EPA Region 5 Records Ctr.
201248

City of Marshall, WWTP

Request for Information , Request # 13
Monthly Reports from 11/55 to 9/03

Request for Information, Request #15
Sludge Data from 11/55 to 8/83 are included in the monthly reports

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November, 1955

SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1		58	46	52	60	59	96	93	1.23	out	10	160	*1400	300	1700	5000
2		48	32	40	59	58			1.34		81	160	3300	600	3900	4800
3		35	30	32	58	57			1.32	of	483	160	7400	100	7500	4400
4	(				59	58			1.31		37	160	5700	0	5700	4200
5	(								1.29	service	2	160	5300	0	5300	4400
6	(	45	29	37					1.23		3	160	4500	0	4500	4900
7		36	30	33	59	59	96	94	1.34	for	559	160	5700	0	5700	3700
8		42	32	37	59	58			1.28		389	160	5500	0	5500	5000
9		40	31	35	59	57			1.27	winter	77	160	*1300	400	1700	5500
10		50	34	42	59	58			1.27		27	160	6900	0	6900	3200
11	(				58	57			1.27	season	51	120	5500	0	5500	3500
12	(								1.23		3	160	6300	0	6300	2000
13	(	65	41	53					1.20		7	120	*1400	500	1900	1400
14		48	37	42	58	57	95	93	1.29		127	160	8100	0	8100	1900
15		54	42	48	59	57			1.34		335	160	7400	0	7400	2400
16		51	17	34	58	57			1.33		266	200	8200	0	8200	4200
17		31	23	27	58	55			1.26		168	200	8600	0	8600	3700
18	(				58	57			1.29		123	160	9400	0	9400	2000
19	(								1.25		84	160	9400	0	9400	2100
20	(	38	29	33					1.22		57	120	9300	0	9300	2000
21		42	32	37	59	58	95	93	1.34		259	160	9600	400	10000	500
22		57	34	40	58	56			1.30		133	160	10200	700	10900	1800
23	(				58	56			1.29		202	120	9900	0	9900	2100
24	(	36	20	28					1.29		234	160	9200	0	9200	1900
25	(				57	56			1.27		201	160	7900	0	7900	3000
26	(								1.24		71	120	7400	0	7400	3500
27	(	43	8	25					1.20		72	200	5800	0	5800	5100
28		26	6	16	57	55	94	93	1.30		83	200	5800	0	5800	5200
29		34	8	21	57	55			1.27		168	160	9300	0	9300	3000
30		32	14	23	57	56			1.29		115	160	9600	0	9600	2300
31																
Total									38.3		4417	4760	205300	3000	208300	9870
Max.		65			60	59	96	94	1.34		559	160	10200	700	10900	5500
Min.			6		57	55	94	93	1.20		2	120	1400	0	1700	500
Av.				35	58	57	95	93	1.28		147	159	6843	100	6943	3290

REMARKS: * Meter stuck, quantity actually produced unknown.
Gas produced was burnable but of poor quality. Sewage gas was used in the heat exchanger, control building and waste gas pilot supplied from purchased gas.

PREPARED BY R. D. Craun, chief operator

DATE December 13, 1955

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November, 1955.. SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PPM PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE MAXIMUM	PH. DATA RAW SEWAGE MINIMUM	PH. DATA PLANT EFFLUENT MAXIMUM	PH. DATA PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	732	628	180	88.9	58	93.1	226	140	9.5	7.2	8.5	7.3			
2	692	608	138	86.2	59	91.5	146	53	7.7	7.5	7.6	7.5			
3	616	544	123	83.7	63	82.5	238	143	7.8	7.4	7.6	7.4	6.0	6.2	6.2
4	768	564	154	85.1	65	92.3	124	62	7.9	7.3	7.7	7.5	5.7	6.2	6.8
5															
6															
7	828	700	* 271	86.0	128	84.4	* 175	69	7.5	7.3	7.6	7.2	6.0	5.9	6.5
8	764	636	159	85.5	168	85.5	153	92	8.4	7.5	7.7	7.3	6.2	6.0	6.9
9	700	592	148	86.5	61	85.2	165	78	8.2	7.5	7.6	7.3	6.1	6.0	6.9
0	716	600	139	84.9	69	85.5	124	73	7.8	7.5	7.6	7.5	6.1	6.1	6.8
1	852	580	156	82.1	58	89.7	162	93	8.1	7.5	7.6	7.4	6.2	6.2	6.8
2															
3															
4	952	544	215	81.0	68	82.4	151	71	8.4	7.5	7.4	7.2	6.2	6.2	6.9
5	1116	852	* 299	71.9	98	73.5	* 294	128	7.7	7.2	7.5	7.3	6.2	5.9	6.2
6	716	624	142	81.0	55	85.9	177	88	7.7	7.5	7.5	7.2	6.2	6.2	6.8
7	692	684	136	86.8	52	94.2	151	76	7.8	7.6	7.7	7.5	6.2	6.2	6.8
8	796	616	146	87.7	62	87.7	140	83	7.8	7.6	7.8	7.5	6.1	6.1	7.0
9															
0															
1	1120	836	* 476	73.1	216	73.1	* 363	206	7.6	7.5	7.6	7.3	6.2	6.2	7.0
2	776	624	164	82.3	64	84.4	230	71	7.7	7.5	7.5	7.2	6.2	6.3	7.0
3	740	624	149	81.9	65	78.5	165	101	7.8	7.5	7.6	7.5	6.1	6.2	7.1
4	Thanksgiving														
5	744	584	182	80.8	75	81.3	248	111	7.7	7.5	7.7	7.5	6.1	6.1	7.0
6															
7															
8	924	668	256	81.3	84	75.0	228	105	7.7	7.5	7.6	7.3	6.1	6.4	6.9
9	828	608	144	78.5	61	83.6	246	94	7.8	7.7	7.8	7.4	6.2	6.5	6.8
0	840	680	* 308	66.2	126	71.4	* 254	151	7.9	7.4	7.7	7.5	6.3	6.7	7.0
1															
tal															
ax.	* 1120	852	* 476	88.9	* 216	94.2	* 363	206	9.5		8.5		6.3	6.7	7.1
in.	616	544	123	71.9	52	71.4	124	53		7.2		7.2	5.7	5.9	6.2
v.	805	638	195	82.0	79	83.9	198	99					6.1	6.3	6.8

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	805	256800	638	203500	167	53300	26.2
SUSPENDED SOLIDS	195	62200	79	25200	116	37000	59.5
5 DAY B.O.D.	198	63200	99	31500	99	31700	50.0

* See remarks on sheet 4.

PREPARED BY R. D. Craun, Chief Operator

DATE December 14, 1955

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November, 1955 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER (*)	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernantant — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Dig. No.
1	3757	4.0	1250	85.0	1065								
2	3315	4.5	1240	87.0	1080								
3	2431	3.2	650	88.2	570								
4	2652	4.7	1030	85.2	885								
5	2873												
6	2873												
7	4199	3.8	1330	75.0	995	24752					24752	.2	2
8	2873	5.1	1220	75.0	915								
9	3094	4.2	1080	74.6	805								
10	3094	4.5	1160	70.8	820	1550							
11	3094	5.1	1310	86.2	1130								
12	2652	4.7	1040	82.6	860								
13	2652												
14	5525												
15	1989	4.7	780	83.3	650	(a)17682					(a)9282		2
16	3757	4.2	1310	75.0	985								
17	3757	3.8	1180	81.0	960								
18	3536	4.0	1180	73.9	870								
19	3315												
20	3094												
21	5746	3.2	1530	84.2	1290	(b)51856					(b)35944		2
22	3978	3.8	1360	68.2	925								
23	3751	4.1	1280	75.0	960								
24	2873												
25	2873	3.5	840	81.8	685								
26	3536												
27	3094												
28	3315	3.1	850	83.3	710								
29	3094	4.1	1060	76.2	805								
30	3536	3.8	1120	76.2	850	2000					23000	.4	1
31													
Total	100328		23800		18815	97837					92978		
Max.	5746	5.1	1530	88.2	1290	51856					35944	.4	
Min.	1989	3.1	650	68.2	570	0					0	.2	
Av.	3344	4.1	1140	79.4	905	3261					1198	.3	

REMARKS: (*) Sludge pumpage computed from amount of digester cover travel.
(a) Drying bed filled from #2, 8400 gallons. # 2 refilled from #1 and an additional gallons also, overflowing #2 the excess 9282. Sludge to the bed was 4.6% dry Solids and 64.5% volatile.
(b) Transfered 15900 gal. from #2 to #1 and then back from 1 to 2 to attempt to seed #1 and bring up the pH. Then pumped 35944 gal from 1 to 2 and overflowed #2 that much. Intermixed 1 and 2 for 16 hours on 28th.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 14, 1955

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November, 1955. SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE				COMMENTARY
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	
1									The plant, as a whole, functioned with a minimum of operational problems. The #1 digester is slow in coming into the alkalin range and is very sour. However,#2 is at about the neutral poi and the seeding of 1 with sludge from 2 is begining to bring up the pH of 1. It is expected that both digesters wil
2	46	9.3	80.4	3.5	48	9.8	84.8	13.4	be fully conditioned during next month.
3	44	10.2	84.3	5.5	44	10.1	83.5	8.3	"Shots" of red sewage on Fridays an
4	43	10.5	84.0	11.4	43	10.5	84.0	8.1	of green sewage at various times has
5									been a source of speculation but they
6									have been of such short duretion that
7									they have not been considered a cause
8	40	11.2	86.4	5.0	40	11.4	87.8	2.6	for anyalarm or special investigation.
9	40	10.4	80.1	2.5	40	10.2	78.6	2.5	The laboratory data indicates that
10	39	11.4	86.7	2.2	39	11.1	84.4	2.5	the plant is producing a satisfactory
11	43	10.4	83.5	3.6	43	10.6	85.9	4.4	effluent, with reductions probably
12									exceeding the expectancy for such a
13									dilute sewage. The widw variations in
14									strength as indicated by the maximum
15	48	9.2	79.7	6.8	48	9.2	79.7	6.6	and minimum suspended solids and 5 day
16	47	9.2	78.4	2.4	47	9.3	79.2	2.7	BOD's are surprising for a separate
17	37	11.3	83.4	2.5	37	11.2	82.6	2.6	sanitary system even with the great
18	36	12.0	87.8	2.6	36	11.9	87.2	3.1	amount of infiltration we experience
19									since the flow ramains very constant.
20									The high volatile content of the solid
21									would seem to indicate that very littl
22									extraneous matter is entering the sewe
23	42	10.6	83.8	2.2	42	10.6	83.8	2.5	The spot checking of the river from
24									above and below the effluent discharge
25	37	11.8	87.1	2.6	37	11.6	85.6	3.0	indicates a very satisfactory conditio
26									The high dissolved oxygen content and
27									the very slight differences and low
28									range of the B.O.D.'s is good evidence
29	33	12.0	83.3	2.4	33	12.2	84.8	3.3	that our effluent is of no impairment
30									to the stream.
31									
Total									
Max.	48	12.0	87.8	11.4	48	12.2	87.8	13.4	
Min.	33	9.2	80.1	2.2	33	9.2	78.6	2.5	
Av.	41	10.7	83.5	3.9	41	10.7	83.7	4.7	

