

เอกสารอ้างอิง



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ภาคผนวก



ตารางที่ 1 ปริมาณน้ำที่เข้าสู่อ่างเก็บน้ำสิริกิติ์ ตั้งแต่ปี พ.ศ. 2514 - 2527

(หน่วย : ล้านลูกบาศก์เมตร)

ปี	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.	ม.ค.	ก.พ.	มี.ค.	ตลอดปี
2514	-	-	318	1,319	2,430	1,169	495	162	101	71	59	44	6,168
2515	85	65	137	323	2,260	662	466	218	115	74	58	138	4,601
2516	52	145	242	950	1,743	1,788	671	233	102	119	68	70	6,183
2517	168	234	286	378	1,272	894	391	215	113	150	89	87	4,277
2518	85	153	657	1,170	2,704	1,988	886	307	157	139	131	121	8,498
2519	78	168	420	538	1,404	1,529	1,074	369	172	165	86	108	6,111
2520	164	250	161	482	1,004	1,038	433	296	139	121	90	98	4,280
2521	108	106	325	1,005	1,711	1,596	774	252	94	106	72	115	5,264
2522	108	250	530	305	1,065	664	331	148	90	84	38	69	3,602
2523	51	114	368	1,055	1,083	2,336	526	216	111	96	37	78	6,071
2524	80	394	392	2,757	1,573	1,166	619	306	159	119	91	33	7,689
2525	137	125	212	696	1,070	1,457	923	254	115	102	69	75	5,235
2526	113	221	196	572	1,251	1,347	896	329	159	130	120	106	5,440
2527	122	221	375	1,230	1,500	1,637	627	271	136	127	105	95	6,446

ตารางที่ 2 มาตรฐานแหล่งน้ำในประเทศไทย

ลำดับ	ดัชนีคุณภาพน้ำ	ค่าทางสถิติ	หน่วย	การแบ่งประเภทคุณภาพน้ำตามการใช้ประโยชน์				
				ประเภท 1	ประเภท 2	ประเภท 3	ประเภท 4	ประเภท 5
1.	อุณหภูมิ (Temperature)		°C					
2.	ความเป็นกรดและด่าง (pH)		-	5.0-9.0	5.0-9.0	5.0-9.0	5.0-9.0	-
3.	ออกซิเจนละลาย (DO)	*	มก./ลิตร	6.0	4.0	2.0	2.0	-
4.	บีโอดี (BOD)	*	"	1.5	2.0	4.0	4.0	-
5.	โคลิฟอร์ม แบคทีเรีย	*	MPN/100 มล.	5,000	20,000	-	-	-
	- Total Coliform			1,000	4,000	-	-	-
	- Fecal Coliform			สูงสุดไม่เกิน	5.0	-	-	-
6.	ไนเตรทในรูปไนโตรเจน (NO_3-N)		มก./ลิตร	"	"	0.5	-	-
7.	แอมโมเนียไนโตรเจนในรูปไนโตรเจน (NH_3-N)		"	"	"	0.005	-	-
8.	ฟีนอล (Phenols)		"	"	"	0.1	-	-
9.	ทองแดง (Cu)		"	"	"	0.1	-	-
10.	นิกเกิล (Ni)		"	"	"	1.0	-	-
11.	แมกนีสิียม (Mg)		"	"	"	1.0	-	-
12.	สังกะสี (Zn)		"	"	"	1.0	-	-
13.	บรอมไทน์รวม (Total Hg)		"	"	"	0.002	-	-
14.	แคดเมียม (Cd)		"	"	"	0.005 * 0.05 **	-	-
15.	โครเมียม (Cr Hexavalent)		"	"	"	0.05	-	-
16.	ตะกั่ว (Pb)		"	"	"	0.05	-	-
17.	สารหนู (As)		"	"	"	0.01	-	-
18.	ซีลีเนียม (CN)		"	"	"	0.005	-	-
19.	กัมมันตภาพรังสี (Radioactivity)		เบคเคอเรล/ลิตร	"	"	0.1	-	-
	- ความเร็วตัวรวม α			"	"	1.0	-	-
	- ความเร็วตัวรวม β			"	"	0.05	-	-
20.	สารเคมีที่ใช้ในการป้องกันกำจัดศัตรูพืชและสัตว์รวม (Pesticides)		มก./ลิตร	"	"	1.0	-	-
	- DDT		ไมโครกรัม/ลิตร	"	"	0.02	-	-
	- o-PHC		"	"	"	0.1	-	-
	- Dieldrin		"	"	"	0.1	-	-
	- Aldrin		"	"	"	0.1	-	-
	- Heptachlor, Heptachlor epoxide		"	"	"	0.2	-	-
	- Endrin		"	"	"	สูงสุดไม่เกิน โดยวิธีที่กำหนด	-	-

หมายเหตุ

ข เป็นไปตามธรรมชาติ แต่เปลี่ยนแปลงไม่เกิน 3 ชม

ค เป็นไปตามธรรมชาติ แต่เปลี่ยนแปลงไม่เกิน 100 มก./ลิตร ในรูป $CaCO_3$

ด ในน้ำที่มีความกระด้างไม่เกินกว่า 100 มก./ลิตร ในรูป $CaCO_3$

ด* ในน้ำที่มีความกระด้างเกินกว่า 100 มก./ลิตร ในรูป $CaCO_3$ ไม่ได้กำหนด

ประเภท 1 ได้แก่แหล่งน้ำที่มีสภาพตามธรรมชาติโดยปราศจากน้ำทิ้งจากกิจกรรมทางอุตสาหกรรมและส.ม.ร.ด. เป็นประโยชน์

- การอุปโภคและบริโภคโดยตรงผ่านการฆ่าเชื้อโรคตามปกติก่อน
- การขยายพันธุ์ตามธรรมชาติของสิ่งมีชีวิตระดับพื้นฐาน
- การอนุรักษ์ระบบนิเวศวิทยาของแหล่งน้ำ

ประเภท 2 ได้แก่ แหล่งน้ำที่ได้รับน้ำทิ้งจากกิจกรรมบางประเภท และสามารถเป็นประโยชน์เพื่อ

- การอุปโภคและบริโภคโดยตรงผ่านการฆ่าเชื้อโรคตามปกติและผ่านการบำบัดปรับปรุงคุณภาพน้ำทิ้งไว้ก่อน
- การอนุรักษ์สัตว์น้ำประเภทต่าง ๆ
- การประมง
- การว่ายน้ำและกีฬาทางน้ำ

ประเภท 3 ได้แก่ แหล่งน้ำที่ได้รับน้ำทิ้งจากกิจกรรมบางประเภท และสามารถเป็นประโยชน์เพื่อ

- การอุปโภคและบริโภคโดยตรงผ่านการฆ่าเชื้อโรคตามปกติและผ่านการบำบัดปรับปรุงคุณภาพน้ำทิ้งไว้ก่อน
- เกษตรกรรม

ประเภท 4 ได้แก่ แหล่งน้ำที่ได้รับน้ำทิ้งจากกิจกรรมบางประเภท และสามารถเป็นประโยชน์เพื่อ

- การอุปโภคและบริโภคโดยตรงผ่านการฆ่าเชื้อโรคตามปกติและผ่านการบำบัดปรับปรุงคุณภาพน้ำทิ้งไว้ก่อน
- อุตสาหกรรม

ประเภท 5 ได้แก่ แหล่งน้ำที่ได้รับน้ำทิ้งจากกิจกรรมบางประเภทเจือปน และสามารถเป็นประโยชน์เพื่อ

- การคมนาคม

* ใช้กับแหล่งน้ำที่มี 50 มก/ลิตร และใช้กับพื้นที่ชุมชนและกักเก็บความสะอาดของน้ำดื่ม

FILE : CHILL

CALCULATION REAERATION RATE COEFFICIENT (k2)
BY CHURCHILL'S EQUATION

$$k2 = 5.026 * ((V^{0.969}) / (h^{1.673}))$$

$$k2 (t) = k2 * (1.0238^{(Temp-20)})$$

Month : JULY

STATION	Velocity (V)		0.969 V [^]	Depth (h)			k2	Temp (C)	k2 (t)
	m/sec	ft/sec		m	ft	h [^]			
1	0.7001	2.29709	2.2386	3.585	11.76	17.642	0.63773	27.2	0.75542
2	1.0642	3.49170	3.3589	3.402	11.16	16.742	1.00836	28.5	1.23152
3	1.2514	4.10594	3.9300	2.7975	9.178	13.767	1.43474	26.5	1.67175
4	0.1395	0.45791	0.4691	1.45	4.757	7.1358	0.33042	27.6	0.39510
5	0.5662	1.85762	1.8222	1.156	3.792	5.6889	1.60993	29.5	2.01303

Month : SEPTEMBER

STATION	Velocity (V)		0.969 V [^]	Depth (h)			k2	Temp (C)	k2 (t)
	m/sec	ft/sec		m	ft	h [^]			
1	0.8767	2.87657	2.7838	2.37	7.775	11.663	1.19963	28	1.44800
2	1.0840	3.55650	3.4193	2.04	6.692	10.039	1.71181	28.5	2.09067
3	0.4708	1.54476	1.5240	2.0875	6.848	10.273	0.74563	29	0.92143
4	0.5571	1.82803	1.7941	1.5625	5.126	7.6894	1.17270	29	1.44918
5	0.6943	2.27797	2.2205	2.05	6.725	10.088	1.10625	30	1.39961

Month : NOVEMBER

STATION	Velocity (V)		0.969 V [^]	Depth (h)			k2	Temp (C)	k2 (t)
	m/sec	ft/sec		m	ft	h [^]			
1	0.8132	2.66821	2.5882	1.525	5.003	7.5049	1.73334	25.5	1.97272
2	0.5843	1.91704	1.8787	1.7133	5.621	8.4315	1.11991	25	1.25967
3	1.0608	3.48035	3.3483	2.05	6.725	10.088	1.66811	27.5	1.98993
4	0.1869	0.61336	0.6227	1.8125	5.946	8.9197	0.35088	27.5	0.41858
5	0.6359	2.08640	2.0393	1.728	5.669	8.5039	1.20531	27	1.42103

Month : MARCH

STATION	Velocity (V)		0.969 V [^]	Depth (h)			k2	Temp (C)	k2 (t)
	m/sec	ft/sec		m	ft	h [^]			
1	0.1228	0.40300	0.4145	1.58	5.183	7.7755	0.26793	27	0.31589
2	0.1611	0.52876	0.5393	1.7	5.577	8.3661	0.32399	27	0.38198
3	1.2995	4.26370	4.0762	2.575	8.448	12.672	1.61671	24.5	1.79721
4	0.8354	2.74102	2.6566	2.9875	9.801	14.702	0.90818	25.5	1.03361
5	0.8270	2.71327	2.6306	2.46	8.070	12.106	1.09210	25	1.22840

FILE : ISAACS

CALCULATION REAERATION RATE COEFFICIENT (k2)
BY ISAACS' EQUATION

$$k2 = 2.833*(V/(H^{(3/2)}))$$

$$k2 (t) = k2*(1.0238^{(Temp.-20)})$$

Month : JULY

Station	Velocity (V)		Depth (H)		H^(3/2)	k2 (20 C)	Temp. C	k2 per day
	m/sec	ft/sec	m	ft				
1	0.7001	2.297099	3.585	11.76180	40.33769	0.161330	27.2	0.191101
2	1.0642	3.491708	3.402	11.16141	37.28883	0.265280	28.5	0.323991
3	1.2514	4.105943	2.7975	9.178147	27.80561	0.418337	26.5	0.487444
4	0.1395	0.457913	1.45	4.757216	10.37598	0.125026	27.6	0.149497
5	0.5662	1.857620	1.156	3.792649	7.386082	0.712507	29.5	0.890908

Month : SEPTEMBER

Station	Velocity (V)		Depth (H)		H^(3/2)	k2 (20 C)	Temp. C	k2 per day
	m/sec	ft/sec	m	ft				
1	0.8767	2.876574	2.37	7.775588	21.68202	0.375856	28	0.453673
2	1.0840	3.556501	2.04	6.692911	17.31500	0.581898	28.5	0.710682
3	0.4708	1.544766	2.0875	6.848751	17.92326	0.244170	29	0.301736
4	0.5771	1.893651	1.5625	5.126310	11.60666	0.462209	29	0.571182
5	0.6943	2.277971	2.05	6.725719	17.44247	0.369987	30	0.468099

Month : NOVEMBER

Station	Velocity (V)		Depth (H)		H^(3/2)	k2 (20 C)	Temp. C	k2 per day
	m/sec	ft/sec	m	ft				
1	0.8132	2.668211	1.525	5.003279	11.19134	0.675436	25.5	0.768719
2	0.5843	1.917046	1.7133	5.621169	13.32723	0.407510	25	0.458368
3	1.0608	3.480353	2.05	6.725719	17.44247	0.565277	27.5	0.674334
4	0.1869	0.613362	1.8125	5.946520	14.50088	0.119831	27.5	0.142949
5	0.6359	2.086400	1.728	5.669289	13.49873	0.437876	27	0.516246

Month : MARCH

Station	Velocity (V)		Depth (H)		H^(3/2)	k2 (20 C)	Temp. C	k2 per day
	m/sec	ft/sec	m	ft				
1	0.1228	0.403001	1.58	5.183725	11.80220	0.096736	27	0.114050
2	0.1611	0.528766	1.7	5.577426	13.17197	0.113725	27	0.134080
3	1.2995	4.263702	2.575	8.448160	24.55518	0.491915	24.5	0.546837
4	0.8354	2.741019	2.9875	9.801506	30.68592	0.253057	25.5	0.288006
5	0.8270	2.713270	2.46	8.070863	22.92873	0.335242	25	0.377081

FILE : OWENS

CALCULATION REAERATION RATE COEFFICIENT (k2)
BY OWENS, EDWARD & GIBBS' EQUATION (1964)

$$k2 = 9.4 * V^{(0.67)} * h^{(-1.85)}$$

$$k2 (t) = k2 * 1.0238^{(Temp-20)}$$

Month : JULY

#	VELOCITY (V)		0.67	DEPTH (h)		-1.85	k2	Temp	k2 (t)
	m/sec	ft/sec	V [^]	m	ft	h [^]		(C)	
1	0.7001	2.29709	1.74578	3.585	11.7618	0.0104	0.17168	27.2	0.2033714
2	1.0642	3.49170	2.31118	3.402	11.1614	0.0115	0.25042	27.4	0.2980399
3	1.2514	4.10594	2.57624	2.7975	9.17814	0.0165	0.40088	26.5	0.4671065
4	0.1395	0.45791	0.59254	1.45	4.75721	0.0558	0.31099	27.6	0.3718643
5	0.5662	1.85762	1.51426	1.156	3.79265	0.0849	1.20860	29.5	1.5112229

