nov-93	37	26	6	77
	05-Nov-93	39	21	8	62
	07-Nov-93	41	18	4	78
	09-Nov-93	43	18	4	78
	11-Nov-93	45	18	5	72
	13-Nov-93	47	21	11	48
	15-Nov-93	49	20	7	65
	17-Nov-93	51	22	8	64
	19-Nov-93	53	22	10	55
	21-Nov-93	55	20	4	80
	23-Nov-93	57	16	3	81
	25-Nov-93	59	17	3	82
Avg			20	6	70
Run 3	27-Nov-93	61	15	4	73
	29-Nov-93	63	18	5	72
	01-Dec-93	65	17	6	65
	03-Dec-93	67	16	6	63
	05-Dec-93	69	17	4	76
	07-Dec-93	71	16	2.8	83
	09-Dec-93	73	20	3	85
	11-Dec-93	75	17	4	76
	13-Dec-93	77	17	4	76
	15-Dec-93	79	16	3	81
Avg			17	4	75
Run 4	17-Dec-93	81	20	4	80
	19-Dec-93	83	17	4	76
	21-Dec-93	85	20	3.8	81
	23-Dec-93	87	19	4	79
	25-Dec-93	89	18	3.6	80
	27-Dec-93	91	19	4.2	78
	29-Dec-93	93	17	3.6	79
	31-Dec-93	95	16	3.5	78
Avg			18	4	79

TKN

	Date	Day	Influent	Effluent Settled	%Remove Settled
Run 5	02-Jan-94	97	35	9	74
	04-Jan-94	99	35	4.7	87
	06-Jan-94	101	38	4.9	87
	08-Jan-94	103	34	4.2	88
	10-Jan-94	105	32	7.3	77
	12-Jan-94	107	37	4.3	88
	14-Jan-94	109	38.5	6.7	83
	16-Jan-94	111	34	5.2	85
	18-Jan-94	113	36	4.8	87
Avg			36	6	84
Run 6	20-Jan-94	115	35	4.8	86
	22-Jan-94	117	33	5	85
	24-Jan-94	119	37	3.6	90
	26-Jan-94	121	29	3.2	89
	28-Jan-94	123	34	5	85
	30-Jan-94	125	43	7	84
	01-Feb-94	127	39	9	77
	03-Feb-94	129	37	5	86
Avg			36	5	85
Run 7	05-Feb-94	131	36	17	53
	07-Feb-94	133	33	7	79
	09-Feb-94	135	39	10.4	73
	11-Feb-94	137	34	9	74
	13-Feb-94	139	35	8	77
	15-Feb-94	141	36	8.4	77
	17-Feb-94	143	33	5.9	82
Avg			35	9	73
Run 8	19-Feb-94	145	33.5	13	61
	21-Feb-94	147	35	13.4	62
	23-Feb-94	149	36	7	81
	25-Feb-94	151	46	12	74
	27-Feb-94	153	34	9.5	72
	01-Mar-94	155	35.5	6.3	82
	03-Mar-94	157	35	5.9	83
	05-Mar-94	159	36	10	72
Avg			36	10	73
Run 9	07-Mar-94	161	11.8	5.8	51
	09-Mar-94	163	10.5	4.8	54
	11-Mar-94	165	13	3.7	72
	13-Mar-94	167	11.2	4.9	56
	15-Mar-94	169	12	5	58
	17-Mar-94	171	11.6	2.3	80
	19-Mar-94	173	12	3.5	71
	21-Mar-94	175	10.4	2.4	77
Avg			12	4	65