REMARKS: *Concerning sheet 2. Supernatant liquor from the digesters is discharged into the raw sewage wet well ahead of the sampling point for the Raw Sewage. If the days when digester liquor was returned are deleted from the data, then the averages would be as follows:
Suspended Solids; Raw Sewage, 161ppm - Plant Effluent, 64ppm. Reduction 97ppm, 60.
5 Day B.O.D. " " 181ppm - " " 90ppm. " 91ppm, 50.3%

PREPARED BY R.D.Craun, Chief Operator

DATE Dec. 16, 1955

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1955 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1		34	31	32			93	90	1.27		68	160	8900	0	8900	3100
2		38	33	35					1.26		71	160	8400	0	8400	1800
3									1.26		32	120	8300	0	8300	2000
4									1.24		79	160	8800	100	8900	3300
5	S	28	17	27	56	55	93	90	1.32		71	120	6700	3300	10000	1300
6	Cl	30	18	24	57	56	93	90	1.34		60	160	7700	3700	11400	1700
7	Cl-F	40	26	33	56	55	94	91	1.30		356	160*	4700	2900	7600	2200
8	F	31	20	25	56	55	94	91	1.29		271	160*	8200	5000	13200	1600
9	LS	28	14	21			94	91	1.27		68	120*	9400	6900	16300	2700
10	LS	28	20	24			94	92	1.23		30	160*	9300	7000	16300	2600
11	LS	30	21	26			92	91	1.20		36	120*	9200	6400	15600	2500
12	LS	32	22	27	57	55	93	90	1.32		54	160*	8900	5900	14800	2200
13	F	35	22	28	56	54	94	90	1.29		64	160*	8600	3300	11900	2200
14	LS	34	10	22	56	55	94	90	1.28		75	160*	8600	2000	10600	2400
15	LS	20	11	15	55	53	94	90	1.29		100	120*	8400	1700	10100	2700
16	Cl	24	19	21	55	54	94	90	1.28		447	160*	8500	1800	10300	2700
17	F	29	20	24			94	92	1.25		24	120*	10000	1200	11200	2600
18	S	30	18	24			94	91	1.14		37	160*	7900	1100	9000	2300
19	F	21	11	16	55	53	95	90	1.22		153	120*	8000	2200	10200	3100
20	Cl	23	14	18	54	53	95	90	1.21		77	160*	8200	2400	10600	3100
21	Cl	26	18	22	55	54	92	91	1.22		97	120*	8700	1100	9800	3200
22	Cl	33	24	28	55	54	90	93	1.23		510	160	8300	2000	10300	1900
23	Cl	44	28	36	55	54	93	92	1.24		243	160	8800	1700	10500	1500
24	Cl	52	28	40			94	90	1.15		24	120	8400	1900	10300	1500
25	F	38	21	29			92	92	1.08		26	120	8400	700	9100	1600
26	F	33	18	26			94	91	1.16		26	80	8200	800	9000	2400
27	F	30	18	24	54	53	96	90	1.24		113	160	8300	400	8700	2200
28	Cl	41	22	31	54	53	96	90	1.23		60	120	8600	500	9100	2400
29	Cl	40	17	28	55	53	92	92	1.20		55	160	8400	900	9300	2000
30	S	26	18	22	55	53	94	90	1.25		84	160	8700	400	9100	2500
31	F	34	18	26			92	92	1.21		23	120	9900	100	10000	2100
Total									38.49		3434	4400	261400	67400	328800	71400
Max.		52			57	56	96	93	1.34		510	160	10000	7000	16300	3300
Min.			10		54	53	90	90	1.08		23	80	4700	0	7600	1300
Av.				26	55	54	94	91	1.24		110	142*	8432*	2174*	10608	2300

REMARKS: * Violent action in #1 digester. Gas pressures up around 9.5 inches and #1 cover riding on gas high enought to allow escapage under skirt, also venting from pressure relief on cover. Condensate forming in waste gas burner line and has to be blown out with compressed air once or twice daily. Purchased gas only is used for control building heat and so is used even when there is an excess of digester gas.

PREPARED BY R. D. Craun, Chief Operator

DATE January 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1955 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	756	576	139	82.7	47	89.4	150	85	8.1	7.6	7.6	7.4	6.5	6.7	7.0
2	924	604	173	81.5	68	79.4	168	84	7.7	7.5	7.6	7.4	6.2	6.7	7.0
3															
4															
5	795	636	192	74.0	76	78.9	158	87	7.7	7.5	7.6	7.5	6.1	6.9	7.1
6	**832	684	244	78.7	86	86.1	122	99	7.9	7.5	7.7	* 7.3	6.2	6.8	7.3
7	828	668	151	87.4	71	93.4	139	92	8.1	7.5	7.6	7.6	6.1	6.8	7.0
8	716	624	139	82.9	63	82.6	92	73	7.8	* 7.3	7.6	7.5	6.1	6.9	7.1
9	872	628	169	82.3	70	70.0	140	67	8.4	7.6	7.7	7.4	6.3	6.8	7.0
10															
11															
12	**1032	692	404	75.7	126	76.2	191	91	8.7	7.4	7.6	7.4	6.4	6.9	7.4
13	796	600	186	77.4	72	79.2	146	75	8.7	7.7	7.7	7.5	6.4	6.9	7.2
14	812	640	154	87.0	62	88.7	128	73	7.8	7.6	7.7	7.5	6.3	6.8	7.2
15	916	604	166	80.7	63	79.4	130	82	7.8	7.6	7.7	7.5	6.3	6.8	7.1
16	808	567	154	90.4	53	92.5	117	74	8.4	7.6	7.9	7.6	6.3	6.9	6.9
17															
18															
19	748	636	178	86.5	70	95.7	135	86	8.2	7.5	7.7	7.2	6.3	6.8	7.1
20	868	652	191	79.1	70	74.3	134	93	8.2	7.5	7.8	7.4	6.3	6.9	7.2
21	724	672	149	79.2	81	76.5	137	87	8.1	7.7	7.8	7.5	6.2	7.0	7.2
22	800	644	155	88.4	78	89.7	134	97	7.8	7.6	7.7	7.5	6.4	7.0	7.1
23	**1008	668	344	75.6	126	81.0	218	110	7.9	7.5	7.7	7.5	6.3	7.0	7.1
24															
25															
26															
27	896	556	238	77.3	62	90.3	158	86	8.7	7.3	7.6	7.2	6.3	7.1	7.2
28	784	612	156	83.3	60	90.0	142	88	8.1	7.4	7.7	7.4	6.3	7.1	7.2
29	704	616	143	81.8	59	84.8	138	78	7.7	7.7	7.7	7.5	6.2	7.0	7.2
30	** 960	672	294	81.6	104	90.6	153	91	7.6	7.5	7.7	7.3	6.3	7.1	7.3
31															
Total															
Max.	1032	692	404	90.4	126	95.7	218	110	8.7		7.9		6.5	7.1	7.4
Min.	707	556	139	74.0	47	70.0	92	67		7.3		7.2	6.1	6.9	6.9
Av.	834	631	196	81.6	75	84.2	144	86	7.6		7.5		6.3	6.9	7.1

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	834	267714	631	202551	203	65163	24.3
SUSPENDED SOLIDS	196	62916	75	24075	121	38841	61.7
5 DAY B.O.D.	144	46224	86	27606	58	18618	40.3

* Low pH readings accompanied by green sewage

** See remarks on sheet 4

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 10, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..December.. 1955...

SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS: SUPERNATANT — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS DIG. No.
1	3978	3.2	1050	84.6	885								
2	4198	3.4	1190	84.6	1010								
3	2652												
4	2652												
5	2652	3.6	795	72.7	575								
6	2652	3.4	750	84.2	630	24310	4.9	9940	76.0	7560	24300	.32	2
7	2431	3.8	770	85.7	660								
8	2873	3.6	860	78.9	680								
9	3315	3.7	1020	81.0	830								
10	2873												
11	2400												
12	3440	3.5	1000	84.1	850	22000	3.6	6610	55.6	3690	22000	.6	1
13	3360	3.5	980	72.2	710								
14	2880	3.3	790	87.0	690	7730	1.1	720	80.0	570			
15	3600	3.9	1170	77.3	910								
16	3600	3.6	1080	87.0	940								
17	3170												
18	3200												
19	3315	3.3	910	81.3	740								
20	3536	3.4	1000	87.0	870								
21	3757	3.0	1260	88.2	1110								
22	3757	2.6	820	85.7	700	3100							
23	3536	3.4	1000	80.0							15000	.6	1
24	2652												
25	3094												
26	3094												
27	2210	3.0	550	75.0	420								
28	3536	3.2	940	85.0	800								
29	3315	3.4	940	73.7	690						19230	.3	2
30	3094	2.9	750	80.0	600	19230	2.6	4170	61.5	2570			
31	2652												
Total	94822		26920		21994	76370		19768		13502	80530		
Max.	4198	3.9	1260	88.2	1110	24310	4.9	9940	80.0	7560	24300	.6	
Min.	2210	2.6	550	72.2	420	0	1.1	720	55.6	570	0	.3	
Av.	3059	3.4	868	81.7	9464 710	2464	3.1	638	68.3	436	2598	.45	

REMARKS:

Filled # 2 drying bed on the 14th. 10 inches of fill, 7730 gallons. 6.6 % Solids and 60.0 % volatile - 4260 lbs. dry and 2530 lbs. volatile. Intermixed #1 and #2 digesters for 16 hours on the 21st. by opening both suctions and discharges through the circulating pump.

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1955 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	34	11.4	80.3	2.2	34	11.4	80.3	1.4
2								
3								
4								
5								
6								
7	35	11.8	84.4	2.7	35	12.0	85.8	3.1
8	35	11.8	84.4	2.6	35	11.8	84.4	2.2
9								
10								
11								
12								
13	37	11.6	85.4	2.0	37	11.8	88.0	2.4
14	36	11.2	81.2	2.2	36	11.6	84.1	2.8
5								
6								
25	Iced at sampling points.							
26								
27								
28	35	12.0	85.8	2.8	35	11.9	85.1	3.1
29	37	11.7	86.1	2.9	37	11.6	85.4	2.7
30								
31								
Total								
Max.	37	12.0	86.1	2.9	37	12.0	88.0	3.1
Min.	34	11.2	80.3	2.0	34	11.4	80.3	1.4
Av.	36	11.6	83.9	2.5	36	11.7	84.7	2.5

COMMENTARY

The plant again functioned with a minimum of mechanical troubles and contineous treatment was provided. The Kalamazoo St. Lift Station pump was found stopped on the 14th and a fuse blown. 30 amp fuses were provided instead of 20. On several later occasions the overload was found tripped but the pump starts without hesitation upon resetting and will start repeatedly so the cause of the overload has not been determined as yet.