Month : SEPTEMBER

#	VELOCITY (V)		0.67	DEPTH (h)		-1.85	k2	Temp	k2 (t)
	m/sec	ft/sec	V [^]	m	ft	h [^]		(C)	
1	0.8767	2.87657	2.02976	2.37	7.77559	0.0224	0.42925	28	0.5181300
2	1.0840	3.55650	2.33983	2.04	6.69291	0.0296	0.65301	28.5	0.7975423
3	0.4708	1.54476	1.33825	2.0875	6.84875	0.0284	0.35791	29	0.4423039
4	0.5571	1.82803	1.49806	1.5625	5.12631	0.0486	0.68472	29	0.8461632
5	0.6943	2.27797	1.73603	2.05	6.72572	0.0294	0.48014	30	0.6074626

Month : NOVEMBER

#	VELOCITY (V)		0.67	DEPTH (h)		-1.85	k2	Temp	k2 (t)
	m/sec	ft/sec	V [^]	m	ft	h [^]		(C)	
1	0.8132	2.66821	1.93004	1.525	5.00328	0.0508	0.92272	25.5	1.0501639
2	0.5843	1.91704	1.54655	1.7133	5.62106	0.0410	0.59611	25	0.6705069
3	1.0608	3.48035	2.30615	2.05	6.72572	0.0294	0.63782	27.5	0.7608727
4	0.1869	0.61336	0.72072	1.8125	5.94652	0.0369	0.25032	27.5	0.2986244
5	0.6359	2.08640	1.63680	1.728	5.66929	0.0403	0.62100	27	0.7321532

Month : MARCH

#	VELOCITY (V)		0.67	DEPTH (h)		-1.85	k2	Temp	k2 (t)
	m/sec	ft/sec	V [^]	m	ft	h [^]		(C)	
1	0.1228	0.40300	0.54394	1.58	5.18372	0.0476	0.24355	27	0.2871452
2	0.1611	0.52876	0.65250	1.7	5.57742	0.0416	0.25515	27	0.3008275
3	1.2995	4.26370	2.64214	2.575	8.44816	0.0192	0.47926	24.5	0.5327740
4	0.8354	2.74102	1.96517	2.9875	9.80150	0.0146	0.27079	25.5	0.3081912
5	0.8270	2.71327	1.95182	2.46	8.07086	0.0209	0.38527	25	0.4333528

FILE : LEAST\LJ1

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
 Station : NAN (1)

Day X	BOD Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0	0	3.476	0.5410797	0	0
1	0.525	2.951	0.4699692	0.4699692	1
2	0.943	2.533	0.4036351	0.8072703	4
3	1.274	2.202	0.3428173	1.0284519	9
4	1.538	1.938	0.2873537	1.1494150	16
5	1.747	1.729	0.2377949	1.1889749	25
10	1.832	1.644	0.2159018	2.1590181	100
15	2.825	0.651	-0.186419	-2.796285	225
20	3.476				
40		2.3121330		4.0068145	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.060790
b =	0.6776773
k1 =	0.060790
L =	4.760771
temp. =	27.2
k1 (t) =	0.084615

k1 = 0.085 per day

FILE : LEAST\LJ2

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
 Station : SA (2)

Day X	BOD Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0	0	3.912	0.5923988	0	0
1	0.364	3.548	0.5499836	0.5499836	1
2	0.653	3.259	0.5130843	1.0261687	4
3	0.882	3.03	0.4814426	1.4433278	9
4	1.064	2.848	0.4545399	1.8181599	16
5	1.209	2.703	0.4318460	2.1592302	25
10	1.663	2.249	0.3519894	3.5198945	100
15	2.896	1.016	0.0068937	0.1034056	225
20	3.912				
40		3.3821786		10.621170	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.057489
b =	0.8116802
k1 =	0.057489
L =	6.481570
temp. =	28.5
k1 (t) =	0.084944

k1 = 0.085 per day

FILE : LEAST\LJ3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
Station : DAM SITE (3)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	3.3105	0.5198935	0	0
1	0.445	2.8655	0.4572004	0.4572004	1
2	0.816	2.4945	0.3969835	0.7939670	4
3	1.103	2.2075	0.3439007	1.0317021	9
4	1.331	1.9795	0.2965555	1.1862220	16
5	1.512	1.7985	0.2549104	1.2745522	25
10	2.338	0.9725	-0.012110	-0.121103	100
15	2.83	0.4805	-0.318306	-4.774599	225
20	3.3105				

40 1.9390271 -0.152059 380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.074175
b =	0.7008610
temp. =	26.5

k1 = 0.10 per day
k1 (t) = 0.099979

FILE : LEAST\LJ4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
Station : PHATAO (4)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	3.308	0.5195655	0	0
1	0.182	3.126	0.4949889	0.4949889	1
2	0.327	2.981	0.4743619	0.9487239	4
3	0.441	2.867	0.4574276	1.3722830	9
4	0.533	2.775	0.4432629	1.7730519	16
5	0.605	2.703	0.4318460	2.1592302	25
10	2.305	1.003	0.0013009	0.0130093	100
15	3.087	0.221	-0.655607	-9.834115	225
20	3.308				

40 2.1671463 -3.072828 380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.102071
b =	0.8928573
temp. =	27.6

k1 = 0.145 per day
k1 (t) = 0.144710

FILE : LEAST\LJ5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
 Station : UTTARADIT (5)

Day X	BOD Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0	0	3.005	0.4778444	0	0
1	0.353	2.652	0.4235735	0.4235735	1
2	0.634	2.371	0.3749315	0.7498631	4
3	0.857	2.148	0.3320342	0.9961028	9
4	1.034	1.971	0.2946866	1.1787464	16
5	1.175	1.83	0.2624510	1.3122554	25
10	1.669	1.336	0.1258064	1.2580645	100
15	2.718	0.287	-0.542118	-8.131771	225
20	3.005				

40 1.7492098 -2.213165 380

n = 7

m b
 40 7 = 1.749209
 380 40 = -2.21316
 1600 280 = 69.96839
 2660 280 = -15.4921
 1060 0 = -85.4605
 m = -0.080623 k1 = 0.080623
 b = 0.7105909 L = 5.135596
 temp. = 29.5 k1 (t) = 0.124724

k1 = 0.125 per day

FILE : LEAST\LS1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : SEPTEMBER
 Station : NAN (1)

Day X	BOD Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0	0	2.5205	0.4014867	0	0
1	0.273	2.2475	0.3516997	0.3516997	1
2	0.49	2.0305	0.3076029	0.6152059	4
3	0.662	1.8585	0.2691625	0.8074876	9
4	0.799	1.7215	0.2359070	0.9436281	16
5	0.907	1.6135	0.2077689	1.0388448	25
10	1.676	0.8445	-0.073400	-0.734003	100
15	2.465	0.0555	-1.255707	-18.83560	225
20	2.5205				

40 0.4445205 -15.81274 380

n = 7

m b
 40 7 = 0.444520
 380 40 = -15.8127
 1600 280 = 17.78082
 2660 280 = -110.689
 1060 0 = -128.470
 m = -0.121198 k1 = 0.121198
 b = 0.7560636 L = 5.702479
 temp. = 28 k1 (t) = 0.175012

k1 = 0.175 per day

FILE : LEAST\LS2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : SEPTEMBER
 Station : SA (2)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0		0	2.2505	0.3522790	0	0	0
1	0.297	1	1.9535	0.2908134	0.2908134	0.2908134	1
2	0.533	2	1.7175	0.2348967	0.4697934	0.4697934	4
3	0.72	3	1.5305	0.1848333	0.5545000	0.5545000	9
4	0.869	4	1.3815	0.1403508	0.5614035	0.5614035	16
5	0.987	5	1.2635	0.1015752	0.5078762	0.5078762	25
10	1.22	10	1.0305	0.0130479	0.1304799	0.1304799	100
15	2.201	15	0.0495	-1.305394	-19.58092	-19.58092	225
20	2.2505	20					
40		40		0.0124018	-17.06605	-17.06605	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.113168
b =	0.6484480
temp. =	28.5

k1 = 0.167 per day

k1 (t) = 0.167213

FILE : LEAST\LS3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : SEPTEMBER
 Station : DAM SITE (3)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0		0	2.46	0.3909351	0	0	0
1	0.244	1	2.216	0.3455697	0.3455697	0.3455697	1
2	0.438	2	2.022	0.3057811	0.6115623	0.6115623	4
3	0.592	3	1.868	0.2713768	0.8141306	0.8141306	9
4	0.715	4	1.745	0.2417954	0.9671817	0.9671817	16
5	0.812	5	1.648	0.2169572	1.0847860	1.0847860	25
10	1.213	10	1.247	0.0958664	0.9586645	0.9586645	100
15	2.406	15	0.054	-1.267606	-19.01409	-19.01409	225
20	2.46	20					
40		40		0.6006757	-14.23219	-14.23219	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.116653
b =	0.7524006
temp. =	29

k1 = 0.176 per day

k1 (t) = 0.176366

FILE : LEAST\LS4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THERIAULT'S LEAST-SQUARE METHOD

Month : SEPTEMBER
Station : PHATAO (4)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	2.156	0.3336487	0	0
1	0.173	1.983	0.2973227	0.2973227	1
2	0.311	1.845	0.2659963	0.5319927	4
3	0.42	1.736	0.2395497	0.7186491	9
4	0.507	1.649	0.2172206	0.8688826	16
5	0.576	1.58	0.1986570	0.9932854	25
10	1.077	1.079	0.0330214	0.3302144	100
15	2.11	0.046	-1.337242	-20.05863	225
20	2.156				
40		0.2481745		-16.31828	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.117127
b =	0.7047526
temp. =	29

k1 = 0.177 per day

k1 (t) = 0.177083

FILE : LEAST\LS5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THERIAULT'S LEAST-SQUARE METHOD

Month : SEPTEMBER
Station : UTTARADIT (5)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	2.425	0.3847117	0	0
1	0.219	2.206	0.3436055	0.3436055	1
2	0.392	2.033	0.3081373	0.6162747	4
3	0.53	1.895	0.2776092	0.8338276	9
4	0.64	1.785	0.2516382	1.0065528	16
5	0.727	1.698	0.2299376	1.1496884	25
10	0.977	1.448	0.1607685	1.6076856	100
15	2.348	0.077	-1.113509	-16.70263	225
20	2.425				
40		0.8428990		-11.14600	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.105413
b =	0.7227752
temp. =	30

k1 = 0.167 per day

k1 (t) = 0.166863

FILE : LEAST\LN1

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
THERIAULT'S LEAST-SQUARE METHOD

Month : NOVEMBER
Station : NAN (1)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	1.636	0.2137832	0	0
1	0.244	1.392	0.1436392	0.1436392	1
2	0.438	1.198	0.0784568	0.1569136	4
3	0.592	1.044	0.0187004	0.0561014	9
4	0.67	0.966	-0.015022	-0.060091	16
5	0.76	0.876	-0.057495	-0.287479	25
10	0.941	0.695	-0.158015	-1.580151	100
15	1.488	0.148	-0.829738	-12.44607	225
20	1.636				
40			-0.605692	-14.01714	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0

m = -0.069709 k1 = 0.069709
b = 0.3118137 L = 2.050282

temp. = 25.5 k1 (t) = 0.089742

k1 = 0.09 per day

FILE : LEAST\LN2

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
THERIAULT'S LEAST-SQUARE METHOD

Month : NOVEMBER
Station : SA (2)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	1.067	0.0281644	0	0
1	0.087	0.98	-0.008773	-0.008773	1
2	0.156	0.911	-0.040481	-0.080963	4
3	0.21	0.857	-0.067019	-0.201037	9
4	0.195	0.872	-0.059483	-0.237934	16
5	0.222	0.845	-0.073143	-0.365716	25
10	0.437	0.63	-0.200659	-2.006594	100
15	0.816	0.251	-0.600326	-9.004894	225
20	1.067				
40			-1.021722	-11.90593	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0

m = -0.040068 k1 = 0.040068
b = 0.0830025 L = 1.210605

temp. = 25 k1 (t) = 0.050412

k1 = 0.05 per day

FILE : LEAST\LN3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : NOVEMBER
 Station : DAM SITE (3)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2	
0		0		1.99	0.2988530	0	0	
1	0.369	1	0.369	1.621	0.2097830	0.2097830	1	
2	0.662	2	0.662	1.328	0.1231980	0.2463961	4	
3	0.728	3	0.728	1.262	0.1010593	0.3031780	9	
4	0.788	4	0.788	1.202	0.0799044	0.3196178	16	
5	0.895	5	0.895	1.095	0.0394141	0.1970705	25	
10	1.445	10	1.445	0.545	-0.263603	-2.636034	100	
15	1.522	15	1.522	0.468	-0.329754	-4.946312	225	
20	1.99	20	1.99					
40		40				0.2588544	-6.306301	380

n = 7

m = 40
 b = 380
 m = 1600
 b = 2660
 m = 1060
 m = -0.051413
 b = 0.3307705
 temp. = 27.5
 k1 = 0.073 per day

FILE : LEAST\LN4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : NOVEMBER
 Station : PHATAO (4)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2	
0		0		1.972	0.2949069	0	0	
1	0.238	1	0.238	1.734	0.2390490	0.2390490	1	
2	0.427	2	0.427	1.545	0.1889284	0.3778569	4	
3	0.577	3	0.577	1.395	0.1445742	0.4337226	9	
4	0.744	4	0.744	1.228	0.0891983	0.3567934	16	
5	0.845	5	0.845	1.127	0.0519239	0.2596195	25	
10	1.193	10	1.193	0.779	-0.108462	-1.084625	100	
15	1.74	15	1.74	0.232	-0.634512	-9.517680	225	
20	1.972	20	1.972					
40		40				0.2636064	-8.935263	380

n = 7

m = 40
 b = 380
 m = 1600
 b = 2660
 m = 1060
 m = -0.069029
 b = 0.4323971
 temp. = 27.5
 k1 = 0.097 per day