PO4

	Date	Day	Influent	Effluent Settled	%Remove Settled
Run 1	28-Sep-93	1	3.2	2.8	13
	30-Sep-93	3	3.6	2.2	39
	02-Oct-93	5	3.7	2	46
	04-Oct-93	7	3.8	2	47
	06-Oct-93	9	3.4	0.8	76
	08-Oct-93	11	2.8	1	64
	10-Oct-93	13	3	0.9	70
	12-Oct-93	15	3	0.5	83
	14-Oct-93	17	3	0.8	73
	16-Oct-93	19	2.1	0.8	62
	18-Oct-93	21	2.8	0.8	71
	20-Oct-93	23	3.2	1.9	41
	22-Oct-93	25	3	1.4	53
	24-Oct-93	27	2.6	1	62
	26-Oct-93	29	3.2	1.4	56
	28-Oct-93	31	3	1.1	63
	30-Oct-93	33	3.7	1.3	65
Avg			3.1	1.3	58.0
Run 2	01-Nov-93	35	3	1.5	50
	03-Nov-93	37	3.4	1.5	56
	05-Nov-93	39	3.5	1.2	66
	07-Nov-93	41	3.2	1.4	56
	09-Nov-93	43	2.8	0.9	68
	11-Nov-93	45	3	0.8	73
	13-Nov-93	47	2	1.2	40
	15-Nov-93	49	3.4	1	71
	17-Nov-93	51	3.2	1.2	63
	19-Nov-93	53	3.4	1.3	62
	21-Nov-93	55	3	1.4	53
	23-Nov-93	57	3	1	67
	25-Nov-93	59	3.1	1.2	61
Avg			3.1	1.2	60.4
Run 3	27-Nov-93	61	3	1.6	47
	29-Nov-93	63	3.1	1	68
	01-Dec-93	65	3.4	1.4	59
	03-Dec-93	67	3.5	1.3	63
	05-Dec-93	69	2.5	1.1	56
	07-Dec-93	71	3.7	1.9	49
	09-Dec-93	73	3	1.2	60
	11-Dec-93	75	3.3	1.6	52
	13-Dec-93	77	3.7	1.8	51
	15-Dec-93	79	3.5	1.6	54
Avg			3.3	1.5	55.8
Run 4	17-Dec-93	81	5	2.5	50
	19-Dec-93	83	4.4	2.5	43
	21-Dec-93	85	4.5	2.1	53
	23-Dec-93	87	4.3	1.8	58
	25-Dec-93	89	4.9	2.3	53
	27-Dec-93	91	4.9	2.3	53
	29-Dec-93	93	4.7	2.3	51
	31-Dec-93	95	4.4	1.9	57
Avg			4.6	2.2	52.3

PO4

	Date	Day	Influent	Effluent Settled	%Remove Settled
Run 5	02-Jan-94	97	7.7	2.4	69
	04-Jan-94	99	7.4	1.3	82
	06-Jan-94	101	8.3	1.6	81
	08-Jan-94	103	7.2	1.6	78
	10-Jan-94	105	6.7	2.1	69
	12-Jan-94	107	7.2	1.2	83
	14-Jan-94	109	7.6	2.8	63
	16-Jan-94	111	7.5	2.4	68
	18-Jan-94	113	6.8	2.3	66
Avg			7.4	2.0	73.2
Run 6	20-Jan-94	115	7.9	2.5	68
	22-Jan-94	117	7.8	3.2	59
	24-Jan-94	119	7.6	2.5	67
	26-Jan-94	121	6.9	2.4	65
	28-Jan-94	123	6.6	2.1	68
	30-Jan-94	125	8.4	3.8	55
	01-Feb-94	127	8.2	4.1	50
Avg			7.6	2.9	61.8
Run 7	03-Feb-94	129	7.2	4	44
	05-Feb-94	131	6.9	2.6	62
	07-Feb-94	133	7.8	3.1	60
	09-Feb-94	135	7.4	4.1	45
	11-Feb-94	137	7.5	3.6	52
	13-Feb-94	139	7.1	3.7	48
	15-Feb-94	141	6.9	3	57
	17-Feb-94	143	7.2	2.7	63
Avg			7.3	3.4	53.8
Run 8	19-Feb-94	145	6.9	3	57
	21-Feb-94	147	7.3	3.2	56
	23-Feb-94	149	7.2	3.4	53
	25-Feb-94	151	7.8	3.4	56
	27-Feb-94	153	7.5	3	60
	01-Mar-94	155	9.3	4.5	52
	03-Mar-94	157	9.8	4.6	53
	05-Mar-94	159	9.8	5.2	47
Avg			8.2	3.8	54.2
Run 9	07-Mar-94	161	3.3	1.6	52
	09-Mar-94	163	3	1.5	50
	11-Mar-94	165	1.9	1.3	32
	13-Mar-94	167	2.5	1.1	56
	15-Mar-94	169	2.9	1.1	62
	17-Mar-94	171	3	1.1	63
	19-Mar-94	173	2.8	1.0	64
	21-Mar-94	175	2.9	0.9	69
Avg			2.8	1.2	55.9

ประวัติผู้วิจัย

นายธีรวัตร โสมวดี สำเร็จการศึกษาปริญญาตรี วิศวกรรมศาสตร์บัณฑิต สาขาเครื่องกล จากมหาวิทยาลัยเกษตรศาสตร์ เข้ามาศึกษาต่อในหลักสูตรปริญญามหาบัณฑิต สาขาวิศวกรรมสิ่งแวดล้อมที่จุฬาลงกรณ์มหาวิทยาลัย ปีการศึกษา 2532 ปัจจุบันเป็นวิศวกรประจำที่บริษัท ACT CONSULTANTS CO.,LTD.