A sample of on of our occasional "shots" of green sewage was sent to the Mich. Dept of Health for analysis on the 6th. On the 16th we got an answer stating that it contained about 75 ppm of hex. chromium. We were advised to find the source at once and arrange to have the discharge discontinued. Mr. Angley called all possible contributors but all disclaimed responcibility, but we have not actually seen any since.

The flexible wire type electrodes for regulating the sewage pumps are our chief source of annoyance at present. The turbulance in the wet well causes the porcelain shields to float which results in very erratic action. Also, on the surface, they soon become coated with greese and then fail. The porcelains trap all of the stringy materials which slide down the wires which has to be cut off quite often. Ridged type electrodes should be substituted to correct the situation and eliminate a lot of unnecessary maintenance.

Both digesters are now stabelized after a short period of violent action in No.1 during which foam was thrown out around the skirt and onto the cover and great quantities of gas were lost from under the skirt and through the pressure relief.

REMARKS: ** Concerning Items on sheet 2. Sampling point for raw sewage is beyond the discharge of supernatant. If the days that supernate was drawn are excluded The various data averages are as follows:

Total Solids - Raw 809 ppm, Effluent 614ppm; Reduction, 195 ppm or 24.1 %
Suspended Sol. " 166 " , " 66 " : " , 100 " " 60.2 %
B.O.D. - " 138 " " 83 " " 55 " " 39.9 %

PREPARED BY R. D. Craun, Chief Operator

DATE January 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January, 1956 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
	F	36	19	27			92	90	1.12		21	120	8900	00	8900	2300
2	LS	40	31	35			94	90	1.19		28	120	8300	00	8300	3400
3	C	34	26	30	55	53	92	93	1.22		62	120	7900	00	7900	1900
4	C	31	19	25	54	53	94	90	1.20		63	160	7200	200	7400	3300
5	F	40	20	30	54	53	94	90	1.21		62	120	7300	500	7800	2600
6	C	36	22	26	54	53	94	88	1.20		71	160	7600	00	7600	2900
7	F	26	14	20			95	88	1.18		22	120	7300	00	7300	3300
8	F	22	8	15			91	90	1.15		20	160	6700	00	6700	4000
9	F	28	12	20	54	51	94	88	1.20		158	80	*2300	00	2300	3100
10	S1	36	28	32	54	53	90	87	1.20		208	160	7600	400	8000	2400
11	S1	34	19	26	54	52	92	86	1.18		91	120	6900	100	7000	3400
12	F	33	19	26	54	52	93	85	1.19		66	160	7000	00	7000	3700
13	F	38	14	26	54	53	90	88	1.19		51	160	7700	00	7700	2900
14	F	30	15	22		~~98~~	~~98~~	87	1.19		26	120	7800	00	7800	2900
15	C	32	26	29			89	90	1.09		20	80	6900	00	6900	2100
16	F	15	34	25	54	51	93	88	1.25		74	160	6700	00	6700	4100
17	F	32	16	24	54	53	94	86	1.21		48	160	7300	00	7300	3700
18	F	34	24	29	54	52	94	86	1.20		70	120	7000	200	7200	3800
19	S	30	26	28	54	52	95	86	1.20		71	160	6800	800	7600	4400
20	S	36	24	30	54	52	96	85	1.21		54	120	6400	1000	7400	4900
21	LS	30	10	20			96	84	1.19		27	120	6900	700	7600	4000
22	LS	23	2	12			94	87	1.12		25	120	7700	00	7700	4500
23	F	28	4	16	54	51	98	86	1.27		372	160	6800	00	6800	4100
24	LS	27	5	16	54	52	100	84	1.19		49	120	8300	00	8300	3100
25	C	28	6	17	53	52	92	87	1.18		52	160	7800	00	7800	3200
26	F	30	6	18	53	52	96	86	1.20		366	120	6500	00	6500	4200
27	F	32	12	22	53	52	97	85	1.21		42	160	7500	800	8300	3600
28	FR	34	24	29			98	84	1.20		24	120	7500	900	8400	3800
29	S	35	21	28			94	88	1.13		26	120	8000	00	8000	3300
30	S	30	18	24	53	51	98	86	1.21		53	120	6500	200	6700	4800
31	F	28	5	16	54	52	98	85	1.22		185	160	7000	800	7800	4400
Total									36.91		2507	4160	222100	6600	228700	↓ 110100
Max.		40	34	35	55	53	100	93	1.27		372	160	8900	1000	8900	4900
Min.		15	2	12	53	51	89	84	1.09		20	80	*2300	00	2300	1900
Av.		31	17	24	54	52	94	87	1.19		81	134	7165	213	7377	3551

REMARKS: * Low reading because of stuck meter. Sticks when changing from 99 to 100. Digester gas used only for the heat exchanger. Purchased gas used for main control building heating.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 2, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF ~~February~~ January, 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3	788	620	203	81.3	54	85.4	159	93	7.8	7.4	7.7	7.3	6.4	7.0	7.2
4	612	576	135	84.4	53	83.0	135	84	7.8	7.6	7.8	7.5	6.3	7.0	7.2
5	792	592	131	87.8	59	88.1	126	86	7.8	7.6	7.7	7.6	6.4	7.0	7.1
6	840	580	160	87.5	57	87.7	117	68	7.8	7.6	7.7	7.5	6.3	7.0	7.1
7															
8															
9	804	624	258	57.4	70	87.1	131	77	7.7	7.5	7.5	7.3	6.0	6.9	7.1
10	804	636	175	83.4	68	85.3	142	97	7.9	* 6.8	7.5	7.4	6.3	7.0	7.1
11	812	620	217	88.9	67	94.0	174	88	7.9	7.5	7.5	7.3	6.1	7.0	7.1
12	716	592	158	87.3	62	91.9	119	77	7.6	7.5	7.5	7.3	6.3	7.1	7.1
13	768	572	179	83.2	68	82.4	155	64	7.6	* 7.1	7.4	7.3	6.4	6.9	7.0
14															
15															
16	844	624	242	81.8	76	80.3	189	94	7.7	7.5	7.5	7.3	6.3	7.0	7.1
17	884	636	149	85.3	61	90.2	147	92	7.8	7.6	7.6	7.4	6.0	7.0	7.1
18	780	608	153	84.3	60	81.7	159	77	8.1	7.6	7.6	7.4	6.1	6.9	7.1
19	684	644	139	87.7	68	89.7	121	86	7.7	7.4	7.6	7.5	6.0	7.0	7.1
20	728	568	165	92.7	66	92.4	140	88	7.7	7.5	7.5	7.4	6.0	7.0	7.1
21															
22															
23	860	632	320	80.3	96	77.1	191	106	7.7	7.3	7.5	7.3	6.0	7.0	7.0
24	708	592	157	82.8	64	85.9	128	81	9.2	7.5	8.1	7.4	6.2	7.0	7.0
25	704	592	132	90.9	64	89.1	146	94	8.0	7.5	7.7	7.4	6.1	6.8	7.0
26	712	533	133	88.7	50	92.0	130	76	8.2	7.5	7.5	7.4	6.0	6.9	7.0
27	900	600	185	88.1	57	94.7	184	86	7.7	7.5	7.6	7.5	6.1	6.9	7.0
28															
29	800	616	206	90.2	60	100.0	153	90	7.7	7.6	7.6	7.5	6.0	7.0	7.1
30	784	628	248	79.8	61	88.5	181	84	8.4	7.5	7.7	7.5	6.0	6.7	7.4
31															
High	900	644	320	92.7	96	100.0	191	106	9.2		8.1		6.4	7.1	7.4
Low	612	533	131	57.4	50	77.1	117	64		6.8		7.3	6.0	6.7	7.0
Average	768	604	183	84.5	64	89.0	149	85					6.2	7.0	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	768	* 236436	604	* 185947	164	* 50489	21.4
SUSPENDED SOLIDS	183	* 56338	64	* 19703	119	* 36635	65.0
5 DAY B.O.D.	149	* 45871	85	* 26168	64	* 19703	42.9

* Green sewage 11:45 on 10th and 10:35 on 13th.

* PPM and poundage based on 8 hr. day strengths.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF. January,... 1956.... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS — Supernatant: GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Bed. NO.
1	2873												
2	2652												
3	2873	3.0	720	81.2	580								
4	3757	3.5	1100	81.6	890								
5	3204	3.6	960	85.0	820	19780	1.7	2850	63.0	1800			
6	3094	3.8	980	81.4	800								
7	2652												
8	2873												
9	2210	3.5	650	86.0	560								
0	2652	3.4	750	84.3	630								
1	2652	4.3	950	82.2	780								
2	3094	4.0	1040	80.5	840						18100	.6	1
3	2873	3.6	860	82.4	710								
4	2210												
5	1989												
6	2431	4.0	810	81.5	660								
7	3094	4.0	1040	84.3	870								
8	3094	4.2	1080	82.9	900								
9	2431	2.9	590	80.0	470	4860	5.0	2030	70.0	1420	4860	.6	2
0	2431	3.3	670	81.2	550								
	1989												
	1989												
	2310	3.5	670	82.5	560								
	3315	3.2	880	81.2	720								
	2431	3.7	750	84.8	640								
	2652	3.5	770	86.4	670								
	1989	3.5	580	83.8	490								
	1768												
	1989												
	2873	4.0	960	79.2	760								
	2431	3.6	730	84.8	620	10610	3.3	2930	74.3	2170	10610	.5	1
	80875	76.1	24457		20236	35250		7810		5390	66720		
	3094	4.3	1100	86.4	900	19780	5.0	2930	74.3	2170	33150	.8	
	1768	2.9	580	79.2	470	0	1.7	0	63.0	0	0	.5	
	2609	3.6	789	82.7	653	1173	3.3	252	69.1	174	2152	.6	

REMARKS Drew 19000gal. to beds 3&4 on 5th. Approx 10 inch fill. Sludge good. 6.3 % sol. 10175lbs. and 52.8 % vol. 5372 lbs. 11.3 cu. ft. gas per lb. vol. added. 76.% red. vol. sol. by digestion.