FILE : LEAST\LN5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : NOVEMBER
 Station : UTTARADIT (5)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	1.636	0.2137832	0	0
1	0.245	1.391	0.1433271	0.1433271	1
2	0.441	1.195	0.0773679	0.1547358	4
3	0.596	1.04	0.0170333	0.0511000	9
4	0.613	1.023	0.0098756	0.0395025	16
5	0.697	0.939	-0.027334	-0.136672	25
10	1.143	0.493	-0.307153	-3.071530	100
15	1.49	0.146	-0.835647	-12.53470	225
20	1.636				
40		-0.708747	-15.35424		380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0

m = -0.074650 k1 = 0.074650
 b = 0.3253262 L = 2.115077

temp. = 27 k1 (t) = 0.102958
 k1 = 0.103 per day

FILE : LEAST\LM1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : MARCH
 Station : NAN (1)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0	0	1.629	0.2119210	0	0
1	0.263	1.366	0.1354506	0.1354506	1
2	0.329	1.3	0.1139433	0.2278867	4
3	0.427	1.202	0.0799044	0.2397134	9
4	0.493	1.136	0.0553783	0.2215133	16
5	0.56	1.069	0.0289777	0.1448885	25
10	1.032	0.597	-0.224025	-2.240256	100
15	1.237	0.392	-0.406713	-6.100708	225
20	1.629				
40		-0.005163	-7.371513		380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0

m = -0.048484 k1 = 0.048484
 b = 0.2763190 L = 1.889378

temp. = 27 k1 (t) = 0.066870
 k1 = 0.067 per day

FILE : LEAST\LM2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : MARCH
 Station : SA (2)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0		0	0	1.255	0.0986437	0	0
1	0.131	1	0.131	1.124	0.0507663	0.0507663	1
2	0.329	2	0.329	0.926	-0.033389	-0.066778	4
3	0.394	3	0.394	0.861	-0.064996	-0.194990	9
4	0.397	4	0.397	0.858	-0.066512	-0.266050	16
5	0.451	5	0.451	0.804	-0.094743	-0.473719	25
10	0.543	10	0.543	0.712	-0.147520	-1.475200	100
15	0.851	15	0.851	0.404	-0.393618	-5.904279	225
20	1.255	20	1.255				
40		40		-0.651371		-8.330252	380

n = 7

m		b	
40	7	=	-0.65137
380	40	=	-8.33025
1600	280	=	-26.0548
2660	280	=	-58.3117
1060	0	=	-32.2569
m =	-0.030431	k1 =	0.030431
b =	0.0808387	L =	1.204588
temp. =	27	k1 (t) =	0.041970

k1 = 0.042 per day

FILE : LEAST\LM3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : MARCH
 Station : DAM SITE (3)

Day	BOD	X	Y	L-Y	log(L-Y)	X*log(L-Y)	X^2
0		0	0	1.931	0.2857822	0	0
1	0.132	1	0.132	1.799	0.2550311	0.2550311	1
2	0.789	2	0.789	1.142	0.0576661	0.1153322	4
3	0.911	3	0.911	1.02	0.0086001	0.0258005	9
4	0.821	4	0.821	1.11	0.0453229	0.1812919	16
5	0.933	5	0.933	0.998	-0.000869	-0.004347	25
10	1.065	10	1.065	0.866	-0.062482	-0.624821	100
15	1.749	15	1.749	0.182	-0.739928	-11.09892	225
20	1.931	20	1.931				
40		40		-0.150877		-11.15064	380

n = 7

m		b	
40	7	=	-0.15087
380	40	=	-11.1506
1600	280	=	-6.03509
2660	280	=	-78.0544
1060	0	=	-72.0193
m =	-0.067942	k1 =	0.067942
b =	0.3666907	L =	2.326434
temp. =	24.5	k1 (t) =	0.083541

k1 = 0.084 per day

FILE : LEAST\LM4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : MARCH
 Station : PHATAO (4)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0		1.616	0.2084413	0	0
1	0.132	1.484	0.1714339	0.1714339	1
2	0.296	1.32	0.1205739	0.2411478	4
3	0.526	1.09	0.0374264	0.1122794	9
4	0.505	1.11	0.0457140	0.1828562	16
5	0.573	1.043	0.0182843	0.0914215	25
10	0.696	0.92	-0.036212	-0.362121	100
15	1.106	0.51	-0.292429	-4.386447	225
20	1.616				
40		0.2732320		-3.949430	380

n = 7

m	b
40	7
380	40
1600	280
2560	280
1060	0
m =	-0.036391
b =	0.2469862
k1 =	0.036391
L =	1.765981
temp. =	25.5
k1 (t) =	0.046850

k1 = 0.047 per day

FILE : LEAST\LM5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
 THERIAULT'S LEAST-SQUARE METHOD

Month : JULY
 Station : UTTARADIT (5)

Day	BOD	L-Y	log(L-Y)	X*log(L-Y)	X^2
X	Y				
0		1.642	0.2153731	0	0
1	0.527	1.115	0.0472748	0.0472748	1
2	0.658	0.984	-0.007004	-0.014009	4
3	0.79	0.852	-0.069560	-0.208681	9
4	0.866	0.776	-0.110138	-0.440553	16
5	0.762	0.88	-0.055517	-0.277586	25
10	0.988	0.654	-0.184422	-1.844222	100
15	1.467	0.175	-0.756961	-11.35442	225
20	1.642				
40		-0.920957		-14.09220	380

n = 7

m	b
40	7
380	40
1600	280
2660	280
1060	0
m =	-0.058308
b =	0.2016269
k1 =	0.058308
L =	1.590841
temp. =	25
k1 (t) =	0.073361

k1 = 0.074 per day

FILE : RHAME\RJ1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : JULY
Station : NAN (1)

Day	BOD
1	0.525
2	0.943
4	1.538
5	1.747
10	1.832
20	3.476

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.525	0.943	1.747	1.832
BOD at T days (Z)	0.943	1.538	1.832	3.476
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.098983	0.199994	1.312873	0.047023
k1 at 20 C	0.098983	0.099997	0.262574	0.004702
Temperature	27.2	27.2	27.2	27.2
k1 (t)	0.137777	0.139188	0.365484	0.006545

Day	k1
1 and 2	0.138
2 and 4	0.139
4 and 10	0.365
10 and 20	0.007
average	0.16225

FILE : RHAME\RJ2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : JULY
Station : SA (2)

Day	BOD
1	0.364
2	0.653
4	1.064
5	1.209
10	1.633
20	3.912

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.364	0.653	1.209	1.633
BOD at T days (Z)	0.653	1.064	1.633	3.912
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.100203	0.201071	0.455060	-0.14475
k1 at 20 C	0.100203	0.100535	0.091012	-0.01447
Temperature	28.5	28.5	28.5	28.5
k1	0.148057	0.148548	0.134476	-0.02138

Day	k1
1 and 2	0.148
2 and 4	0.149
4 and 10	0.134
10 and 20	-0.021
average	0.1025

FILE : RHAME\RJ3

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : JULY
Station : DAM SITE (3)

Day	BOD
1	0.455
2	0.816
4	1.331
5	1.5115
10	2.3375
20	3.3105

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.455	0.816	1.5115	2.3375
BOD at T days (Z)	0.816	1.331	2.3375	3.3105
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.100504	0.199882	0.262428	0.380638
k1 at 20 C	0.100504	0.099941	0.052485	0.038063
Temperature	26.5	26.5	26.5	26.5
k1	0.135468	0.134709	0.070744	0.051305

Day	k1
1 and 2	0.135
2 and 4	0.135
5 and 10	0.071
10 and 20	0.051
average	0.098

FILE : RHAME\RJ4

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : JULY
Station : PHATAO (4)

Day	BOD
1	0.182
2	0.327
4	0.533
5	0.605
10	2.305
20	3.308

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.182	0.327	0.605	2.305
BOD at T days (Z)	0.327	0.533	2.305	3.308
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.098703	0.200680	-0.44869	0.361369
k1 at 20 C	0.098703	0.100340	-0.08973	0.036136
Temperature	27.6	27.6	27.6	27.6
k1	0.139935	0.142255	-0.12722	0.051232

Day	k1
1 and 2	0.14
2 and 4	0.142
5 and 10	-0.127
10 and 20	0.051
average	0.0515

FILE : RHAME\RJ5

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : JULY

Station : UTTARADIT (5)

Day	BOD
1	0.353
2	0.634
4	1.034
5	1.175
10	1.699
20	3.005

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.353	0.634	1.175	1.699
BOD at T days (Z)	0.634	1.034	1.699	3.005
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.099068	0.200029	0.350706	0.114250
k1 at 20 C	0.099068	0.100014	0.070141	0.011425
Temperature	29.5	29.5	29.5	29.5
k1	0.153259	0.154723	0.108509	0.017674

Day	k1
k1 from BOD at 1 and 2	0.153
k1 from BOD at 2 and 4	0.155
k1 from BOD at 5 and 10	0.109
k1 from BOD at 10 and 20	0.018
average	0.10875

FILE : RHAME\RS1

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : SEPTEMBER

Station : NAN (1)

Day	BOD
1	0.273
2	0.49
4	0.799
5	0.9065
10	1.676
20	2.5205

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.273	0.49	0.9065	1.676
BOD at T days (Z)	0.49	0.799	1.676	2.5205
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.099702	0.200237	0.071159	0.297674
k1 at 20 C	0.099702	0.100118	0.014231	0.029767
Temperature	28	28	28	28
k1	0.143973	0.144573	0.020551	0.042984

Day	k1
k1 from BOD at 1 and 2	0.144
k1 from BOD at 2 and 4	0.146
k1 from BOD at 5 and 10	0.021
k1 from BOD at 10 and 20	0.043
average	0.0885



FILE : RHAME\RS2

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : SEPTEMBER
Station : SA (2)

Day	BOD
1	0.297
2	0.533
4	0.869
5	0.9865
10	1.22
20	2.2505

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.297	0.533	0.9865	1.22
BOD at T days (Z)	0.533	0.869	1.22	2.2505
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.099844	0.200387	0.625810	0.073311
k1 at 20 C	0.099844	0.100193	0.125162	0.007331
Temperature	28.5	28.5	28.5	28.5
k1	0.147526	0.148043	0.184935	0.010832

Day	k1
1 and 2	0.148
2 and 4	0.148
5 and 10	0.185
10 and 20	0.011
average	0.123

FILE : RHAME\RS3

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : SEPTEMBER
Station : DAM SITE (3)

Day	BOD
1	0.244
2	0.438
4	0.715
5	0.8115
10	1.213
20	2.46

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.244	0.438	0.8115	1.213
BOD at T days (Z)	0.438	0.715	1.213	2.46
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.099588	0.198994	0.305602	-0.01200
k1 at 20 C	0.099588	0.099497	0.061120	-0.00120
Temperature	29	29	29	29
k1	0.150566	0.150428	0.092407	-0.00181

Day	k1
1 from BOD at 1 and 2	0.151
1 from BOD at 2 and 4	0.15
1 from BOD at 5 and 10	0.092
1 from BOD at 10 and 20	-0.002
average	0.09775

FILE : RHAME\RS4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : SEPTEMBER
Station : PHATAO (4)

Day	BOD
1	0.173
2	0.311
4	0.507
5	0.5755
10	1.077
20	2.156

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.173	0.311	0.5755	1.077
BOD at T days (Z)	0.311	0.507	1.077	2.156
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.098167	0.200504	0.059774	-0.00080
k1 at 20 C	0.098167	0.100252	0.011954	-0.00008
Temperature	29	29	29	29
k1	0.148417	0.151570	0.018074	-0.00012

Day	k1
k1 from BOD at 1 and 2	0.148
k1 from BOD at 2 and 4	0.152
k1 from BOD at 5 and 10	0.018
k1 from BOD at 10 and 20	0.00012
average	0.07947

FILE : RHAME\RS5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : SEPTEMBER
Station : UTTARADIT (5)

Day	BOD
1	0.173
2	0.392
4	0.64
5	0.7265
10	0.977
20	2.4245

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.173	0.392	0.7265	0.977
BOD at T days (Z)	0.392	0.64	0.977	2.4245
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	-0.10239	0.198834	0.462427	-0.17072
k1 at 20 C	-0.10239	0.099417	0.092485	-0.01707
Temperature	30	30	30	30
k1	-0.16209	0.157372	0.146399	-0.02702

Day	k1
k1 from BOD at 1 and 2	-0.162
k1 from BOD at 2 and 4	0.157
k1 from BOD at 5 and 10	0.146
k1 from BOD at 10 and 20	-0.027
average	0.0285

FILE : RHAME\RN1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : NOVEMBER
Station : NAN (1)

Day	BOD
1	0.244
2	0.438
4	0.67
5	0.845
10	1.193
20	1.636

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.244	0.438	0.845	1.193
BOD at T days (Z)	0.438	0.67	1.193	1.636
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.099588	0.275986	0.385277	0.430236
k1 at 20 C	0.099588	0.137993	0.077055	0.043023
Temperature	25.5	25.5	25.5	25.5
k1	0.128207	0.177649	0.099199	0.055387

Day	k1
k1 from BOD at 1 and 2	0.128
k1 from BOD at 2 and 4	0.178
k1 from BOD at 5 and 10	0.099
k1 from BOD at 10 and 20	0.055
average	0.115

FILE : RHAME\RN2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : NOVEMBER
Station : SA (2)

Day	BOD
1	0.087
2	0.156
4	0.195
5	0.222
10	0.437
20	1.0655

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.087	0.156	0.222	0.437
BOD at T days (Z)	0.156	0.195	0.437	1.0655
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.100670	0.602059	0.013914	-0.15782
k1 at 20 C	0.100670	0.301029	0.002782	-0.01578
Temperature	25	25	25	25
k1	0.126658	0.378741	0.003501	-0.01985

Day	k1
k1 from BOD at 1 and 2	0.127
k1 from BOD at 2 and 4	0.379
k1 from BOD at 5 and 10	0.004
k1 from BOD at 10 and 20	-0.02
average	0.1225

FILE : RHAME\RN3

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : NOVEMBER
Station : DAM SITE (3)

Day	BOD
1	0.369
2	0.662
4	0.788
5	0.895
10	1.445
20	1.99

t/T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.369	0.662	0.895	1.445
BOD at T days (Z)	0.662	0.788	1.445	1.99
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.100158	0.720487	0.211460	0.423471
k1 at 20 C	0.100158	0.360243	0.042292	0.042347
Temperature	27.5	27.5	27.5	27.5
k1	0.141347	0.508389	0.059684	0.059761

Day	k1
1 and 2	0.141
2 and 4	0.508
5 and 10	0.06
10 and 20	0.06
average	0.19225

FILE : RHAME\RN4

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : NOVEMBER
Station : PHATAO (4)

Day	BOD
1	0.238
2	0.427
4	0.744
5	0.845
10	1.193
20	1.972

t/T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.238	0.427	0.845	1.193
BOD at T days (Z)	0.427	0.744	1.193	1.972
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.100115	0.129368	0.385277	0.185102
k1 at 20 C	0.100115	0.064684	0.077055	0.018510
Temperature	27.5	27.5	27.5	27.5
k1	0.141286	0.091284	0.108743	0.026122