PREPARED BY R. D.Craun, Chief Operator

DATE Feb. 2, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..January...1956..... SHEET NO. 4

DATE	RECEIVING STREAM DATA								COMMENTARY
	ABOVE EFFLUENT DISCHARGE				BELOW EFFLUENT DISCHARGE				
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	
									Continuous treatment was maintained during the month with very satisfactory results. The reductions of 65% in the suspended solids and 42.9% in the 5 day BOD are excellent for the dilute sewage being treated. About 24500 pounds, dry weight, of sludge solids were removed to the digester. The volatile content remains very high. Digestion is well
	37	11.5	84.6	3.3	37	11.5	84.6	3.6	stabilized and is producing a uniform
	35	11.4	81.5	2.8	35	11.4	81.5	3.0	quantity of gas at a rate of about 7375 cu.ft. per day. This is equivalent to 1.23 cu.ft. per capita per day or 11.3 cu.ft. per lb. of volatile solids added
	35	12.0	85.7	3.2	35	12.2	87.3	3.8	The wide descrepency of 33% between the calculated weights of the suspended
	36	11.6	85.0	3.2	36	11.6	85.0	3.2	solids removed and the dry solids to digester must be the result of the difference between the day and night flow strengths. Using the weight differential as a basis of calculation, it is estimated that the night flow of raw sewage
	34	11.6	81.8	2.2	34	11.6	81.8	2.6	must be about 85 ppm of suspended solid and the average for the 24 hours about 125 ppm, giving a factor of about 68% of day strength equaling the probable 24 hr. strength. The population equivalent of the BOD is about 7800 and if the same factor is used an equivalent of 5300 is obtained which tallies to a reasonable extent with the 5800 actual population.
	Sampling discontinued due to weather conditions.								Green sewage was observed again on the 10th, very strong but of short duration and on the 13th when it appeared to be weaker but lasted over an hou Mr. Angley again spent considerable time and effort trying to locate the offenders, but got flat denials from everyone contacted, but there has been no more green sewage observed since his investigation.
	37	12.0	85.7	3.3	37	12.2	87.3	3.8	
	34	11.4	81.5	2.2	34	11.4	81.5	2.6	
	35	11.6	83.7	2.9	35	11.7	84.0	3.2	Continued trouble keeping the lift station pump in operation resulted in

EMARKS: the installation of heavier heaters and changing the control electrodes so that the time interval would be longerbetween operating cycles. The pump has been operating without an overload stoppage since the 26th.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February...1956... SHEET NO. 1

TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
LS	30	14	22	53	52	100	84	1.19		42	160	80	0	80	34
F	33	3	18	53	52	94	87	1.17		43	120	88	0	88	28
F	30	4	17	53	52	97	87	1.19		40	120	66	0	66	43
F	36	14	25			98	86	1.17		26	160	71	8	79	37
F	34	18	26			94	89	1.08		26	80	73	1	74	35
FR	34	28	31	53	51	96	87	1.16		59	160	63	20	83	51
C	38	27	33	53	52	98	86	1.16		42	160	53	23	76	23
C	48	32	40	53	53	96	85	1.18		48	120	85	6	91	16
LS	36	28	32	53	52	96	84	1.19		53	160	70	23	93	21
F	38	24	31	53	52	96	84	1.26		414	120	68	16	84	20
S	32	26	29			94	84	1.20		23	160	67	6	73	27
LS	36	25	30			91	85	1.12		58	120	64	8	72	25
F	40	28	34	53	52	94	83	1.22		51	160	81	0	81	25
F	30	15	22	54	51	93	82	1.27		71	160	70	18	88	17
F	44	22	33	52	52	93	82	1.26		45	120	44	33	77	22
S	32	14	23	52	51	88	83	1.23		44	120	90	5	95	26
C	40	28	34	53	52	92	82	1.23		33	160	95	1	96	23
F	30	14	22			92	82	*1.18est.		641	160	80	18	98	22
F	38	13	20			98	84	*1.12est.		18	120	88	1	89	24
LS	32	10	21			92	84	*1.20est		21	120	62	12	74	23
F	26	10	18	52	51	92	81	1.20		24	160	60	27	87	23
F	26	4	15	52	51	90	80	1.22		28	120	82	16	98	28
F	34	6	20	52	51	90	80	1.20		20	160	58	34	92	22
R	46	32	39	52	51	90	78	1.49		31	160	77	21	98	22
S	34	16	25			90	78	1.44		2	120	77	12	89	26
F	41	23	32			88	80	1.37		5	160	88	3	91	24
F	30	11	20	52	50	90	79	1.37		19	160	23	22	45	21
LS	30	13	21	53	51	88	78	1.46		45	160	75	11	86	26
F	38	24	31	52	52	89	78	1.40		348	160	77	7	84	21
								35.909		2320	4120	2075	3520	2427	755
	48	32	40	54	53	100	89	1.487		641	160	95	34	98	51
	26	3	15	52	50	88	78	1.074		2	80	23	0	45	16
	35	18	26	53	52	93	83	1.238		80	142	71.6	12.1	83.7	26

REMARKS: Turned purchased gas supply off of the heat exchenger on 7th.

* Cable spool and cam gear assembly dropped off of the flow meter at 1:45 a.m. on the 19th. Raw sewage by-passed from 9:45 until 11:30 on the 20th in order to zero out and recalibrate meter after repairs were made. Flow for 18th, 19th and 20th estimated from averages of the 6 previous weekends.

PREPARED BY R. D. Craun, Chief Operator

DATE March 7, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1956

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B O D. 20 DEG C PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	820	596	168	83.3	51	88.2	149	76	8.5	7.5	7.7	7.5	6.1	7.0	7.0
2	624	576	128		42		119	71	7.7	7.6	7.6	7.5	6.1	6.9	7.0
3	692	600	173	88.4	64	90.6	124	72	7.8	7.5	7.6	7.5	6.1	7.0	7.0
4															
5															
6	744	592	221	85.5	67	89.6	187	90	7.7	7.3	7.5	7.2	6.2	7.0	7.1
7	688	592	146	78.8	52	90.4	118	71	8.4	7.6	7.7	7.4	6.3	7.1	7.1
8	780	632	155	81.9	55	90.9	131	73	8.2	7.6	7.7	7.6	6.2	7.0	7.0
9	828	616	227	84.1	69	89.9	162	85	7.7	7.6	7.6	7.5	6.1	7.0	7.1
10	928	624	290	79.3	80	97.5	136	90	7.7	7.4	7.7	7.5	6.1	6.8	7.0
11															
12															
13	876	600	211	86.7	50	90.0	182	76	7.8	7.6	7.6	7.4	6.1	7.0	7.1
14	992	612	243	58.4	55	76.4	136	62	8.8	7.5	7.6	7.4	6.1	7.0	7.0
15	1016	616	320	89.4	54	96.3	171	82	8.9	7.5	8.4	7.5	6.2	7.0	7.2
16	1560	776	162	90.7	56	96.4	207	82	7.8	7.2	7.6	7.3	6.1	6.8	6.9
17	700	660	163	84.0	59	86.4	115	75	7.8	7.5	7.6	7.5	6.0	6.8	7.0
18															
19															
20	No samples, working on flow meter														
21	732	548	175	86.9	45	93.3	141	68	9.1	7.4	7.6	7.5	5.8	6.9	7.0
22	712	608	196	85.7	54	83.3	134	77	7.7	7.5	7.6	7.5	6.0	6.9	7.1
23	664	584	127	85.0	48	89.6	116	70	8.1	7.5	7.6	7.5	6.1	6.9	7.0
24	908	692	249	85.9	46	97.8	144	79	7.9	7.5	7.5	7.3	6.1	7.0	7.1
25															
26															
27	672	580	264	90.5	63	84.1	116	72	7.6	7.4	7.6	7.3	6.1	6.9	7.0
28	984	548	276	84.8	40	95.0	201	66	9.1	7.4	7.7	7.4	6.0	6.9	7.2
29	808	596	202	82.6	66	86.3	134	78	7.7	7.5	7.6	7.5	6.2	6.9	7.0
30															
31															
Total															
Max.	1560	776	320	90.7	80	97.8	207	90	911	7.6	8.4	7.6	6.3	7.1	7.2
Min.	624	548	128	81.9	40	76.4	115	62	7.6	7.2	7.5	7.2	5.8	6.8	6.9
Av.	836	612	205	83.3	56	90.1	146	76	8.1	7.5	7.7	7.4	6.1	6.9	7.0

SUMMARY *	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	836	250365	612	183281	224	67084	26.8
SUSPENDED SOLIDS	205	61393	56	16771	149	44622	72.7
5 DAY B O D.	146	43724	76	22760	70	20964	47.9

* Based on daytime strengths

PREPARED BY R. D. Craun, Chief Operator

DATE March 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February 1956... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS: GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2: GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SUPERNATANT: GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Dig.#
1	2873	3.6	870	81.2	710								
2	2652	3.3	730	82.1	600								
3	1989	3.1	520	81.8	420								
4	1768*	3.6	530	*82.5	440								
5	2210	* 3.6	670	*82.5	550								
6	2210	3.4	610	85.0	520								
7	2652	4.0	890	88.6	790								
8	2431	4.2	860	82.1	700								
9	3315	4.6	1270	83.3	1050	12600	2.8	2960	78.6	2230	12600	1.3	2
10	2652	3.0	660	86.7	570								
11	1989	* 3.6	530	*82.5	440								
12	2431	* 3.6	730	*82.5	610								
13	1989	3.8	800	85.7	690								
14	3536	3.2	950	81.4	770								
15	2652	3.5	840	79.5	680	33800	.4	1130	75.0	850	33800	.4	2
16	2873	3.7	890	81.1	730								
17	3315	3.7	1030	78.0	800								
18	2652	* 3.6	800	*82.5	660								
19	1768	* 3.6	530	*82.5	440								
20	2210	* 3.6	670	*82.5	550								
21	3094	3.8	990	80.9	800								
22	2652	3.3	740	83.3	610								
23	2431	3.4	690	88.1	610								
24	2652	3.4	760	86.8	660								
25	1989	* 3.6	530	*82.5	440								
26	1989	* 3.6	530	*82.5	440								
27	2210	4.1	760	76.8	580								
28	2873	3.8	920	74.4	680	30500	.5	1270	60.0	760	30500	.4	2
29	3315	3.7	1030	83.0	850								
30													
31													
Total	73372		22188		18305	76900		5360		3840	76900		
Max.	3536	4.6	1270	88.6	1050	33800	2.8	2960	78.6	2230	33800	1.3	
Min.	1768	3.0	520	74.4	420	0	.4	0	60.0	0	0	.4	
Av.	2530	3.6	765	82.5	631	1652	.9	185	71.2	132	1652	.7	

REMARKS. * Monthly average used. SG 1.01 used 8.4 lb./gal. for raw sludge.

PREPARED BY R. D. Craun, Chief Operator

DATE March 8 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February...1956..

SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	No sampling because of weather conditions.							
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14	38	11.2	83.6	3.0	38	11.2	83.6	3.2
15	37	11.2	82.4	3.2	37	11.2	82.4	3.2
16								
17								
18								
19								
20								
21	36	11.2	81.2	2.3	36	11.6	84.1	3.3
22	35	12.0	85.8	3.0	35	12.2	87.1	3.6
23								
24								
25								
26								
27								
28	33	11.1	77.1	7.1	33	11.2	77.8	7.0
29	33	11.2	77.8	5.8	33	11.0	76.4	5.8
30								
31								
otal								
Max.	38	12.0	85.8	7.1	38	12.2	87.1	7.0
Min.	33	11.1	77.1	2.3	33	11.0	76.4	3.2
Av.	35	11.3	81.3	4.1	35	11.4	81.9	4.3

COMMENTARY

The plant was in contineous operation except for approximately 1½ hours during the month. The shutdown was necessary in order to "zero out" the flow meter after the cable spool and cam gear assembly jumped its bearing at 1.45 a.m. on the 19th.

Treatment results were very satisfactory, with reductions based on the daytime flow being very good for primary treatment.

There was no "green sewage" observed this month.

The volatile content remains very high and the digestion of sludge solids produced an average of 8370 cu.ft. of gas per day. This is equivalent to approximately 1.4 cu.ft. per capita and 13.3 cu.ft. per lb. of volatile solids added.

The wide discrepency between the calculated number of pounds of suspended solids removed, based on daytime sampling, and the pounds of solids pumped to the digester is again indicative of a tremendeous difference in the day and night strengths.

On the 21st, on our regular inspection tour, the motor of the pump at the lift station was found burned out. It was pulled and taken to a motor shop the next day and when it was disassembled it was found that the top bearing was without lubricant. This bearing was supposed to have been factory packed for a 5 year period but had been missed. The motor was rewound and placed back in service on the 27th and has functioned satisfactorily since.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE March 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....March...1956..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		PPM		5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	744?	520	241	57.3	68	72.1	122	66	8.1	7.2	7.6	7.5	6.0	6.9	7.0
2	717	524	171	84.2	52	82.7	119	56	7.7	7.5	7.6	7.4	6.2	6.9	7.0
3															
4															
5	676	508	147	77.6	45	80.0	107	56	7.7	7.5	7.4	7.3	6.1	6.9	7.0
6	788	524	216	85.2	44	88.6	130	60	8.0	7.4	7.5	7.4	6.1	6.9	7.2
7	664	580	115	87.8	63	84.1	85	64	7.6	7.4	7.6	7.5	6.2	7.0	7.0
8	676	644	171	80.1	50	84.0	98	52	7.6	7.4	7.4	7.4	6.2	7.0	6.9
9	716	564	172	77.3	78	88.7	112	64	7.6	7.5	7.6	7.5	6.3	7.0	7.0
10															
11															
12	736	516	240	87.9	40	97.5	160	69	7.6	7.5	7.5	7.3			
13	676	544	117	87.2	50	94.0	128	73	7.6	7.5	7.5	7.4	6.1	7.0	7.1
14	660	512	157	87.3	44	?	131	63	7.9	7.5	7.6	7.5	6.2	7.1	7.0
15	796	548	123	87.8	63	85.7	101	76	7.7	7.5	7.5	7.5	6.2	7.0	7.0
16	916	580	252	77.8	41	89.1	147	65	7.6	7.4	7.5	7.4	6.1	6.9	7.1
17															
18															
19	752	556	210	86.7	69	94.2	164	67	7.7	7.6	7.7	7.4	6.1	7.0	7.0
20	680	548	143	88.8	50	88.0	107	71	7.8	7.5	7.5	7.4	6.1	7.0	6.9
21	680	536	120	84.2	50	82.0	98	62	7.8	7.5	7.6	7.4	6.3	7.0	7.0
22	616	536	120	88.3	46	93.5	107	64	7.8	7.5	7.5	7.4	6.0		
23	712	564	183	81.4	59	81.4	101	56	7.6	7.5	7.5	7.4	6.2	7.1	7.0
24															
25															
26	696	564	166	77.7	56	78.6	128	69	8.1	7.6	7.6	7.3	6.1	7.1	7.0
27	692	560	117	84.6	47	93.6	110	58	7.7	7.6	7.5	7.4	6.2	7.0	7.0
28	668	560	102	89.2	46	89.1	98	59	7.7	7.6	7.5	7.4	6.2	7.1	7.0
29	944	524	254	74.0	39	87.2	140	58	7.8	7.4	7.6	7.3	6.4	6.9	7.0
30	684	632	163	83.4	58	83.4	90	53	7.7	7.6	7.6	7.5	6.3	7.1	6.9
31															
Total															
Max.	944	644	254	89.2	78	97.5	164	76	8.1		7.7		6.4	7.1	7.2
Min.	616	508	102	57.3	40	72.1	85	52		7.2		7.3	6.0	6.9	6.9
Av.	722	552	168	84.5	53	87.0	117	63					6.2	7.0	7.1

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCLN
TOTAL SOLIDS	722	271455	552	207549	170	63906	23.5
SUSPENDED SOLIDS	168	63164	53	19927	115	43237	68.5
5 DAY B.O.D.	117	43989	63	23686	54	20303	46.2

PREPARED BY .....R. L. Craun, Chief Operator

DATE.....April 10, 1956.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March, 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	~~DRAWN TO DRYING BEDS~~ SUPERNATE — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Dig. No.
1	4420	4.3	1590	73.3	1170								
2	2431	4.5	920	75.0	690								
3	2431	*3.8	730	*78.0	610								
4	1768	*3.8	560	*78.0	440								
5	2210	4.4	820	74.5	610								
6	2210	4.1	760	73.8	560	21000	.75	1320	62.8	830	14370	.47	2
7	2873	4.0	970	70.8	680								
8	2873	4.9	1180	65.4	770								
9	2873	3.5	840	72.5	610								
10	1989	*3.8	630	*78.0	490								
11	2210	*3.8	710	*7800	550								
12	2431	3.7	760	73.0	550								
13	2431	3.5	710	80.0	570								
14	2210	2.9	540	88.9	480								
15	2652	3.1	690	74.9	540								
16	1989	5.2	870	82.1	710	24530	3.0	6180	57.1	3530	24530	.45	2
17	2210	*3.8	710	*78.0	550								
18	2210	*3.8	710	*78.0	550								
19	2210	3.4	630	81.1	510								
20	2873	3.4	820	75.6	620								
21	2431	3.1	630	80.7	510								
22	2652	4.1	910	78.7	720								
23	2652	3.5	780	82.1	640								
24	1989	*3.8	630	*78.0	490								
25	1989	*3.8	630	*78.0	490								
26	3315	3.3	920	85.0	780								
27	3315	3.7	1030	79.6	850								
28	2210	3.2	590	82.9	490								
29	1989	3.1	520	80.7	420	30720	1.7	4380	56.5	2480	30720	.54	2
30	2652	4.1	910	80.0	730								
31	1989	*3.8	630	*78.0	490								
Total	76687		24478		18083	76250		11880		6840	69620		
Max.	4420	5.2	1590	88.9	1170	30720	3.0	6180	62.8	3530	30720	.54	
Min.	1768	3.1	520	65.4	420	21000	.75	1320	56.5	830	14370	.45	
Av.	2474	3.8	790	78.0	580	2560	1.8	128	58.2	221	2246	.49	

REMARKS: * Averages for sampling days used. .4 lbs/Gal. used to nearest 10 lbs.
Sludge solids and Vol solids totals computed, not added.
1300 gal concentrated scum to digester on the 1st.
6630 gal digested sludge to bed 5 on 6th. 9inch fill. Solids, 6.9 % - Vol.54.

PREPARED BY R. D. Craun, Chief Operator

April 11, 1956
DATE

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....March..1956..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	35	11.0	78.6	5.2	same	10.8	77.2	5.2
2	34	11.0	77.4	11.2P		11.2	78.9	11.2P
3								
4								
5								
6	37	10.5	77.2	5.1		10.2	75.1	4.8
7	37	10.6	78.0	9.6		10.4	76.5	5.4
8								
9								
10								
11								
12								
13	36	11.6	84.1	4.0		11.2	81.3	3.6
14	38	11.0	82.1	3.0		11.0	82.1	3.2
15	38	11.6	86.6	3.8		11.5	85.9	3.7
16								
17								
18								
19	39	11.8	89.5	3.4		12.0	90.9	4.0
20	40	11.4	87.7	2.9		11.6	89.4	3.3
21	40	10.8	83.1	3.0		10.6	81.6	3.0
22								
23								
24								
25								
26	42	11.2	88.9	3.0		11.2	88.9	2.9
27	38	10.9	81.4	2.6		11.6	86.6	3.7
28	38	11.6	86.6	3.8		11.4	85.1	3.6
29								
30								
31								
otal								
Max.	42	11.8	89.5	11.2P		11.6	90.9	11.2P
Min.	34	10.5	77.4	2.6		10.2	75.1	3.0
Av.	38	11.2	83.2	4.7		11.1	83.0	4.4

COMMENTARY

The plant was in continueous operation except for about an hour at about 1:30 on Sunday the 18th. At that time the Consumers Power Co. were changing over a high tension line that has a right-of-way through our property and they dropped a line on the primary that supplies the plant from the Municipal Power Plant and caused a power failure.

All other operational duties were of a routine nature and the plant produced an effluent of very good quality at all time.

REMARKS: Oxygen totally depleeted on B.O.D. semples of the 2nd

PREPARED BY R. D. Craun, Chief Operator

DATE April 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...April, 1956..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) x 100	SEWAGE GAS WASTED (cu. ft.) x 100	TOTAL GAS PRODUCED (cu. ft.) x 100	GAS PURCHASED (cu. ft.) x 10
1	R	38	57	47			99		1.39		10	120	72	0	72	12
2	C	74	52	63	51	51	99		1.49		87	160	66	14	80	6
3	F	78	44	61	52	53	100		1.51		386	200	55	40	95	7
4	C	46	32	39	52	51	99		1.45		39	120	77	23	100	16
5	F	64	40	52	52	53	100		1.50		35	160	56	21	77	9
6	F	71	32	52	52	53	100		1.50		62	200	60	31	91	7
7	S	36	30	33			100		1.49		9	120	85	25	110	21
8							100		1.39		12	160	77	16	93	17
9	F	50	26	38	52	53	100		1.50		56	160	57	18	75	13
10	F	54	30	42	52	52	100	74	1.51		140	160	45	32	77	15
11	F	59	32	45	52	53	100		1.49		37	160	54	18	72	13
12	F	62	28	45	52	54	99		1.47		32	200	76	15	91	11
13	F	54	34	44	52	53	100		1.49		32	160	54	27	81	11
14	R	66	34	50			99		1.46		8	120	83	12	95	12
15	C	50	34	42			101		1.39		11	160	80	4	84	15
16	S	40	32	36	52	52	102		1.49		42	160	0	62	62	29
17					52	52	98		1.46		25	160	77	9	86	18
18	C	47	26	36	52	51	99		1.45		321	200	75	27	102	19
19	F	50	24	37	52	53	99		1.43		39	160	81	27	108	14
20	F	46	31	38	53	53	100		1.48		131	200	55	36	91	15
21	C	56	34	45			100		1.42		8	160	79	18	97	13
22	C	48	25	36			102		1.34		10	160	74	15	89	15
23	C	47	31	39	52	52	102		1.45		34	160	0	79	79	13
24	F	52	32	42	52	52	98		1.43		336	160	25	69	94	11
25	R	54	40	47	52	52	96		1.39		100	200	25	62	87	14
26	F	65	42	53	53	54	94		1.43		31	160	73	16	89	9
27	R	76	46	61	53	52	96		1.57		73	200	41	48	89	6
28	R	50	38	44			96		1.83		3	160	12	54	66	15
29	R	55	35	45			92		2.01		7	200	11	48	59	16
30	F	52	34	43	52	53	90		2.09		56	200	62	32	94	10
31																
Total									45.296		2172	5000	1687	* 898	*2585	402
Max.		78	57	63	53	54	102		2.09		386	200	85	79	110	29
Min.		36	24	33	51	51	90		1.34		3	120	0	0	59	
Av.		55	36	45	52	52	99	74	1.51		72	167	56	30	86	1

REMARKS: Green Sewage observed from 3:10 to 3:30 on the 5th.