Day	k1
1 from BOD at 1 and 2	0.141
1 from BOD at 2 and 4	0.091
1 from BOD at 5 and 10	0.109
1 from BOD at 10 and 20	0.026
average	0.09175

FILE : RHAME\RN5

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : NOVEMBER

Station : UTTARADIT (5)

Day	BOD
1	0.241
2	0.441
4	0.613
5	0.697
10	1.143
20	1.636

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.245	0.441	0.697	1.143
BOD at T days (Z)	0.441	0.613	1.143	1.636
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.096910	0.408910	0.193897	0.365199
k1 at 20 C	0.096910	0.204455	0.038779	0.036519
Temperature	27	27	27	27
k1	0.133658	0.281984	0.053484	0.050368

Day	k1
k1 from BOD at 1 and 2	0.134
k1 from BOD at 2 and 4	0.282
k1 from BOD at 5 and 10	0.053
k1 from BOD at 10 and 20	0.05
k1 average	0.12975

FILE : RHAME\RM1

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : MARCH

Station : NAN (1)

Day	BOD
1	0.263
2	0.329
4	0.493
5	0.56
10	1.032
20	1.629

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.263	0.329	0.56	1.032
BOD at T days (Z)	0.329	0.493	1.032	1.629
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.600411	0.302352	0.074246	0.237705
k1 at 20 C	0.600411	0.151176	0.014839	0.023770
Temperature	27	27	27	27
k1	0.828087	0.208501	0.020480	0.032784

Day	k1
k1 from BOD at 1 and 2	0.828
k1 from BOD at 2 and 4	0.209
k1 from BOD at 5 and 10	0.02
k1 from BOD at 10 and 20	0.033
k1 average	0.2725

FILE : RHAME\RM2

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : MARCH
Station : SA (2)

Day	BOD
1	0.131
2	0.329
4	0.397
5	0.451
10	0.543
20	1.255

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.131	0.329	0.451	0.543
BOD at T days (Z)	0.329	0.397	0.543	1.255
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	-0.17939	0.684686	0.690388	-0.11768
k1 at 20 C	-0.17939	0.342343	0.138077	-0.01176
Temperature	27	27	27	27
k1	-0.24741	0.472159	0.190436	-0.01623

Day	k1
1 and 2	-0.247
2 and 4	0.472
5 and 10	0.19
10 and 20	-0.016
average	0.09975

FILE : RHAME\RM3

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : MARCH
Station : DAM SITE (3)

Day	BOD
1	0.132
2	0.789
4	0.821
5	0.993
10	1.065
20	1.931

t\T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.132	0.789	0.993	1.065
BOD at T days (Z)	0.789	0.821	1.065	1.931
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	-0.69699	1.391927	1.139616	0.089831
k1 at 20 C	-0.69699	0.695963	0.227923	0.008983
Temperature	24.5	24.5	24.5	24.5
k1	-0.85701	0.855749	0.280252	0.011045

Day	k1
1 and 2	-0.857
2 and 4	0.856
5 and 10	0.28
10 and 20	0.011
average	0.0725

FILE : RHAME\RM4

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : MARCH
Station : PHATAO (4)

Day	BOD
1	0.132
2	0.296
4	0.505
5	0.573
10	0.696
20	1.616

t/T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.132	0.296	0.573	0.696
BOD at T days (Z)	0.296	0.505	0.696	1.616
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	-0.09426	0.151145	0.668249	-0.12117
k1 at 20 C	-0.09426	0.075572	0.133649	-0.01211
Temperature	25.5	25.5	25.5	25.5
k1	-0.12136	0.097290	0.172058	-0.01560

Day	k1
1 and 2	-0.121
2 and 4	0.97
5 and 10	0.172
10 and 20	-0.016
average	0.25125

FILE : RHAME\RMS

CACULATION DEOXYGENATION RATE COEFFICIENT (k1)
BY RHAME'S TWO POINT METHOD

Month : MARCH
Station : UTTARADIT (5)

Day	BOD
1	0.527
2	0.658
4	0.762
5	0.866
10	0.988
20	1.642

t/T	1\2	2\4	5\10	10\20
BOD at t days (X)	0.527	0.658	0.866	0.988
BOD at T days (Z)	0.658	0.762	0.988	1.642
1/(T-t)	1	0.5	0.2	0.1
log(X/(Z-X))	0.604539	0.801192	0.851158	0.179179
k1 at 20 C	0.604539	0.400596	0.170231	0.017917
Temperature	25	25	25	25
k1	0.760602	0.504011	0.214177	0.022543

Day	k1
1 and 2	0.761
2 and 4	0.504
5 and 10	0.214
10 and 20	0.023
average	0.3755

FILE : STP\JUL

CALCULATION DEOXYGENATION & REAERATION RATE COEFFICIENT
(k1 & k2)
BY STREETER & PHELPS' EQUATION

$$k1 = (1/t) * \log(La/Lb)$$

$$k2 = (k1 * \text{avgL} / \text{avgD}) - (\text{delD} / (2.3 * t * \text{avgD}))$$

Month : JULY

	Station				
	1	2	3	4	5
DOsat	7.84	7.65	7.95	7.78	7.51
DO	3.65	3.58	0.83	1.117	1.65
Flow	219877.1	424613	351544.3	10827.33	93763.28
D	8.0E+10	1.5E+11	2.2E+11	6.2E+09	4.7E+10
avgD	1.1E+11		1.1E+11	2.7E+10	1.3E+11
delD	-7.0E+10		2.1E+11	-4.1E+10	1.7E+11
BOD (20)	3.476	3.912	3.3105	3.308	3.005
L	6.6E+10	1.4E+11	1.0E+11	3.1E+09	2.4E+10
avgL	1.0E+11		5.2E+10	1.4E+10	
log La/Lb	-0.33713		1.511786	-0.89579	
Time (t)	0.57725		0.470098	1.377523	
k1	-0.58403		3.215892	-0.65029	
k2	-0.07586		-0.24801	0.152490	

	k1	k2
Between Station 1 and 2	-0.584	-0.076
Between Station 3 and 4	3.216	-0.248
Between Station 4 and 5	-0.65	0.152

FILE : STP\SEP

CALCULATION DEOXYGENATION & REAERATION RATE COEFFICIENT
(k1 & k2)
BY STREETER & PHELPS' EQUATION

$$k1 = (1/t) * \log(La/Lb)$$

$$k2 = (k1 * \text{avgL} / \text{avgD}) - (\text{delD} / (2.3 * t * \text{avgD}))$$

Month : SEPTEMBER

	Station				
	1	2	3	4	5
DOsat	7.72	7.65	7.58	7.58	7.44
DO	3.65	3.65	3.34	3.1	3.45
Flow	185360.1	257393	100702	59561.43	203871.6
D	6.5E+10	8.9E+10	3.7E+10	2.3E+10	7.0E+10
avgD	7.7E+10		3.0E+10	4.7E+10	5.4E+10
delD	-2.4E+10		1.4E+10	-4.7E+10	-3.3E+10
BOD (20)	2.5205	2.2505	2.46	2.156	2.425
L	4.0E+10	5.0E+10	2.1E+10	1.1E+10	4.3E+10
avgL	4.5E+10		1.6E+10	2.7E+10	
log La/Lb	-0.09337		0.285359	-0.58545	
Time (t)	0.519439		0.636105	0.776838	
k1	-0.17975		0.448604	-0.75363	
k2	0.152756		-0.07232	0.131901	

	k1	k2
Between Station 1 and 2	-0.18	0.153
Between Station 3 and 4	0.449	-0.072
Between Station 4 and 5	-0.754	0.132

FILE : STP\NOV

CALCULATION DEOXYGENATION & REAERATION RATE COEFFICIENT
(k1 & k2)
BY STREETER & PHELPS' EQUATION

$$k1 = (1/t) * \log(La/Lb)$$

$$k2 = (k1 * \text{avgL} / \text{avgD}) - (\text{delD} / (2.3 * t * \text{avgD}))$$

Month : NOVEMBER

	Station				
	1	2	3	4	5
DOsat	8.1	8.18	7.8	7.8	7.87
DO	7.55	8.12	6.43	7.6	7.65
Flow	112070.8	136790.4	218527.2	16537.31	157457.7
D	5.3E+09	7.1E+08	2.6E+10	2.9E+08	3.0E+09
avgD	3.0E+09		1.3E+10	1.6E+09	1.4E+10
delD	4.6E+09		2.6E+10	-2.7E+09	2.3E+10
BOD (20)	1.636	1.067	1.99	1.972	1.636
L	1.6E+10	1.3E+10	3.8E+10	2.8E+09	2.2E+10
avgL	1.4E+10		2.0E+10	1.3E+10	
log La/Lb	0.099055		1.124986	-0.89757	
Time (t)	0.728768		0.524085	1.181475	
k1	0.135922		2.146573	-0.75970	
k2	-0.27195		1.692268	-5.20223	

	k1	k2
Between Station 1 and 2	0.136	-0.272
Between Station 3 and 4	2.147	1.692
Between Station 4 and 5	-0.76	-0.52

FILE : STP\MAR

CALCULATION DEOXYGENATION & REAERATION RATE COEFFICIENT
(k1 & k2)
BY STREETER & PHELPS' EQUATION

$$k1 = (1/t) * \log(La/Lb)$$

$$k2 = (k1 * \text{avgL} / \text{avgD}) - (\text{delD} / (2.3 * t * \text{avgD}))$$

Month : MARCH

	Station				
	1	2	3	4	5
DOsat	7.87	7.87	8.252	8.1	8.18
DO	7.605	7.45	5.78	6.301	6.75
Flow	12176.06	30966.46	327818.8	203941.9	291312.5
D	2.8E+08	1.1E+09	7.0E+10	3.2E+10	3.6E+10
avgD	7.0E+08		5.1E+10	3.4E+10	5.3E+10
delD	-8.4E+08		3.8E+10	-4.3E+09	3.4E+10
BOD (20)	1.629	1.255	1.931	1.616	1.642
L	1.7E+09	3.4E+09	5.5E+10	2.8E+10	4.1E+10
avgL	2.5E+09		4.2E+10	3.5E+10	
log La/Lb	-0.29210		0.283468	-0.16178	
Time (t)	3.586289		0.306287	0.584806	
k1	-0.08145		0.925499	-0.27664	
k2	-0.14845		-0.31274	-0.19097	

	k1	k2
Between Station 1 and 2	-0.081	-0.148
Between Station 3 and 4	0.925	-0.313
Between Station 4 and 5	-0.277	-0.191

FILE : THOMAS\TJI

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : JULY
Station : NAN (1)

Day	n	BOD	y	y'	y'y	y^2
	0					
	1	0.525	0.4715	0.247537	0.275625	
	2	0.943	0.3745	0.353153	0.889249	
	3	1.274	0.2975	0.379015	1.623076	
	4	1.538	0.2365	0.363737	2.365444	
	5	1.747	0.049	0.085603	3.052009	
	10	1.832	0.1078	0.197489	3.356224	
	15	2.825	0.1644	0.46443	7.980625	
	20	3.476				
SUM	7	10.684	1.7012	2.090965	19.54225	

a	b	
7	10.684	= 1.7012
10.684	19.54225	= 2.090965
74.788	114.1478	18.17562
74.788	136.7957	14.63675
0	22.64790	-3.53886
b	a	= -0.15625
		= 0.481519
k = 2.303*-b	k	= 0.359856
L = a/k'	L	= -3.08161
Temp.	27.2	k (t) = 0.500893
k1 = 0.501 per day		

FILE : THOMAS\TJ2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : JULY
Station : SA (2)

Day	n	BOD	y	y'	y'y	y^2
	0					
	1	0.364	0.3265	0.118846	0.132496	
	2	0.653	0.259	0.169127	0.426409	
	3	0.882	0.2055	0.181251	0.777924	
	4	1.064	0.1635	0.173964	1.132096	
	5	1.209	0.099833	0.120698	1.461681	
	10	1.663	0.1687	0.280548	2.765569	
	15	2.896	0.2249	0.651310	8.386816	
	20	3.912				
SUM	7	8.731	1.447933	1.695745	15.08299	

a	b	
7	8.731	= 1.447933
8.731	15.08299	= 1.695745
61.117	76.23036	12.64190
61.117	105.5809	11.87021
0	29.35057	-0.77169
b	a	= -0.02629
		= 0.239641
k = 2.303*-b	k	= 0.060550
L = a/k'	L	= -9.11455
Temp.	28.5	k (t) = 0.089467
k1 = 0.089 per day		

FILE : THOMAS\TJ3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : JULY
Station : DAM SITE (3)

Day	n	BOD	y	y'	y'y	y^2
0	0					
1	0.455	0.408	0.18564	0.207025		
2	0.816	0.324	0.264384	0.665856		
3	1.103	0.2575	0.284022	1.216609		
4	1.331	0.2045	0.272189	1.771561		
5	1.512	0.167833	0.253764	2.286144		
10	2.338	0.1318	0.308148	5.466244		
15	2.83	0.09725	0.275217	8.0089		
20	3.3105					
SUM	7	10.385	1.590883	1.843365	19.62233	

a	b
7	10.385
10.385	19.62233
72.695	107.8482
72.695	137.3563
0	29.50814
	-3.61776
	-0.12260
	0.409158

k = 2.303*-b
L = a/k'
Temp. 26.5 k (t) = 0.380579
kl = 0.381 per day

FILE : THOMAS\TJ4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : JULY
Station : PHATAO (4)

Day	n	BOD	y	y'	y'y	y^2
0	0					
1	0.182	0.1635	0.029757	0.033124		
2	0.327	0.1295	0.042346	0.105929		
3	0.441	0.113	0.049833	0.194481		
4	0.553	0.082	0.045346	0.305809		
5	0.605	0.292	0.17666	0.366025		
10	2.305	0.2482	0.572101	5.313025		
15	3.087	0.1003	0.309626	9.529569		
20	3.308					
SUM	7	7.5	1.1285	1.225669	15.84896	

a	b
7	7.5
7.5	15.84896
52.5	56.25
52.5	110.9427
0	54.69273
	0.115937
	0.002119
	0.158943

k = 2.303*-b
L = a/k'
Temp. 27.6 k (t) = -0.00692
kl = -0.007 per day

FILE : THOMAS\TJ5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : JULY
Station : UTTARADIT (5)

Day	BOD	n	y	y'	y'y	y^2
0		0				
1	0.353	1	0.353	0.317	0.111901	0.124609
2	0.634	2	0.634	0.252	0.159768	0.401956
3	0.857	3	0.857	0.2	0.1714	0.734449
4	1.034	4	1.034	0.159	0.164406	1.069156
5	1.175	5	1.175	0.105833	0.124354	1.380625
10	1.669	10	1.669	0.1543	0.257526	2.785561
15	2.718	15	2.718	0.1336	0.363124	7.387524
20	3.005	20	3.005			
SUM		7	8.44	1.321733	1.352480	13.88388

a b
7 8.44 = 1.321733
8.44 13.88388 = 1.352480
59.08 71.2336 11.15542
59.08 97.18716 9.467364
0 25.95356 -1.68806
b = -0.06504
a = 0.267240
k = 2.303*-b k = 0.149791
L = a/k' L = -4.10875
Temp. 29.5 k (t) = 0.231728
k1 = 0.232 per day

FILE : THOMAS\T51

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : SEPTEMBER
Station : NAN (1)

Day	BOD	n	y	y'	y'y	y^2
0		0				
1	0.273	1	0.273	0.245	0.066885	0.074529
2	0.49	2	0.49	0.1945	0.095305	0.2401
3	0.662	3	0.662	0.1545	0.102279	0.438244
4	0.799	4	0.799	0.1225	0.097877	0.638401
5	0.907	5	0.907	0.146166	0.132573	0.822649
10	1.676	10	1.676	0.1558	0.261120	2.808976
15	2.465	15	2.465	0.08445	0.208169	6.076225
20	2.5205	20	2.5205			
SUM		7	7.272	1.102916	0.964209	11.09912

a b
7 7.272 = 1.102916
7.272 11.09912 = 0.964209
50.904 52.88198 8.02041
50.904 77.69386 6.749468
0 24.81188 -1.27094
b = -0.05122
a = 0.210773
k = 2.303*-b k = 0.117966
L = a/k' L = -4.11480
Temp. 28 k (t) = 0.170346
k1 = 0.17 per day

FILE : THOMAS\TS2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)

THOMAS' SLOPE METHOD

Month : SEPTEMBER

Station : SA (2)

Day	BOD	y	y'	y'y	y^2
0		0			
1	0.297	0.2665	0.079150	0.088209	
2	0.533	0.2115	0.112729	0.284089	
3	0.72	0.168	0.12096	0.5184	
4	0.869	0.1335	0.116011	0.755161	
5	0.987	0.0585	0.057739	0.974169	
10	1.22	0.1214	0.148108	1.4884	
15	2.201	0.10305	0.226813	4.844401	
20	2.2505				

SUM 7 6.827 1.06245 0.861512 8.952829

a	b
7	6.827
6.827	8.952829
47.789	46.60792
47.789	62.66980
0	16.06187
	-1.22276
b	= -0.07612
a	= 0.226025

k = 2.303*-b
 L = a/k
 Temp. 28.5 k(t) = 0.259051
 k1 = 0.259 per day

FILE : THOMAS\TS3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)

THOMAS' SLOPE METHOD

Month : SEPTEMBER

Station : DAM SITE (3)

Day	BOD	y	y'	y'y	y^2
0		0			
1	0.244	0.219	0.053436	0.059536	
2	0.438	0.174	0.076212	0.191844	
3	0.592	0.1385	0.081992	0.350464	
4	0.715	0.11	0.07865	0.511225	
5	0.812	0.083	0.067396	0.659344	
10	1.213	0.1594	0.193352	1.471369	
15	2.406	0.1247	0.300028	5.788836	
20	2.46				

SUM 7 6.42 1.0086 0.851066 9.032618

a	b
7	6.42
6.42	9.032618
44.94	41.2164
44.94	63.22832
0	22.01192
	-0.51774
b	= -0.02352
a	= 0.165658

k = 2.303*-b
 L = a/k
 Temp. 29 k(t) = 0.081898
 k1 = 0.082 per day

FILE : THOMAS\TS4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : SEPTEMBER
Station : PHATAO (4)

Day	n	BOD	y	y'	y'y	y^2
0						
1	0	0.173	0.1555	0.026901	0.029929	
2	0	0.311	0.1235	0.038408	0.096721	
3	0	0.42	0.098	0.04116	0.1764	
4	0	0.507	0.078	0.039546	0.257049	
5	0	0.576	0.095	0.05472	0.331776	
10	0	1.077	0.1534	0.165211	1.159929	
15	0	2.11	0.1079	0.227669	4.4521	
20	0	2.156				

SUM 7 5.174 0.8113 0.593616 6.503904

a	b
7	5.174
5.174	6.503904
36.218	26.77027
36.218	45.52732
0	18.75705

b = -0.00225
a = 0.117568

k = 2.303*-b
L = a/k'
Temp. 29 k (t) = 0.007861
k1 = 0.008 per day

FILE : THOMAS\TS5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : SEPTEMBER
Station : UTTARADIT (5)

Day	n	BOD	y	y'	y'y	y^2
0						
1	0	0.219	0.196	0.042924	0.047961	
2	0	0.392	0.1555	0.060956	0.153664	
3	0	0.53	0.124	0.06572	0.2809	
4	0	0.64	0.0985	0.06304	0.4096	
5	0	0.727	0.056166	0.040833	0.528529	
10	0	0.977	0.1621	0.158371	0.954529	
15	0	2.348	0.1448	0.339990	5.513104	
20	0	2.425				

SUM 7 5.833 0.937066 0.771835 7.888287

a	b
7	5.833
5.833	7.888287
40.831	34.02388
40.831	55.21800
0	21.19412

b = -0.00297
a = 0.136346

k = 2.303*-b
L = a/k'
Temp. 30 k (t) = 0.010847
k1 = 0.011 per day

FILE : THOMAS\TN1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : NOVEMBER
Station : NAN (1)

Day	BOD	y	y'	y'y	y^2
0					
1	0.244	0.219	0.053436	0.059536	
2	0.438	0.174	0.076212	0.191844	
3	0.592	0.116	0.068672	0.350464	
4	0.67	0.084	0.05628	0.4489	
5	0.76	0.045166	0.034326	0.5776	
10	0.941	0.0728	0.068504	0.885481	
15	1.488	0.0695	0.103416	2.214144	
20	1.636				

SUM 7 5.133 0.780466 0.460847 4.727969

a b
7 5.133 = 0.780466
5.133 4.727969 = 0.460847
35.931 26.34768 4.006135
35.931 33.09578 3.225932
0 6.748094 -0.78020
b = -0.11561
a = 0.196276
k = 2.303*-b k = 0.266268
L = a/k' L = -1.69762
Temp. 25.5 k (t) = 0.342789
k1 = 0.343 per day

FILE : THOMAS\TN2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : NOVEMBER
Station : SA (2)

Day	BOD	y	y'	y'y	y^2
0					
1	0.087	0.078	0.006786	0.007569	
2	0.156	0.0615	0.009594	0.024336	
3	0.21	0.0195	0.004095	0.0441	
4	0.195	0.006	0.00117	0.038025	
5	0.222	0.040333	0.008954	0.049284	
10	0.437	0.0594	0.025957	0.190969	
15	0.816	0.063	0.051408	0.665856	
20	1.067				

SUM 7 2.123 0.327733 0.107964 1.020139

a b
7 2.123 = 0.327733
2.123 1.020139 = 0.107964
14.861 4.507129 0.695777
14.861 7.140973 0.755753
0 2.633844 0.059975
b = 0.022771
a = 0.039912
k = 2.303*-b k = -0.05244
L = a/k' L = 1.752780
Temp. 25 k (t) = -0.06598
k1 = -0.066 per day

FILE : THOMAS\TN3

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
THOMAS' SLOPE METHOD

Month : NOVEMBER
Station : DAM SITE (3)

Day	BOD	n	y	y'	y'y	y^2
0		0				
1	0.369	1	0.369	0.331	0.122139	0.136161
2	0.662	2	0.662	0.1795	0.118829	0.438244
3	0.728	3	0.728	0.063	0.045864	0.529984
4	0.788	4	0.788	0.0835	0.065798	0.620944
5	0.895	5	0.895	0.1095	0.098002	0.801025
10	1.445	10	1.445	0.0627	0.090601	2.088025
15	1.522	15	1.522	0.0545	0.082949	2.316484
20	1.99	20	1.99			

SUM 7 6.409 0.8837 0.624183 6.930867

a b

7 6.409 = 0.8837
6.409 6.930867 = 0.624183

44.863 41.07528 5.663633
44.863 48.51606 4.369281

0 7.440788 -1.29435

b = -0.17395
a = 0.285509

k = 2.303*-b k = 0.400615
L = a/k' L = -1.64129
Temp. 27.5 k (t) = 0.565363

k1 = 0.565 per day

FILE : THOMAS\TN4

CALCULATION DEOXYGENATION RATE COEFFICIENT (K1)
THOMAS' SLOPE METHOD

Month : NOVEMBER
Station : PHATAO (4)

Day	BOD	n	y	y'	y'y	y^2
0		0				
1	0.238	1	0.238	0.2135	0.050813	0.056644
2	0.427	2	0.427	0.1695	0.072376	0.182329
3	0.577	3	0.577	0.1585	0.091454	0.332929
4	0.744	4	0.744	0.134	0.099696	0.553536
5	0.845	5	0.845	0.074833	0.063234	0.714025
10	1.193	10	1.193	0.0895	0.106773	1.423249
15	1.74	15	1.74	0.0779	0.135546	3.0276
20	1.972	20	1.972			

SUM 7 5.764 0.917733 0.619893 6.290312

a b

7 5.764 = 0.917733
5.764 6.290312 = 0.619893

40.348 33.22369 5.289814
40.348 44.03218 4.339255

0 10.80848 -0.95055

b = -0.08794
a = 0.203521

k = 2.303*-b k = 0.202538
L = a/k' L = -2.31417
Temp. 27.5 k (t) = 0.285830

k1 = 0.285 per day



FILE : THOMAS\TM1

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : MARCH
Station : NAN (1)

Day	n	y	BOD	y'	y'y	y^2
0	0					
1	1	0.263	0.1645	0.043263	0.069169	
2	2	0.329	0.082	0.026978	0.108241	
3	3	0.427	0.082	0.035014	0.182329	
4	4	0.493	0.0665	0.032784	0.243049	
5	5	0.56	0.089833	0.050306	0.3136	
10	10	1.032	0.0677	0.069866	1.065024	
15	15	1.237	0.0597	0.073848	1.530169	
20	20	1.629				
SUM	7	4.341	0.612233	0.332061	3.511581	

a	b
7	4.341
4.341	3.511581
30.387	18.84428
30.387	24.58106
0	5.736786
	-0.33327
	-0.05809
	0.123488

k = 2.303*-b
L = a/k'
Temp. 27 k (t) = 0.184522
k1 = 0.185 per day

FILE : THOMAS\TN5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : NOVEMBER
Station : UTTARADIT (5)

Day	n	y	BOD	y'	y'y	y^2
0	0					
1	1	0.245	0.2205	0.054022	0.060025	
2	2	0.441	0.1755	0.077395	0.194481	
3	3	0.596	0.086	0.051256	0.355216	
4	4	0.613	0.0505	0.030956	0.375769	
5	5	0.697	0.088333	0.061568	0.485809	
10	10	1.143	0.0793	0.090639	1.306449	
15	15	1.49	0.0493	0.073457	2.2201	
20	20	1.636				
SUM	7	5.225	0.749433	0.439295	4.997849	

a	b
7	5.225
5.225	4.997849
36.575	27.30062
36.575	34.98494
0	7.684318
	-0.84071
	-0.10940
	0.188726

k = 2.303*-b
L = a/k'
Temp. 27 k (t) = 0.347509
k1 = 0.348 per day

FILE : THOMAS\TM2

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : MARCH
Station : SA (2)

Day n	BOD y	y'	y'y	y^2
0				
1	0.131	0.1645	0.021549	0.017161
2	0.329	0.1315	0.043263	0.108241
3	0.394	0.034	0.013396	0.155236
4	0.397	0.0285	0.011314	0.157609
5	0.451	0.024333	0.010974	0.203401
10	0.543	0.04	0.02172	0.294849
15	0.851	0.0712	0.060591	0.724201
20	1.255			

SUM 7 3.096 0.494033 0.182809 1.660698

a	b
7	3.096
3.096	1.660698
21.672	9.585216
21.672	11.62488
0	2.03967

b = -0.12250
a = 0.124757

k = 2.303*-b
L = a/k'
Temp. 27 k(t) = 0.389102

k1 = 0.389 per day

FILE : THOMAS\TM3

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : MARCH
Station : DAM SITE (3)

Day n	BOD y	y'	y'y	y^2
0				
1	0.132	0.3945	0.052074	0.017424
2	0.789	0.3895	0.307315	0.622521
3	0.911	0.016	0.014576	0.829921
4	0.821	0.011	0.009031	0.674041
5	0.933	0.040666	0.037942	0.870489
10	1.065	0.0816	0.086904	1.134225
15	1.749	0.0866	0.151463	3.059001
20	1.931			

SUM 7 6.4 1.019866 0.659305 7.207622

a	b
7	6.4
6.4	7.207622
44.8	40.96
44.8	50.45335
0	9.493354

b = -0.20140
a = 0.329836

k = 2.303*-b
L = a/k'
Temp. 24.5 k(t) = 0.570326

k1 = 0.57 per day

FILE : THOMAS\TM4

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : MARCH
Station : PHATAO (4)

Day	BOD	y	y'	y'y	y^2
0		0			
1	0.132	0.132	0.148	0.019536	0.017424
2	0.296	0.296	0.197	0.058312	0.087616
3	0.526	0.526	0.1045	0.054967	0.276676
4	0.505	0.505	0.0235	0.011867	0.255025
5	0.573	0.573	0.031833	0.018240	0.328329
10	0.696	0.696	0.0533	0.037096	0.484416
15	1.106	1.106	0.092	0.101752	1.223236
20	1.616	1.616			

SUM 7 3.834 0.650133 0.301771 2.672722

a	b
7	3.834
3.834	2.672722
26.838	14.69955
26.838	18.70905
0	4.009498

b = -0.09482
a = 0.144814

k = 2.303*-b = 0.218386
L = a/k' = -1.52714
Temp. 25.5 k (t) = 0.281146

k1 = 0.281 per day

FILE : THOMAS\TM5

CALCULATION DEOXYGENATION RATE COEFFICIENT (k1)
THOMAS' SLOPE METHOD

Month : MARCH
Station : UTTARADIT (5)