* Appreciable quantities of unmetered gas wasted at the pressure relief valve of No. 1 digester when the heat exchanger is out of service whic is a portion of nearly every day.

High flows for last three days due to high river and ground water level which causes extra infiltration.

PREPARED BY R. D. Craun, Chief ...perator

DATE May 2, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....April...1956.....

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	816	592	228	81.1	57	84.2	148	61	8.3	7.5	7.5	7.3	6.2		
3	784	596	166	86.1	51	84.3	133	66	7.8	7.5	7.5	7.4	6.1		
4	728	564	131	80.1	48	79.2	116	62	7.7	7.5	7.4	7.4	6.1	7.0	7.0
5	768	572	157	82.2	55	83.6	122	69	7.7	7.6	7.5	7.4	6.2	7.0	7.0
6	720	560	192	82.8	65	92.3	147	68	7.6	7.6	7.9	7.4	6.2	6.9	7.0
7															
8															
9	772	548	190	80.5	51	84.3	155	81	7.6	7.5	7.4	7.3	6.3	7.0	7.0
10	848	596	293	70.3	62	75.8	162	58	7.6	7.4	7.5	7.5	6.0	7.2	7.0
11	664	592	162	84.6	62	83.9	98	58	8.4	7.5	7.6	7.4	6.1	6.9	7.0
12	616	568	92	81.5	61	96.7	89	60	7.6	7.6	7.6	7.5	6.1	7.0	7.0
13	724	568	137	76.0	62	83.9	73	62	7.6	7.5	7.5	7.4	6.1	7.0	6.9
14															
15															
16	780	588	166	83.1	63	85.7	130	65	7.7	7.5	7.5	7.4	6.2	7.0	7.0
17	708	588	145	83.4	45	89.1	145	85	7.7	7.5	7.5	7.4	6.0	6.9	7.0
18	616	544	124	84.7	47	95.7	99	62	8.6	7.5	7.5	7.4	6.1	6.9	7.0
19	756	592	140	87.1	49	85.7	128	77	7.6	7.5	7.6	7.2	6.2	7.0	7.0
20	692	632	158	83.5	60	86.6	118	73	7.7	7.5	7.5	7.4	6.1	7.0	7.0
21															
22															
23	728	536	177	81.9	55	85.5	156	72	7.7	7.5	7.5	7.3			
24	892	580	126	84.9	46	93.5	119	71	7.6	7.5	7.4	7.3	6.0	7.0	7.0
25	c636	576	135	78.5	66	86.4	128	81	7.6	7.6	7.9	7.5	6.1	7.0	6.9
26	792	560	147	85.0	64	84.4	123	85	7.6	7.4	7.6	7.4	6.1	7.0	6.9
27	900	524	324	80.3	64	78.1	143	59	7.6	7.3	7.5	7.2	6.0	7.1	7.3
28															
29															
30	844	568	138	73.9	47	91.5	134	65	7.6	7.5	7.4	7.4	6.1	7.0	7.0
31															
Total															
Max.	900	632	324	87.1	66	95.7	162	85	8.6		7.9		6.3	7.1	7.3
Min.	616	524	92	70.3	45	75.8	73	58		7.3		7.2	6.0	6.9	6.9
Av.	752	574	168	81.5	56	86.2	127	69					6.1	7.0	7.0

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	752	284098	574	216851	178	67247	23.7
SUSPENDED SOLIDS	168	63469	56	21156	112	42313	66.7
5 DAY B.O.D.	127	47979	69	26068	58	21911	45.8

PREPARED BY R. D. Craun, Chief Operator

DATE May 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April, 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS — Digester Overflow — GALLONS DRAWN	PERCENT DRY SOLIDS	XXX From Dig.
1	1768	* 3.4	510	* 79.7	400								
2	3757	3.4	1070	80.6	860								
3	2873	3.8	920	78.6	720								
4	2210	4.3	800	79.1	630								
5	2210	4.0	750	80.5	600								
6	3094	4.6	1190	78.4	940								
7	2431	* 3.4	690	* 79.7	550								
8	2210	* 3.4	630	* 79.7	500								
9	1768	3.0	440	80.6	360								
10	2873	3.9	940	77.6	730	31380	1.2	3160	66.7	2110	31380	.47	2
11	4420	5.2	1930	72.9	1400								
12	1989	4.3	720	71.4	510								
13	2431	3.5	710	76.3	540								
14	2210	* 3.4	630	* 79.7	500								
15	2210	* 3.4	630	* 79.7	500								
16	2210	2.8	520	83.4	430								
17	2431	3.9	800	82.0	650								
18	2873	3.7	890	81.6	730								
19	2873	3.4	820	83.8	690	8840							
20	2210	3.9	720	78.9	570								
21	1768	* 3.4	510	* 79.7	400								
22	1989	* 3.4	570	* 79.7	450								
23	3094	2.8	730	86.1	630								
24	2431	4.0	820	83.3	680								
25	2431	3.1	630	84.2	530								
26	2873	2.7	650	91.2	590								
27	3536	3.9	1160	75.6	870	33150	1.9	5280	66.7	3520	33150	.57	2
28	1768	* 3.4	510	* 79.7	400								
29	1768	*3.4	510	* 79.7	400								
30	3978	6.6	2200	66.7	1470								
Total	76687	**	21890	**	17450	73370	**	9860	**	6580	64530		
Max.	4420	6.6	2200	91.2	1470	33150	1.9	5280	66.7	3520	33150	.57	
Min.	1768	2.7	440	66.7	400	0	1.2	0	66.7	0	0	.47	
Av.	2556	3.4	730	79.7	580	2446	1.6	329	66.7	219	2151	.52	

REMARKS: * Monthly averages for sampling days used ** Total pounds of solids and vol. computed on total gallons pumped and average percentages instead of added. 1300 gallons of concentrated scum pumped on the 3rd. Cleaned drying beds 1 & 2 on the 13th. #2-cake 4", 15 cu.yds.; moisture 56.0%. #1-cake 2", 7 yds.; moist. 60.6 Bed # 4 on 17th, 3½" cake, 13 yd.; 74.6 % moist. Bed #3 on 19th, 4½" cake, 85.7% moi Filled # 9 on 20th. Approx. 8" fill; 9.9% solids & 51.2 % Vol. Sp.Gr. 1.022 2400 gallons leakage of same to beds 1 & 2.

PREPARED BY R. D. Craun, Chief Operator

DATE May 3, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....April..1956..... SHEET NO. 4

RECEIVING STREAM DATA								COMMENTARY
ABOVE EFFLUENT DISCHARGE				BELOW EFFLUENT DISCHARGE				
TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D PPM	TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D PPM	
								The plant was in contineous service at all times during the month and a satisfactory effluent was produced at all times.
								Four drying beds were cleaned with a yield of about 50 cu. yds. As the beds were cleaned the cake was processed through a Royer Sludge Disintegrator and stockpiled between the fence and
51	9.8	87.5	3.4	Same	9.8	87.5	3.2	the road along the south end of the bed
52	8.8	80.0	3.0		8.8	80.0	3.3	The Dept. of Public Works used about 40
45	9.4	78.4	2.4		9.4	78.4	2.6	cu. yds. for City property and the re-
								mainder was made available to the publi
								at no charge and was quickly exhausted.
								It was discovered in March that the
46	11.0	93.3	2.8		11.0	93.3	2.8	4 drying beds at the end of the filler
45	10.2	85.1	2.4		10.2	85.1	2.7	trough(2 on each side) could not be
48	10.4	90.5	2.2		10.6	92.3	3.0	used as the sludge would not travel to
								that far without overflowing the inlet
								end. A considerable amount of spillage
								occured while filling the 2 central
								beds. On the 10th of this month heavey
44	10.4	85.3	2.8		10.4	85.3	2.7	plank covers with ¼" strap-iron hold
43	10.8	87.2	2.5		10.7	86.4	2.6	downs were constructed for half of the
43	11.4	91.9	3.0		12.0	96.8	3.4	length of the trough, and I attempted
								to fill an end bed. The sludge was only
								9.9% solids but the back pressure under
								the planking caused them to bow and I
								lost about 2400 gallons into the first
								two beds while getting 6000 gallons to
45	10.9	90.8	2.5		11.0	91.7	2.6	the end bed. As this was nearly a third
46	10.8	91.6	2.4		11.0	93.4	2.6	it was decided to place a 6" fill line
46	9.8	83.1	2.2		10.0	84.8	2.2	in the trough. The pipe and crosses
								are on order.
52	11.4	93.3	3.4		12.0	96.8	3.4	
43	8.8	78.4	2.2		8.8	80.0	2.2	
46	10.3	87.1	2.6		10.8	87.9	2.6	

MARKS: River data based on 1 grab sample collected at about 10:00 a.m.