Day	BOD	y	y'	y'y	y^2
0		0			
1	0.527	0.527	0.329	0.173383	0.277729
2	0.658	0.658	0.1315	0.086527	0.432964
3	0.79	0.79	0.052	0.04108	0.6241
4	0.762	0.762	0.038	0.028956	0.580644
5	0.866	0.866	0.037666	0.032619	0.749956
10	0.988	0.988	0.0601	0.059378	0.976144
15	1.467	1.467	0.0654	0.095941	2.152089
20	1.642	1.642			

SUM 7 6.058 0.713666 0.517885 5.793626

a	b
7	6.058
6.058	5.793626
42.406	36.69936
42.406	40.55538
0	3.856018

b = -0.18106
a = 0.258651

k = 2.303*-b = 0.416993
L = a/k' = -1.42849
Temp. 25 k (t) = 0.524641

k1 = 0.525 per day

FILE : SAG\JU
 CALCULATION DO SAG CURVE FROM STATION 1 TO 2
 BY STREETER & PHELPS MODEL
 JULY

	Station 1	Station 2	
Flow	219877.1	424613	l/sec
Water Temperature	27.2	28.5	C
Time (t)	0.57725		day
DO sat	7.84	7.65	mg/l
DO deficit	3.65	3.58	mg/l
DO deficit	4.19	4.07	mg/l
Ultimate BOD	3.476	3.912	mg/l
DO sat (average)	7.745		mg/l
k1	0.162		per day
k2	0.191		per day

$$Dt = k1LA / (k2 - k1) * [10^{-(k1t)} - 10^{-(k2t)}] + DA * 10^{-(k2t)}$$

t	Dt	DO
0	4.19	3.555
0.01	4.18452664	3.56047335
0.02	4.17902923	3.56597076
0.03	4.17350804	3.57149195
0.04	4.16796336	3.57703663
0.05	4.16239546	3.58260453
0.06	4.15680463	3.58819536
0.07	4.15119114	3.59380885
0.08	4.14555526	3.59944473
0.09	4.13989728	3.60510271
0.1	4.13421746	3.61078253
0.11	4.12851607	3.61648392
0.12	4.12279338	3.62220661
0.13	4.11704966	3.62795033
0.14	4.11128517	3.63371482
0.15	4.10550017	3.63949982
0.16	4.09969492	3.64530507
0.17	4.09386968	3.65113031
0.18	4.08802471	3.65697528
0.19	4.08216026	3.66283973
0.2	4.07627659	3.66872340
0.21	4.07037395	3.67462604
0.22	4.06445259	3.68054740
0.23	4.05851276	3.68648723
0.24	4.05255469	3.69244530
0.25	4.04657865	3.69842134
0.26	4.04058487	3.70441512
0.27	4.03457359	3.71042640

0.28	4.02854505	3.71645494
0.29	4.02249950	3.72250049
0.3	4.01643716	3.72855283
0.31	4.01035828	3.73461171
0.32	4.00426308	3.74073691
0.33	3.99815180	3.74684819
0.34	3.99202467	3.75297532
0.35	3.98588191	3.75911404
0.36	3.97972376	3.76527623
0.37	3.97355043	3.77144956
0.38	3.96736216	3.77763783
0.39	3.96115916	3.78384083
0.4	3.95494166	3.79005833
0.41	3.94870987	3.79629012
0.42	3.94246400	3.80253599
0.43	3.93620429	3.80879570
0.44	3.92993094	3.81506905
0.45	3.92364416	3.82135582
0.46	3.91734417	3.82765582
0.47	3.91103117	3.83396882
0.48	3.90470538	3.84029461
0.49	3.89836700	3.84663299
0.5	3.89201623	3.85298376
0.51	3.88565329	3.85934670
0.52	3.87927837	3.86572162
0.53	3.87289167	3.87210832
0.54	3.86649340	3.87850659
0.55	3.86008374	3.88491625
0.56	3.85366291	3.89133708
0.57	3.84723109	3.89776890
0.58	3.84078848	3.90421151
0.59	3.83433527	3.91066472
0.6	3.82787165	3.91712834
0.61	3.82139782	3.92360217
0.62	3.81491395	3.93008604
0.63	3.80842025	3.93657974
0.64	3.80191688	3.94308311
0.65	3.79540405	3.94959594

FILE : SAG\J34
 CALCULATION DO SAG CURVE FROM STATION 3 TO 4
 BY STREETER & PHELPS MODEL
 JULY

	Station 3	Station 4	
Flow	351544.5	10827.4	l/sec
Water Temperature	26.5	27.6	C
Time (t)	0.470096		day
DO sat	7.95	7.78	mg/l
DO	0.83	1.117	mg/l
DO deficit	7.12	6.663	mg/l
Ultimate BOD	3.3105	3.308	mg/l
DO sat (average)	7.865		mg/l
k1	0.098		per day
k2	0.133		per day

$$Dt = k1LA/(k2-k1) * [10^{(-k1t)} - 10^{(-k2t)}] + DA * 10^{(-k2t)}$$

t	Dt	DO
0		
0.01	7.10567920	0.75932079
0.02	7.09138541	0.77361458
0.03	7.07711856	0.78788143
0.04	7.06287862	0.80212137
0.05	7.04866555	0.81633444
0.06	7.03447929	0.83052070
0.07	7.02031980	0.84468019
0.08	7.00618705	0.85881294
0.09	6.99208098	0.87291901
0.1	6.97800155	0.88699844
0.11	6.96394871	0.90105128
0.12	6.94992243	0.91507756
0.13	6.93592265	0.92907734
0.14	6.92194934	0.94305065
0.15	6.90800245	0.95699754
0.16	6.89408193	0.97091806
0.17	6.88018774	0.98481225
0.18	6.86631984	0.99868015
0.19	6.85247819	1.01252180
0.2	6.83866273	1.02633726
0.21	6.82487343	1.04012656
0.22	6.81111024	1.05388975
0.23	6.79737312	1.06762687
0.24	6.78366203	1.08133796
0.25	6.76997691	1.09502308
0.26	6.75631774	1.10868225
0.27	6.74268446	1.12231553

0.28	6.72907703	1.13592296
0.29	6.71549540	1.14950459
0.3	6.70193954	1.16306045
0.31	6.68840941	1.17659058
0.32	6.67490495	1.19009504
0.33	6.66142612	1.20357387
0.34	6.64797289	1.21702710
0.35	6.63454520	1.23045479
0.36	6.62114303	1.24385696
0.37	6.60776631	1.25723368
0.38	6.59441501	1.27058498
0.39	6.58108909	1.28391090
0.4	6.56778851	1.29721148
0.41	6.55451322	1.31048677
0.42	6.54126317	1.32373682
0.43	6.52803833	1.33696166
0.44	6.51483866	1.35016133
0.45	6.50166410	1.36333589
0.46	6.48851463	1.37648536
0.47	6.47539019	1.38960980
0.48	6.46229074	1.40270925
0.49	6.44921625	1.41578374
0.5	6.43616666	1.42883333
0.51	6.42314195	1.44185804
0.52	6.41014205	1.45485794
0.53	6.39716695	1.46783304
0.54	6.38421658	1.48078341
0.55	6.37129091	1.49370908
0.56	6.35838989	1.50661010
0.57	6.34551350	1.51948649
0.58	6.33266167	1.53233832
0.59	6.31983438	1.54516561
0.6	6.30703157	1.55796842
0.61	6.29425322	1.57074677
0.62	6.28149927	1.58350072
0.63	6.26876968	1.59623031
0.64	6.25606442	1.60893557
0.65	6.24338344	1.62161655

FILE : SAG\J45
 CALCULATION DO SAG CURVE FROM STATION 4 TO 5
 BY STREETER & PHELPS MODEL
 JULY

	Station 4	Station 5	
Flow	10827.4	93763.3	l/sec
Water Temperature	27.6	29.5	C
Time (t)	1.377524		day
DO sat	7.78	7.51	mg/l
DO deficit	1.117	1.65	mg/l
Ultimate BOD	6.663	5.86	mg/l
DO sat (average)	3.308	3.005	mg/l
	7.645		mg/l
k1	0.0512		per day
k2	0.0514		per day

$$Dt = k1LA / (k2 - k1) * [10^{-(k1t)} - 10^{-(k2t)}] + DA * 10^{-(k2t)}$$

t	Dt	DO
0	6.563	0.982
0.02	6.65502830	0.98997169
0.04	6.64705712	0.99794287
0.06	6.63908650	1.00591349
0.08	6.63111650	1.01388349
0.1	6.62314713	1.02185286
0.12	6.61517846	1.02982153
0.14	6.60721052	1.03778947
0.16	6.59924334	1.04575665
0.18	6.59127698	1.05372301
0.2	6.58331146	1.06168853
0.22	6.57534684	1.06965315
0.24	6.56738315	1.07761684
0.26	6.55942044	1.08557955
0.28	6.55145873	1.09354126
0.3	6.54349808	1.10150191
0.32	6.53553851	1.10946148
0.34	6.52758008	1.11741991
0.36	6.51962281	1.12537718
0.38	6.51166675	1.13333324
0.4	6.50371194	1.14128805
0.42	6.49575841	1.14924158
0.44	6.48780621	1.15719378
0.46	6.47985536	1.16514463
0.48	6.47190592	1.17309407
0.5	6.46395791	1.18104208
0.52	6.45601137	1.18898862
0.54	6.44806634	1.19693365

0.56	6.44012287	1.20487712
0.58	6.43218098	1.21281901
0.6	6.42424071	1.22075928
0.62	6.41630209	1.22869790
0.64	6.40836518	1.23663481
0.66	6.40042999	1.24457000
0.68	6.39249657	1.25250342
0.7	6.38456496	1.26043503
0.72	6.37663518	1.26836481
0.74	6.36870728	1.27629271
0.76	6.36078128	1.28421871
0.78	6.35285723	1.29214276
0.8	6.34493516	1.30006483
0.82	6.33701511	1.30798488
0.84	6.32909710	1.31590289
0.86	6.32118118	1.32381881
0.88	6.31326737	1.33173262
0.9	6.30535571	1.33964428
0.92	6.29744624	1.34755375
0.94	6.28953899	1.35546100
0.96	6.28163400	1.36336599
0.98	6.27373129	1.37126871
1	6.26583089	1.37916910
1.02	6.25793285	1.38706714
1.04	6.25003720	1.39496279
1.06	6.24214396	1.40285603
1.08	6.23425318	1.41074681
1.1	6.22636488	1.41863511
1.12	6.21847909	1.42652090
1.14	6.21059585	1.43440414
1.16	6.20271519	1.44228480
1.18	6.19483714	1.45016285
1.2	6.18696173	1.45803826
1.22	6.17908900	1.46591099
1.24	6.17121897	1.47378102
1.26	6.16335167	1.48164832
1.28	6.15548715	1.48951284
1.3	6.14762542	1.49737457
1.32	6.13976652	1.50523347
1.34	6.13191048	1.51308951
1.36	6.12405733	1.52094266
1.38	6.11620710	1.52879289
1.4	6.10835981	1.53664018
1.42	6.10051551	1.54448448
1.44	6.09267421	1.55232578

FILE : SAG\SU
 CALCULATION DO SAG CURVE FROM STATION 1 TO 2
 BY STREETER & PHELPS MODEL
 SEPTEMBER

Station 1		Station 2	
Flow	185360.1	195964.2	l/sec
Water Temperature	28	28.5	C
Time (t)	0.519439		day
DO sat	7.72	7.65	mg/l
DO	3.65	3.65	mg/l
DO deficit	4.07	4	mg/l
Ultimate BOD	2.5205	2.2505	mg/l
DO sat (average)	7.685		mg/l
k1	0.105		per day
k2	0.111		per day

Dt = k1LA/(k2-k1)*[10^(-k1t)-10^(-k2t)] + DA*10^(-k2t)

t	Dt	DO
0	4.07	3.615
0.01	4.06568960	3.61931039
0.02	4.06137553	3.62362446
0.03	4.05705783	3.62794216
0.04	4.05273655	3.63226344
0.05	4.04841172	3.63658827
0.06	4.04408339	3.64091660
0.07	4.03975161	3.64524838
0.08	4.03541642	3.64958357
0.09	4.03107786	3.65392213
0.1	4.02673598	3.65826401
0.11	4.02239082	3.66260917
0.12	4.01804242	3.66695757
0.13	4.01369083	3.67130916
0.14	4.00933609	3.67566390
0.15	4.00497824	3.68002175
0.16	4.00061732	3.68438267
0.17	3.99625338	3.68874661
0.18	3.99188646	3.69311353
0.19	3.98751659	3.69748340
0.2	3.98314383	3.70185616
0.21	3.97876821	3.70623178
0.22	3.97438977	3.71061022
0.23	3.97000855	3.71499144
0.24	3.96562461	3.71937539
0.25	3.96123796	3.72376203
0.26	3.95684866	3.72815133
0.27	3.95245675	3.73254324

0.28	3.94806227	3.73693772
0.29	3.94366525	3.74133474
0.3	3.93926571	3.74573425
0.31	3.93486377	3.75013622
0.32	3.93045939	3.75454060
0.33	3.92605263	3.75894736
0.34	3.92164353	3.76335646
0.35	3.91723213	3.76776786
0.36	3.91281848	3.77218151
0.37	3.90840260	3.77659739
0.38	3.90398454	3.78101545
0.39	3.89956434	3.78543565
0.4	3.89514203	3.78985796
0.41	3.89071764	3.79428235
0.42	3.88629123	3.79870876
0.43	3.88186282	3.80313717
0.44	3.87743246	3.80756753
0.45	3.87300017	3.81199982
0.46	3.86856600	3.81643399
0.47	3.86412998	3.82087001
0.48	3.85969215	3.82530784
0.49	3.85525255	3.82974744
0.5	3.85081121	3.83418878
0.51	3.84636817	3.83863182
0.52	3.84192346	3.84307653
0.53	3.83747713	3.84752286
0.54	3.83302919	3.85197080
0.55	3.82857970	3.85642029
0.56	3.82412868	3.86087131
0.57	3.81967618	3.86532381
0.58	3.81522222	3.86977777
0.59	3.81076684	3.87423315
0.6	3.80631007	3.87868992
0.61	3.80185195	3.88314804
0.62	3.79739252	3.88760747
0.63	3.79293180	3.89206819
0.64	3.78846983	3.89653016
0.65	3.78400665	3.90099334
0.66	3.77954229	3.90545770
0.67	3.77507678	3.90992321
0.68	3.77061015	3.91438984
0.69	3.76614244	3.91885755
0.7	3.76167368	3.92332631
0.71	3.75720391	3.92779608
0.72	3.75273315	3.93226684

FILE : SAG\S34

CALCULATION DO SAG CURVE FROM STATION 3 TO 4
 BY STREETER & PHELPS MODEL
 SEPTEMBER

	Station 3	Station 4
Flow	100702	59561.4
Water Temperature	29	29
Time (t)	0.636105	
DO sat	7.58	7.58
DO	3.34	3.1
DO deficit	4.24	4.48
Ultimate BOD	2.46	2.156
DO sat (average)	7.58	

k1 0.098 per day
 k2 0.107 per day

$$Dt = k1LA / (k2 - k1) * [10^{(-k1t)} - 10^{(-k2t)}] + DA * 10^{(-k2t)}$$

t	Dt	DO
0	4.24	3.34
0.01	4.23510447	3.34489552
0.02	4.23020851	3.34979148
0.03	4.22531215	3.35468784
0.04	4.22041540	3.35958459
0.05	4.21551831	3.36448168
0.06	4.21062090	3.36937909
0.07	4.20572319	3.37427680
0.08	4.20082522	3.37917477
0.09	4.19592702	3.38407297
0.1	4.19102862	3.38897137
0.11	4.18613003	3.39386996
0.12	4.18123130	3.39876869
0.13	4.17633244	3.40366755
0.14	4.17143349	3.40856650
0.15	4.16653447	3.41346552
0.16	4.16163541	3.41836458
0.17	4.15673634	3.42326365
0.18	4.15183729	3.42816270
0.19	4.14693828	3.43306171
0.2	4.14203933	3.43796066
0.21	4.13714049	3.44285950
0.22	4.13224177	3.44775822
0.23	4.12734319	3.45265680
0.24	4.12244480	3.45755519
0.25	4.11754660	3.46245339
0.26	4.11264864	3.46735135
0.27	4.10775092	3.47224907

0.28	4.10285349	3.47714650
0.29	4.09795637	3.48204362
0.3	4.09305958	3.48694041
0.31	4.08816314	3.49183685
0.32	4.08326709	3.49673290
0.33	4.07837145	3.50162854
0.34	4.07347624	3.50652375
0.35	4.06858149	3.51141850
0.36	4.06368723	3.51631276
0.37	4.05879347	3.52120652
0.38	4.05390025	3.52609974
0.39	4.04900759	3.53099240
0.4	4.04411550	3.53588449
0.41	4.03922403	3.54077596
0.42	4.03433319	3.54566680
0.43	4.02944300	3.55055699
0.44	4.02455349	3.55544650
0.45	4.01966469	3.56033530
0.46	4.01477661	3.56522338
0.47	4.00988928	3.57011071
0.48	4.00500273	3.57499726
0.49	4.00011698	3.57988301
0.5	3.99523204	3.58476795
0.51	3.99034796	3.58965203
0.52	3.98546474	3.59453525
0.53	3.98058241	3.59941758
0.54	3.97570099	3.60429900
0.55	3.97082051	3.60917948
0.56	3.96594099	3.61405900
0.57	3.96106245	3.61893754
0.58	3.95618492	3.62381507
0.59	3.95130841	3.62869158
0.6	3.94643295	3.63356704
0.61	3.94155856	3.63844143
0.62	3.93668526	3.64331473
0.63	3.93181308	3.64818691
0.64	3.92694204	3.65305795
0.65	3.92207215	3.65792784
0.66	3.91720344	3.66279655
0.67	3.91233593	3.66766406
0.68	3.90746965	3.67253034
0.69	3.90260460	3.67739539
0.7	3.89774083	3.68225916
0.71	3.89287834	3.68712165
0.72	3.88801715	3.69198284

FILE : SAC\S45
 CALCULATION DO SAG CURVE FROM STATION 4 TO 5
 BY STREETER & PHELPS MODEL
 SEPTEMBER

	4	Station	5	
Flow	59561.4	203871.7		l/sec
Water Temperature	29	30		C
Time (t)	0.776838			day
DO sat	7.58	7.44		mg/l
DO	3.1	3.45		mg/l
DO deficit	4.48	3.99		mg/l
Ultimate BOD	2.156	2.425		mg/l
DO sat (average)	7.51			mg/l
k1	0.045			per day
k2	0.114			per day

$Dt = k1LA / (k2 - k1) * [10^{-(k1t)} - 10^{-(k2t)}] + DA * 10^{-(k2t)}$

t	Dt	DO
0	4.48	3.03
0.01	4.47048554	3.03951445
0.02	4.46099371	3.04900628
0.03	4.45152446	3.05847553
0.04	4.44207773	3.06792226
0.05	4.43265346	3.07734653
0.06	4.42325160	3.08674839
0.07	4.41387208	3.09612791
0.08	4.40451486	3.10548513
0.09	4.39517988	3.11482011
0.1	4.38586708	3.12413291
0.11	4.37657641	3.13342358
0.12	4.36730780	3.14269219
0.13	4.35806121	3.15193878
0.14	4.34883658	3.16116341
0.15	4.33963385	3.17036614
0.16	4.33045297	3.17954702
0.17	4.32129389	3.18870610
0.18	4.31215654	3.19784345
0.19	4.30304088	3.20695911
0.2	4.29394685	3.21605314
0.21	4.28487440	3.22512559
0.22	4.27582346	3.23417653
0.23	4.26679400	3.24320599
0.24	4.25778595	3.25221404
0.25	4.24879925	3.26120074
0.26	4.23983387	3.27016612
0.27	4.23088973	3.27911026

0.28	4.22196680	3.28803319
0.29	4.21306501	3.29693498
0.3	4.20418431	3.30581568
0.31	4.19532466	3.31467533
0.32	4.18648599	3.32351400
0.33	4.17766825	3.33233174
0.34	4.16887140	3.34112859
0.35	4.16009538	3.34990461
0.36	4.15134013	3.35865986
0.37	4.14260561	3.36739438
0.38	4.13389176	3.37610823
0.39	4.12519853	3.38480146
0.4	4.11652587	3.39347412
0.41	4.10787373	3.40212626
0.42	4.09924205	3.41075794
0.43	4.09063079	3.41936920
0.44	4.08203989	3.42796010
0.45	4.07346931	3.43653068
0.46	4.06491898	3.44508101
0.47	4.05638887	3.45361112
0.48	4.04787892	3.46212107
0.49	4.03938907	3.47061092
0.5	4.03091929	3.47908070
0.51	4.02246951	3.48753048
0.52	4.0140397	3.4959603
0.53	4.00562979	3.50437020
0.54	3.99723973	3.51276026
0.55	3.98886949	3.52113050
0.56	3.98051901	3.52948098
0.57	3.97218823	3.53781176
0.58	3.96387712	3.54612287
0.59	3.95558562	3.55441437
0.6	3.94731367	3.56268632
0.61	3.93906125	3.57093874
0.62	3.93082828	3.57917171
0.63	3.92261473	3.58738526
0.64	3.91442054	3.59557945
0.65	3.90624568	3.60375431
0.66	3.89809008	3.61190991
0.67	3.88995370	3.62004629
0.68	3.88183650	3.62816349
0.69	3.87373842	3.63626157
0.7	3.86565942	3.64434057
0.71	3.85759945	3.65240054
0.72	3.84955846	3.66044153
0.73	3.84153640	3.66846359
0.74	3.83353323	3.67646676
0.75	3.82554890	3.68445109
0.76	3.81758336	3.69241663
0.77	3.80963656	3.70036343
0.78	3.80170847	3.70829152
0.79	3.79379902	3.71622097
0.8	3.78590818	3.72409181
0.81	3.77803590	3.73196409
0.82	3.77018213	3.73981786

FILE : SAG\NU
 CALCULATION DO SAG CURVE FROM STATION 1 TO 2
 BY STREETER & PHELPS MODEL
 NOVEMBER

	Station 1	Station 2	
Flow	122070.8	136427.2	l/sec
Water Temperature	25.5	25	C
Time (t)	0.728768		day
DO sat	8.1	8.18	mg/l
DO deficit	7.55	7.35	mg/l
Ultimate BOD	0.55	0.83	mg/l
DO sat (average)	1.636	1.0655	mg/l
	8.14		mg/l
k1	0.119		per day
k2	0.161		per day

$$Dt = k1LA/(k2-k1)*[10^{-(k1t)}-10^{-(k2t)}] + DA*10^{-(k2t)}$$

t	Dt	DO
0	0.55	7.59
0.01	0.55243317	7.58756682
0.02	0.55484511	7.58515488
0.03	0.55723594	7.58276405
0.04	0.55960575	7.58039424
0.05	0.56195467	7.57804532
0.06	0.56428281	7.57571718
0.07	0.56659027	7.57340972
0.08	0.56887717	7.57112282
0.09	0.57114361	7.56885638
0.1	0.57338970	7.56661029
0.11	0.57561555	7.56438444
0.12	0.57782127	7.56217872
0.13	0.58000696	7.55999303
0.14	0.58217273	7.55782726
0.15	0.58431869	7.55568130
0.16	0.58644495	7.55355504
0.17	0.58855160	7.55144839
0.18	0.59063875	7.54936124
0.19	0.59270651	7.54729348
0.2	0.59475498	7.54524501
0.21	0.59678426	7.54321573
0.22	0.59879446	7.54120553
0.23	0.60078568	7.53921431
0.24	0.60275802	7.53724197
0.25	0.60471158	7.53528841
0.26	0.60664646	7.53335353
0.27	0.60856277	7.53143722

0.28	0.61046059	7.52953940
0.29	0.61234005	7.52765994
0.3	0.61420122	7.52579877
0.31	0.61604421	7.52395578
0.32	0.61786912	7.52213087
0.33	0.61967605	7.52032394
0.34	0.62146509	7.51853490
0.35	0.62323634	7.51676365
0.36	0.62498990	7.51501009
0.37	0.62672586	7.51327413
0.38	0.62844432	7.51155567
0.39	0.63014537	7.50985462
0.4	0.63182911	7.50817088
0.41	0.63349564	7.50650435
0.42	0.63514503	7.50485496
0.43	0.63677740	7.50322259
0.44	0.63839283	7.50160716
0.45	0.63999141	7.50000858
0.46	0.64157324	7.49842675
0.47	0.64313841	7.49686158
0.48	0.64468701	7.49531298
0.49	0.64621913	7.49378086
0.5	0.64773486	7.49226513
0.51	0.64923429	7.49076570
0.52	0.65071751	7.48928248
0.53	0.65218461	7.48781538
0.54	0.65363567	7.48636432
0.55	0.65507080	7.48492919
0.56	0.65649007	7.48350992
0.57	0.65789357	7.48210642
0.58	0.65928139	7.48071860
0.59	0.66065361	7.47934638
0.6	0.66201033	7.47798966
0.61	0.66335162	7.47664837
0.62	0.66467758	7.47532241
0.63	0.66598829	7.47401170
0.64	0.66728383	7.47271616
0.65	0.66856429	7.47143570
0.66	0.66982975	7.47017024
0.67	0.67108030	7.46891969
0.68	0.67231601	7.46768398
0.69	0.67353698	7.46646301
0.7	0.67474328	7.46525671
0.71	0.67593500	7.46406499
0.72	0.67711221	7.46288778
0.73	0.67827500	7.46172499
0.74	0.67942345	7.46057654
0.75	0.68055764	7.45944235
0.76	0.68167766	7.45832233
0.77	0.68278357	7.45721642
0.78	0.68387546	7.45612453

FILE : SAG\N34
 CALCULATION DO SAG CURVE FROM STATION 3 TO 4
 BY STREETER & PHELPS MODEL
 NOVEMBER

	Station 3	Station 4	
Flow	218527.3	19182.6	l/sec
Water Temperature	27.5	27.5	C
Time (t)	0.524085		day
DO sat	7.8	7.8	mg/l
DO deficit	6.43	6.8	mg/l
DO deficit	1.37	1	mg/l
Ultimate BOD	1.99	1.972	mg/l
DO sat (average)	7.8		mg/l
k1	0.06		per day
k2	0.142		per day

$$Dt = k1LA/(k2-k1) * [10^{-(k1t)} - 10^{-(k2t)}] + DA * 10^{-(k2t)}$$

t	Dt	DO
0	1.37	6.43
0.01	1.36827076	6.43172923
0.02	1.36654339	6.43345660
0.03	1.36481787	6.43518212
0.04	1.36309421	6.43690578
0.05	1.36137240	6.43862759
0.06	1.35965245	6.44034754
0.07	1.35793435	6.44206564
0.08	1.35621810	6.44378189
0.09	1.35450371	6.44549628
0.1	1.35279117	6.44720882
0.11	1.35108048	6.44891951
0.12	1.34937164	6.45062835
0.13	1.34766464	6.45233535
0.14	1.34595949	6.45404050
0.15	1.34425562	6.4557438
0.16	1.34255474	6.45744525
0.17	1.34085513	6.45914486
0.18	1.33915737	6.46084262
0.19	1.33746145	6.46253854
0.2	1.33576737	6.46423262
0.21	1.33407513	6.46592486
0.22	1.33238473	6.46761526
0.23	1.33069617	6.46930382
0.24	1.32900945	6.47099054
0.25	1.32732457	6.47267542
0.26	1.32564152	6.47435847
0.27	1.32396031	6.47603968

0.28	1.32228094	6.47771905
0.29	1.32060340	6.47939659
0.3	1.31892769	6.48107230
0.31	1.31725381	6.48274618
0.32	1.31558177	6.48441822
0.33	1.31391155	6.48608844
0.34	1.31224317	6.48775682
0.35	1.31057661	6.48942338
0.36	1.30891188	6.49108811
0.37	1.30724897	6.49275102
0.38	1.30558789	6.49441210
0.39	1.30392864	6.49607135
0.4	1.30227121	6.49772878
0.41	1.30061560	6.49938439
0.42	1.29896181	6.50103818
0.43	1.29730984	6.50269015
0.44	1.29565969	6.50434030
0.45	1.29401136	6.50598863
0.46	1.29236484	6.50763515
0.47	1.29072015	6.50927984
0.48	1.28907726	6.51092273
0.49	1.28743619	6.51256380
0.5	1.28579694	6.51420305
0.51	1.28415950	6.51584049
0.52	1.28252386	6.51747613
0.53	1.28089004	6.51910995
0.54	1.27925803	6.52074196
0.55	1.27762782	6.52237217
0.56	1.27599942	6.52400057
0.57	1.27437283	6.52562716
0.58	1.27274804	6.52725195
0.59	1.27112506	6.52887493
0.6	1.26950388	6.53049611
0.61	1.26788450	6.53211549
0.62	1.26626692	6.53373307
0.63	1.26465114	6.53534885
0.64	1.26303716	6.53696283
0.65	1.26142498	6.53857501