PREPARED BY R. D. Crown, Chief Operator

DATE May 8, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...May...1956..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) (x 100)	SEWAGE GAS WASTED (cu. ft.) x 100	TOTAL GAS PRODUCED (cu. ft.) x 100	GAS PURCHASED (cu. ft.) X100
1	F	62	44	53	52	53	92		2.08	54	54	160	72	30	102	5
2	R	62	38	50	52	53	92		2.01		30	200	74	66	140	11
3	F	64	38	51	52	54	93	*	2.00		43	200	71	49	120	10
4	F	57	39	46	52	53	94	*	2.00		459	160	81	37	118	14
5	R	60	48	54			96		1.68		3	160	84	26	110	10
6	R	61	35	38			98		1.58		5	160	64	53	117	13
7	F	57	32	44	53	54	99		1.66		37	200	63	40	103	11
8	F	62	42	52	52	54	98		1.60		35	160	77	13	90	10
9	R	66	44	55	52	52	99	77	1.71		37	200	68	56	124	10
10	R	64	52	58	52	52	98		1.64		77	200	72	48	120	8
11	R	78	58	68	54	54	100		1.75		43	200	85	47	132	6
12	R	86	64	75			100		1.80		3	160	88	76	164	7
13	F	88	52	70			102		1.76		17	200	84	35	119	6
14	C	50	64	57			104		1.72		8	160	58	78	136	5
15	R	64	33	48			104		1.73		8	200	1	92	93	10
16	C	52	36	44			98		1.71		49	160	75	68	143	14
17							98		1.68	38	572	200	86	72	158	17
18	F	70	35	52			99		1.65	68	2238	200	46	84	130	10
19	F	60	36	48			100		1.61	61	2155	160	70	35	105	10
20	F	68	52	60			102		1.56	35	2152	160	69	2	71	9
21	F	84	60	72	55	56	103		1.67	65	2204	160	4	60	64	1
22	F	86	50	68	56	57	100		1.79	73	2148	200	38	100	102	2
23	F	60	36	48	54	54	98		1.60	86	2138	160	12	53	65	9
24	F	66	44	55	54	55	95		1.51	58	2198	200	63	32	95	8
25	C	72	48	60	54	55	96		1.54	60	2217	160	75	20	95	6
26	R	73	62	67			98		1.56	50	2184	160	79	4	83	4
27	F	79	54	66			102		1.53	54	2150	160	79	42	121	2
28	F	78	56	67			100		1.60	65	2200	200	0	53	53	6
29	F	88	64	76	56	58	100		1.62	48	2159	160	17	43	60	5
30	R	88	66	77			98		1.55	61	2140	160	83	7	90	6
31	C	78	42	60	61	62	101		1.62	71	2275	200	31	58	89	6
									52.51	893	32083	5520	1853	**1459	3312	251
		88	66	77	61	62	103		2.08	86	2238	200	88	92	164	17
		50	32	38	52	52	92		1.51	35	3	160	0	2	53	1
		69	47	58	54	54	99		1.69	60	1033	178	60	47	107	8

REMARKS: * Float cable drum assembly dropped off its bearing at 1:30 am on Friday the 4th. Meter was out of service until 11:45 but the flow continued through the plant treatment units at all times. Flow recordings were affected for both the 3rd and 4th and the flow was estimated at 2.0 MGD for both days.

** Unmetered gas escaping at pressure relief units on the digester covers so actual gas production is unknown.

PREPARED BY .....R. D. Craun, Chief Operator.....

DATE.....April 6, 1956.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	672	576	117	77.8	48	91.7	98	64	7.5	7.4	7.5	7.4	6.2	6.9	7.0
2	728	540	85	89.4	40	97.5	80	60	7.5	7.5	7.5	7.3	6.0	6.9	7.0
3	640	508	142	88.0	48	89.6	125	69	7.5	7.5	7.4	7.5	6.2	7.0	7.0
4	768	528	118	82.2	41	80.5	88	46	7.5	7.5	7.3	7.5	6.0	7.0	7.0
5															
6															
7	700	580	154	78.6	51	88.2	148	79	7.6	7.5	7.6	7.4	6.2	7.2	7.0
8	640	536	87	89.5	41	92.7	102	65	7.5	7.5	7.5	7.4	6.1	7.1	6.9
9	808	568	234	78.7	49	81.6	136	66	7.5	7.4	7.4	7.3	6.0	7.0	6.9
10	732	580	143	73.4	51	72.5	76	56	7.5	7.4	7.5	7.3	6.0	7.0	6.9
11	688	540	120		47		123	62	7.6	7.5	7.5	7.4	6.1	7.1	6.9
12															
13															
14															
15															
16															
17															
18															
19															
20															
21	776	628	191	86.4	67	88.1	153	71	7.6	7.4	7.5	7.3	6.1	7.0	7.0
22	580	544	101	87.1	52	94.2	116	89	7.6	7.5	7.4	7.2	6.0	7.0	7.0
23	688	516	139	89.2	39	83.9	145	70	7.6	7.3	7.5	7.0	6.2	7.1	7.1
24	668	544	95	89.5	47	89.4	98	63	7.5	7.5	7.4	7.4	6.1	6.9	6.9
25	572	524	114	84.2	48	83.3	85	56	7.5	7.5	7.3	7.5	6.1	6.9	6.9
26															
27															
28	736	556	176	84.7	55	89.1	140	76	8.2	7.2	7.6	7.2	6.1	7.0	6.9
29	604	540	126	88.1	51	88.2	106	61	7.5	7.4	7.4	7.4	6.1	7.0	6.9
30															
31	712	536	160	78.1	48	91.7	86	52	7.6	7.5	7.4	7.4	6.0		
Total															
Max.	808	628	234	89.5	67	97.5	153	89	8.2		7.6		6.2	7.2	7.1
Min.	572	508	85	73.4	39	72.5	76	46		7.2		7.0	6.0	6.9	6.9
Av.	689	550	135	71.6	48	87.6	112	65					6.1	7.0	7.0

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	689	301734	550	240862	139	60872	20.2
SUSPENDED SOLIDS	135	59120	48	21021	87	38099	64.4
5 DAY B.O.D.	112	49048	65	28465	47	20583	42.0

PREPARED BY R. D. Craun, Chief Operator

DATE June 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....May...1956..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS — Supernatant overflow — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Dig. No.
1	3315	5.4	1500	69.4	1040								
2	2431	4.8	980	69.8	680								
3	3094	4.0	1040	75.5	790								
4	1989	3.7	620	77.5	480								
5	1989												
6	2210												
7	2210	4.0	740	77.1	580								
8	2652	3.7	820	83.8	690								
9	3094	3.8	990	79.6	780	34480	.7	2030	50.0	1010	34480	.39	2
0	3094	4.1	1060	78.3	830								
1	2431	4.4	900	76.9	690								
2	1989												
3	1768												
4	2652												
5	3094												
6	4420												
7	1768												
8	1768												
9	1768												
0	1320												
	3536	3.9	1150	80.0	920								
	2873	4.4	1060	80.0	850								
	1989	3.2	530	82.9	440	30940	.8	2040	55.6	1150	30940	.28	2
	2210	3.5	650	80.5	520								
	3094	4.0	1040	79.1	820								
	1989												
	884												
	2873	4.6	1110	82.8	920	4860							
	2431	4.1	840	78.9	660								
	2431												
	2431	5.6	1140	85.0	970								
al	75797		26753		21055	70280		4430		2340	65420		
e.	4420	5.6	1150	85.0	1040	34480	.8	2040	55.6	1150	34480	.39	
h.	884	3.2		69.4		0	.7		50.0		30940	.28	
.	2445	4.2	860	78.7	680	2267	.75	143	52.8	75	2110	.34	

REMARKS: 1768 Gallons of concentrated scum pumped to digester on 16th.
Filled No.9 drying bed on 20th. 10 inch fill (7500 gal) 7.1% solids, 56.3 % volatile.
8.4 lbs./ gal used for sludge data.

PREPARED BY R. D. Craun, Chief Operator

DATE June 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1956 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	48	9.4	81.7	3.0	Same	9.4	81.7	3.0
2	50	8.6	76.1	2.5		8.6	76.1	2.4
3	51	8.6	76.8	2.3		8.8	78.5	2.5
4								
5								
6								
7								
8	52	9.4	85.5	2.2		9.4	85.5	2.3
9	54	8.8	81.4	2.0		8.7	80.6	2.1
10	54	8.1	74.9	1.9		8.3	76.9	2.1
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22	63	8.4	86.6	2.0		8.6	88.8	1.8
23	64	8.0	83.4	1.8		8.1	84.4	2.1
24	61	8.4	85.0	2.2		8.6	86.9	2.3
25								
26								
27								
28								
29	64	8.7	90.7	2.1		8.8	91.6	2.0
30								
31		8.1		2.1		8.0		2.2
Total								
Max.	64	9.4	90.7	3.0		9.4	91.6	3.0
Min.	48	8.0	74.9	1.8		8.1	76.1	1.8
Av.	56	8.6	82.2	2.2		8.7	83.1	2.3

COMMENTARY

The plant was in contineous service during the month and produced a very satisfactory effluent.

Sampling was discontinued for the week of 14th through 18th because of the Annual Meeting of the Michigan Sewage and Industrial Wastes Associatio the checking of the chlorinator and getting it into service for the season and the complete inspection and servicing of the comminutor.

The new toolhouse building was completed and the piping for filling the drying beds installed. We will now be able to use the four beds which could not be filled with the trough arrangement.

A defective bearing recess in the flow meter float drum assembly was machined to give a greater support area Due to inadequate spindle support the assembly has dropped to the bottom of the meter case in the middle of the night on two occasions and required about a half day for reassembly and recalibration of the meter. It is believed that the machining will make a permanent repair.

The chlorine contact tube was drained and inspected in an attempt to find a small leak that causes seepage to occur near the weir chamber. The river was so high that the bottom 18 inches was full of water but all of the joints above water appeared to be in excellant condition. It was thought that a honeye combed area of the chamber around the tube might be resoncible for the leakag and it was patched, but when the tube was refilled the seapage still occures so the leak must have been below the waterline. The leakage is so minor that no further attempt will be made to locate it until the tube is drained at the end of the chlorine season.

REMARKS. River very high due to storm run-off. The additional volume and velocity appears to be doing quite an effective job of scouring out the accumulation of black sludge which had covered the bottom before the plant had been placed in operation.