FILE : SAG\N45
 CALCULATION DO SAG CURVE FROM STATION 4 TO 5
 BY STREETER & PHELPS MODEL
 NOVEMBER

	Station 4	Station 5	
Flow	19182.6	157457	l/sec
Water Temperature	27.5	27	C
Time (t)	1.181475		day
DO sat	7.8	7.87	mg/l
DO	6.8	7.15	mg/l
DO deficit	1	0.72	mg/l
Ultimate BOD	1.972	1.636	mg/l
DO sat (average)	7.835		mg/l
k1	0.05		per day
k2	0.142		per day

$$Dt = k1LA/(k2-k1)*[10^{-(k1t)}-10^{-(k2t)}] + DA*10^{-(k2t)}$$

t	Dt	DO
0	1	6.835
0.02	0.99800266	6.83699733
0.04	0.99600795	6.83899204
0.06	0.99401586	6.84098413
0.08	0.99202641	6.84297358
0.1	0.99003960	6.84496039
0.12	0.98805544	6.84694455
0.14	0.98607393	6.84892606
0.16	0.98409509	6.85090490
0.18	0.98211891	6.85288108
0.2	0.98014540	6.85485459
0.22	0.97817458	6.85682541
0.24	0.97620643	6.85879356
0.26	0.97424098	6.86075901
0.28	0.97227823	6.86272176
0.3	0.97031818	6.86468181
0.32	0.96836084	6.86663915
0.34	0.96640621	6.86859378
0.36	0.96445430	6.87054569
0.38	0.96250512	6.87249487
0.4	0.96055866	6.87444133
0.42	0.95861494	6.87638505
0.44	0.95667396	6.87832603
0.46	0.95473573	6.88026426
0.48	0.95280024	6.88219975
0.5	0.950866751	6.88413248
0.52	0.94893754	6.88606245
0.54	0.94701033	6.88798966

0.56	0.94508589	6.88991410
0.58	0.94316422	6.89183577
0.6	0.94124533	6.89375466
0.62	0.93932923	6.89567076
0.64	0.93741590	6.89758409
0.66	0.93550537	6.89949462
0.68	0.93359764	6.90140235
0.7	0.93169270	6.90330723
0.72	0.92979056	6.90520943
0.74	0.92789123	6.90710876
0.76	0.92599471	6.90900528
0.78	0.92410100	6.91089899
0.8	0.92221011	6.91278988
0.82	0.92032204	6.91467795
0.84	0.91843679	6.91656320
0.86	0.91655437	6.91844562
0.88	0.91467478	6.92032521
0.9	0.91279803	6.92220196
0.92	0.91092411	6.92407588
0.94	0.90905303	6.92594696
0.96	0.90718480	6.92781519
0.98	0.90531941	6.92968058
1	0.90345688	6.93154311
1.02	0.90159719	6.93340280
1.04	0.89974036	6.93525963
1.06	0.89788639	6.93711360
1.08	0.89603527	6.93896472
1.1	0.89418702	6.94081297
1.12	0.89234164	6.94265835
1.14	0.89049912	6.94450087
1.16	0.88865948	6.94634051
1.18	0.88682270	6.94817729
1.2	0.88498880	6.95001119
1.22	0.88315778	6.95184221
1.24	0.88132964	6.95367036
1.26	0.87950437	6.95549562
1.28	0.87768199	6.95731800
1.3	0.87586250	6.95913749

FILE : SAG\MU
 CALCULATION DO SAG CURVE FROM STATION 1 TO 2
 BY STREETER & PHELPS MODEL
 MARCH

	Station 1	Station 2	
Flow	12176.06	30966.46	l/sec
Water Temperature	27	27	C
Time (t)	3.586289		day
DO sat	7.87	7.87	mg/l
DO	7.605	7.45	mg/l
DO deficit	0.265	0.42	mg/l
Ultimate BOD	1.629	1.255	mg/l
DO sat (average)	7.87		mg/l
k1	0.056		per day
k2	0.163		per day

$$Dt = k1LA / (k2 - k1) * [10^{(-k1t)} - 10^{(-k2t)}] + DA * 10^{(-k2t)}$$

t	Dt	DO
0	0.265	7.605
0.05	0.27044440	7.59955559
0.1	0.27572095	7.59427904
0.15	0.28083317	7.58916682
0.2	0.28578456	7.58421543
0.25	0.29057852	7.57942147
0.3	0.29521840	7.57478159
0.35	0.29970749	7.57029250
0.4	0.30404900	7.56595099
0.45	0.30824609	7.56175390
0.5	0.31230186	7.55769813
0.55	0.31621933	7.55378066
0.6	0.32000148	7.54998851
0.65	0.32365123	7.54634876
0.7	0.32717144	7.54282855
0.75	0.33056491	7.53943508
0.8	0.33383440	7.53616559
0.85	0.33698260	7.53301739
0.9	0.34001215	7.52998784
0.95	0.34292565	7.52707434
1	0.34572564	7.52427435
1.05	0.34841461	7.52158838
1.1	0.35099500	7.51900499
1.15	0.35346921	7.51653078
1.2	0.35583959	7.51416040
1.25	0.35810843	7.51189156
1.3	0.36027800	7.50972199
1.35	0.36235051	7.50764949

1.4	0.36432812	7.50567187
1.45	0.36621296	7.50378703
1.5	0.36800712	7.50199287
1.55	0.36971265	7.50028734
1.6	0.37133154	7.49866845
1.65	0.37286575	7.49713424
1.7	0.37431722	7.49568377
1.75	0.37568783	7.49431216
1.8	0.37697942	7.49302057
1.85	0.37819382	7.49180617
1.9	0.37933280	7.49066719
1.95	0.38039809	7.48960190
2	0.38139142	7.48860857
2.05	0.38231445	7.48768554
2.1	0.38316881	7.48683118
2.15	0.38395613	7.48604386
2.2	0.38467797	7.48532302
2.25	0.38533588	7.48466411
2.3	0.38593137	7.48406862
2.35	0.38646592	7.48353407
2.4	0.38694099	7.48305900
2.45	0.38735800	7.48264199
2.5	0.38771835	7.48228164
2.55	0.38802341	7.48197658
2.6	0.38827451	7.48172548
2.65	0.38847297	7.48152702
2.7	0.38862007	7.48137992
2.75	0.38871708	7.48128391
2.8	0.38876523	7.48123476
2.85	0.38876574	7.48123425
2.9	0.38871979	7.48128020
2.95	0.38862854	7.48137145
3	0.38849312	7.48150687
3.05	0.38831467	7.48168532
3.1	0.38809426	7.48190573
3.15	0.38783297	7.48216702
3.2	0.38753186	7.48246813
3.25	0.38719194	7.48280803
3.3	0.38681422	7.48318577
3.35	0.38639969	7.48360030
3.4	0.38594932	7.48405067
3.45	0.38546405	7.48453594
3.5	0.38494481	7.48505518
3.55	0.38439250	7.48560749
3.6	0.38380802	7.48619197
3.65	0.38319224	7.48680775
3.7	0.38254601	7.48745398
3.75	0.38187016	7.48812983
3.8	0.38116551	7.48883448
3.85	0.38043287	7.48956712
3.9	0.37967302	7.49032697

FILE : SAG\M34
 CALCULATION DO SAG CURVE FROM STATION 3 TO 4
 BY STREETER & PHELPS MODEL
 MARCH

	Station 3	Station 4	
Flow	327818.4	203941.9	l/sec
Water Temperature	24.5	25.5	C
Time (t)	0.306287		day
DO sat	8.252	8.1	mg/l
DO	5.78	6.301	mg/l
DO deficit	2.472	1.799	mg/l
Ultimate BOD	1.931	1.616	mg/l
DO sat (average)	8.176		mg/l
k1	0.071		per day
k2	0.423		per day

$$Dt = k1LA / (k2 - k1) * [10^{(-k1t)} - 10^{(-k2t)}] + DA * 10^{(-k2t)}$$

t	Dt	DO
0	2.472	5.704
0.005	2.46156465	5.71433534
0.01	2.45117872	5.72482127
0.015	2.44084196	5.73515803
0.02	2.43055414	5.74544585
0.025	2.42031501	5.75568498
0.03	2.41012434	5.76587565
0.035	2.39998190	5.77601809
0.04	2.38988745	5.78611254
0.045	2.37984076	5.79615923
0.05	2.36984161	5.80615838
0.055	2.35988975	5.81611024
0.06	2.34998497	5.82601502
0.065	2.34012703	5.83587296
0.07	2.33031571	5.84568428
0.075	2.32055078	5.85544921
0.08	2.31083201	5.86516798
0.085	2.30115920	5.87484079
0.09	2.29153210	5.88446789
0.095	2.28195051	5.89404948
0.1	2.27241420	5.90358579
0.105	2.26292295	5.91307704
0.11	2.25347654	5.92252345
0.115	2.24407476	5.93192523
0.12	2.23471740	5.94128259
0.125	2.22540423	5.95059576
0.13	2.21613504	5.95986495
0.135	2.20690963	5.96909036

0.14	2.19772777	5.97827222
0.145	2.18858927	5.98741072
0.15	2.17949390	5.99650609
0.155	2.17044146	6.00555583
0.16	2.16143175	6.01456824
0.165	2.15246455	6.02353344
0.17	2.14353967	6.03246032
0.175	2.13465689	6.04134310
0.18	2.12581601	6.05018398
0.185	2.11701683	6.05898316
0.19	2.10825916	6.06774083
0.195	2.09954278	6.07645721
0.2	2.09086749	6.08513250
0.205	2.08223311	6.09376688
0.21	2.07363943	6.10236056
0.215	2.06508626	6.11091373
0.22	2.05657340	6.11942659
0.225	2.04810065	6.12789934
0.23	2.03966782	6.13633217
0.235	2.03127472	6.14472527
0.24	2.02292116	6.15307883
0.245	2.01460694	6.16139305
0.25	2.00633188	6.16966811
0.255	1.99809578	6.17790421
0.26	1.98989846	6.18610153
0.265	1.98173973	6.19426026
0.27	1.97361940	6.20238059
0.275	1.96553730	6.21046269
0.28	1.95749322	6.21850677
0.285	1.94948700	6.22651299
0.29	1.94151844	6.23448155
0.295	1.93358736	6.24241263
0.3	1.92569359	6.25030640
0.305	1.91783695	6.25816304
0.31	1.91001725	6.26598274
0.315	1.90223431	6.27376568
0.32	1.89448796	6.28151203
0.325	1.88677802	6.28922197

FILE : SAG\M45
 CALCULATION DO SAG CURVE FROM STATION 4 TO 5
 BY STREETER & PHELPS MODEL
 MARCH

	Station 4	Station 5	
Flow	203941.9	291312.4	l/sec
Water Temperature	25.5	25	C
Time (t)	0.584806		day
DO sat	8.1	8.18	mg/l
DO deficit	6.301	6.75	mg/l
Ultimate BOD	1.799	1.43	mg/l
DO sat (average)	1.616	1.642	mg/l
k1	0.06		per day
k2	0.343		per day

$$Dt = k1LA / ((k2 - k1) * [10^{-(k1t)} - 10^{-(k2t)}] + DA * 10^{-(k2t)})$$

t	Dt	DO
0	1.799	6.341
0.01	1.78706995	6.35293004
0.02	1.77523068	6.36476931
0.03	1.76348149	6.37651850
0.04	1.75182167	6.38817832
0.05	1.74025052	6.39974947
0.06	1.72876734	6.41123265
0.07	1.71737145	6.42262854
0.08	1.70606217	6.43393782
0.09	1.69483882	6.44516117
0.1	1.68370072	6.45629927
0.11	1.67264722	6.46735277
0.12	1.66167764	6.47832235
0.13	1.65079134	6.48920865
0.14	1.63998766	6.50001233
0.15	1.62926596	6.51073403
0.16	1.61862559	6.52137440
0.17	1.60806592	6.53193407
0.18	1.59758632	6.54241367
0.19	1.58718617	6.55281382
0.2	1.57686483	6.56313516
0.21	1.56662171	6.57337828
0.22	1.55645618	6.58354381
0.23	1.54636764	6.59363235
0.24	1.53635549	6.60364450
0.25	1.52641913	6.61358086
0.26	1.51655797	6.62344202
0.27	1.50677142	6.63322857

0.28	1.49705889	6.64294110
0.29	1.48741982	6.65258017
0.3	1.47785363	6.66214636
0.31	1.46835974	6.67164025
0.32	1.45893760	6.68106239
0.33	1.44958663	6.69041335
0.34	1.44030630	6.69969369
0.35	1.43109604	6.70890395
0.36	1.42195531	6.71804469
0.37	1.41288356	6.72711643
0.38	1.40388025	6.73611974
0.39	1.39494486	6.74505513
0.4	1.38607685	6.75392314
0.41	1.37727570	6.76272429
0.42	1.36854088	6.77145911
0.43	1.35987188	6.78012811
0.44	1.35126817	6.78873182
0.45	1.34272926	6.79727073
0.46	1.33425464	6.80574535
0.47	1.32584380	6.81415619
0.48	1.31749625	6.82250374
0.49	1.30921149	6.83078850
0.5	1.30098903	6.83901096
0.51	1.29282839	6.84717160
0.52	1.28472909	6.85527090
0.53	1.27669064	6.86330935
0.54	1.26871257	6.87128742
0.55	1.26079441	6.87920558
0.56	1.25293570	6.88706429
0.57	1.24513596	6.89486403
0.58	1.23739474	6.90260525
0.59	1.22971159	6.91028840
0.6	1.22208605	6.91791394
0.61	1.21451766	6.92548232
0.62	1.20700599	6.93299400
0.63	1.19955006	6.9404494
0.64	1.19215103	6.94784896
0.65	1.18480687	6.95519312

ประวัติผู้เขียน

นายสมนึก จิตสัมพันธ์เวช เกิดเมื่อวันที่ 24 พฤศจิกายน พ.ศ. 2507

ที่กรุงเทพมหานคร สำเร็จการศึกษาปริญญาวิทยาศาสตรบัณฑิต (วิทยาศาสตร์สิ่งแวดล้อม)

จากคณะวิทยาศาสตร์ มหาวิทยาลัยศิลปากร เมื่อปีการศึกษา 2526 เข้าศึกษาในหลักสูตร

ปริญญาวิทยาศาสตรมหาบัณฑิต ณ บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย เมื่อปีการศึกษา

2527