PREPARED BY R. D. Craun, Chief Operator

DATE June 7, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....June...1956..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	C	52	38	45	52	53	100		1.49	55	2198	160	30	46	76	11
2	C	62	44	53			97		1.48	58	2168	160	80	16	96	10
3	R	68	48	58	56	55	100		1.43	56	2190	160	69	35	104	8
4	R	67	52	60	56	55	102		1.53	58	2177	200	0	13	13	9
5	F	80	50	65	56	56	98		1.53	62	2188	160	22	32	54	3
6	F	86	54	70	56	57	97	68	1.55	76	2210	200	88	13	101	2
7	C	90	64	77			95	74	1.57	72	2442	160	81	11	92	1
8	F	86	56	71			94	77	1.56	75	2187	200	78	11	89	6
9	F	88	61	74			94	80	*1.45	55	2165	160	71	7	78	2
10	F	96	60	78			98	84	*1.45	60	2146	120	77	2	79	1
11	F	100	70	85			95		*1.68	48	2195	200	65	0	65	1
12	F	95	68	81	58	59	95	86	1.69	61	2172	160	15	9	24	1
13	F	96	68	82			93	86	1.72	80	2572	200	61	7	68	2
14	F	95	70	82			92	87	1.68	61	2133	160	68	meter	68	1
15	R	94	69	81	59	60	92	90	1.69	60	2633	200	57		57	1
16	R	88	68	78			90	91	1.71	52	2175	160	64	out		6
17	R	88	68	78			94	92	1.59	54	2210	160	70			2
18	C	80	56	68			93		1.67	61	2132	160	59	of		1
19	C	86	66	76	58	59	93	92	1.68	62	2172	200	69			1
20	F	90	70	80	59	59	94	92	1.73	59	2167	160	23	service		2
21	C	92	69	80	59	60	93		1.71	61	2152	200	22			1
22	C	92	72	81	65	64	92		1.79	57	2201	160	72			4
23	C	90	68	76			91	94	1.74	60	2149	200	80			7
24	R	86	56	71			97	93	1.64	65	2172	160	73			1
25	C	80	57	68	58	56	95	95	1.60	58	2156	160	75			1
26	C	88	60	74			94	97	1.66	69	2116	160	66			1
27	F	78	54	66	57	58	94	98	1.58	67	2400	200	65			1
28	F	72	50	61			98	96	1.53	64	2168	160	0			6
29	C	86	58	72	59	59	96	94	1.63	67	2173	160	65			6
30	F	92	70	81			95	97	1.61	59	2154	160	63			1
Total									48.36	1852	66473	5160	1728			100
Max.		100	72	85	65	64	102	98	1.79	80	2633	200	88			11
Min.		52	38	45	52	53	90	68	1.43	48	2116	120	0			1
Avg.		84	60	72	58	58	95	89	1.61	62	2216	172	62	**	**	3

REMARKS: * Float cable broken at 1:30 am on the 10th. Repaired and recalibrated at about 2:30 pm on the 11th. Flow estimated for the three days effected.

** Waste gas meter out of service from the 14th due to broken valve. The accuracy is questionable proir to that time as meter was very gummed up. Utilized meter also seems to be slow at times.

PREPARED BY R. D. Craun, Chief Operator

DATE July 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....June...1856..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	648	548	128	91.4	39	92.1	79	44	7.6	7.5	7.5	7.4	6.2	7.0	7.0
2															
3															
4	752	548	178	82.0	61	78.7	144	82	7.6	7.4	7.4	7.3	5.9		
5	688	584	152	81.6	59	79.7	113	68	7.8	7.5	7.5	7.3	6.0	7.1	6.0
6	664	568	133	85.7	49	91.6	111	70	7.6	7.5	7.4	7.3	6.0	6.9	6.9
7	620	548	114	86.0	48	91.7	110	81	7.6	7.4	7.5	7.3	6.0	7.1	7.0
8	648	544	138	84.1	52	90.4	128	59	7.6	7.4	7.5	7.3			
9															
10															
11	No samples, repairing flow meter														
12	632	540	119	86.6	54	90.7	103	69	7.5	7.2	7.4	7.2	6.0	7.1	7.0
13	880	588	219	84.9	70	92.9	139	72	7.5	7.4	7.5	7.3	6.1	7.0	7.4
14	752	536	125	76.0	55	81.8	114	77	7.5	7.5	7.5	7.3	6.0		
15	692	608	127	86.6	63	92.1	79	73	7.6	7.4	7.5	7.4	5.8		
16															
17															
18	680	*1060	166	84.3	56	87.5	157	78	7.6	7.5	7.4	7.3	6.1		
19	724	616	134	85.8	61	88.5	148	93	7.6	7.5	7.5	7.4	5.9	7.1	7.1
20	606	548	91	86.7	50	88.0	92	56	7.6	7.4	7.5	7.4	6.0	7.1	7.1
21	596	528	134	85.1	54	88.9	130	80	8.0	7.5	7.5	7.4	6.0	7.1	7.1
22	676	628	187	85.7	105	83.8	85	76	7.5	7.3	7.5	7.3	6.0	7.1	7.4
23															
24															
25	560	496	117	83.8	52	86.5	96	54	7.5	7.4	7.5	7.4	6.2	7.1	7.2
26	~~528~~	~~488~~	~~82~~	~~79.3~~	~~47~~	~~82.9~~	~~71~~	~~55~~	~~7.6~~	~~7.4~~	~~7.5~~	~~7.4~~	~~6.1~~	~~7.1~~	~~7.1~~
27	528	488	82	79.3	47	82.9	71	55	7.6	7.4	7.5	7.4	6.1	7.1	7.1
28															
29	632	528	145	82.1	63	84.1	94	60	7.6	7.4	7.5	7.3	6.0	7.1	7.2
30															
31															
Total															
Max.	752	1060	219	91.4	105	92.9	157	93	8.0		7.5		6.2	7.1	7.4
Min.	528	488	82	76.0	39	78.7	71	44		7.2		7.0	5.8	6.9	6.9
Av.	665	583	138	84.1	58	87.3	111	69					6.0	7.1	7.1

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	665	267995	583	234949	82	32946	12.3
SUSPENDED SOLIDS	138	55614	58	23374	80	32374	58.0
5 DAY B.O.D.	111	44733	69	27798	42	16935	37.8

* Unusual Residue, Sample sent to State for anaylsis.

Green sewage for short periods at 11:15 and 1:05 on the 5th.

PREPARED BY .....R. D. Craun, Chief Operator

DATE.....July 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA													
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					SUPERNATANT			
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	XXXXX Dig. No.
1	2873	3.2	770	79.4	610								
2	1547												
3	1326												
4	2652	3.7	820	83.3	690								
5	3315	3.9	1080	76.4	830	7960							
6	2873	3.7	890	82.1	730								
7	2652	3.8	850	82.0	690								
8	1768	4.0	590	80.4	480								
9	1326												
10	1768												
11	1326												
12	3536	4.3	1280	77.6	990								
13	2431	3.8	780	77.8	600	26520	4.1	9130	59.0	5380	26520	.24	2
14	1768	3.6	530	77.5	410								
15	6630	4.3	2390	78.6	1880								
16	1547												
17	1326												
18	2210	4.9	910	73.0	670								
19	1547	4.2	550	73.5	400								
20	2652	4.3	960	79.2	760								
21	2652	4.3	960	76.5	730								
22	2431	4.1	840	79.5	660	25640	.8	1725	58.1	1000	25640	.31	2
23	1768												
24	1547												
25	2652	3.7	820	73.8	610								
26	3315												
27	3094	3.6	930	76.1	710								
28	1989												
29	1989	3.4	570	78.8	450								
30	1768												
31													
Total	70278		23023		18000	60120		12120		7090	52660		
Max.	6630	4.9		83.3		26520	4.1		59.0		26520	.31	
Min.	1326	3.2		73.0		0	.8		58.1		0	.24	
Av.	2343	3.9	767	78.1	600	884	2.4	404	58.5	236	884	.27	

REMARKS: Filled # 7 drying bed on 5th. Approx. 10.5 inch fill, 7960 gal. 8.8% solids and 53.4% Vol. Cleaned bed 5 on the 8th. 2½ in. cake, approx. 13 yds. Cleaned bed 9 on 15th. 3½ inch cake, aprox. 19 yds, 59.8% moist. 2200 gal. concentrated scum to digester on the 15th.

(8.4 lbs. per gal used)

PREPARED BY R. D. Craun, Chief operator

July 11, 1956
DATE

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....June 1956..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	58	9.2		1.9	Same	9.5		1.8
2	61	10.1		2.1		10.3		2.0
3	65	9.8		2.2		9.8		2.2
4								
5								
6								
7								
8	68	9.0		2.0		9.4		2.3
9	71	9.0		2.1		9.6		3.2
10	73	8.4		2.6		8.6		2.8
11								
12								
13								
14								
15	68	6.6		1.8		6.8		2.0
16	696	7.6		1.8		7.4		1.5
17	72	7.3		1.5		7.3		1.5
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	73	10.1	2~6	2.6		10.3		3.2
Min.	58	6.6		1.5		6.8		1.5
Av.	67	8.6	92.1	2.0		8.7	94.2	2.1

COMMENTARY

All treatment facilities were in contineous operation throughout the month and an effluent of satisfactory quality was produced at all times.

The float cable of the flow meter broke on Saturday the 9th at about 4:15 am. Since the break occured during the weekend the repair was not made until Monday the 11th. The repair and recalibration took until 1:45 pm and it was necessary to estimate the flow for 3 days from past weekend data.

Erratic action of the waste gas meter was noticable toward the first of the month and it failed completely on the 14th. The actuating rod of one valve was broken and the entire mechanism was badly gummed up. Since the meter was not of large enough capacity for our rate of production at times anyway, it was decided to replace the meter rather than repair it. A new meter is on order and expected by mid-July. It is believe that the utilized gas meter is also becoming unreliable for correct registration.

Sampling was reduced to an alternate day schedual for the last week while the writer was on vacation. Mr. Swalwel the assistant operator, carried on all duties during the period in a very creditable manner.

REMARKS: No sampling during the last week due to vacation schedules.

PREPARED BY .....R. D. Craun, Chief Operator.....

DATE.....July 12, 1956.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1956 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) 100
1	F	94	68	81			98	96	1.58	60	2166	160	63			2
2	C	86	62	74	59	60	97	99	1.66	64	2160	160	0			2
3	C	82	60	71			94	97	1.53	63	2167	160	24			1
4	C	72	56	64	58	57	94	96	1.46	28	2273	160	42			1
5	R	72	56	64			92	97	1.48	56	2134	160	66			1
6	F	86	62	74	64	65	96	97	1.67	74	2204	200	62			2
7	C	90	70	80			95	97	1.69	60	2205	160	27			1
8	C						96	94	1.50	61	2004	160	0			2
9	R	70	54	62	58	58	93	95	1.55	63	2180	160	54			1
10	F	80	58	69	59	58	93	96	1.53	66	2430	160	68			1
11	R	86	62	74			93	98	1.65	74	2216	160	77			2
12	R	86	66	76	58	59	93	99	1.61	66	2174	160	84			1
13	C	82	56	69			95	98	1.55	67	2182	200	72			1
14	F	86	58	72			98	95	1.18	60	2166	160	79			1
15	R	91	63	77			96	99	1.08	62	2132	160	9			1
16	C	86	60	73	61	62	95	98	1.29	45	2170	160	35			5
17	R	76	52	64			95		1.14	69	2260	160	0			1
18	F	82	58	70	60	62	94		1.21	64	2275	160	82			1
19	R	76	58	67	58	59	94	97	1.56	62	2155	160	76			2
20	R	80	60	70	60	60	98		1.60	63	2180	160	75			1
21	R	82	58	70			97	97	1.77	57	2170	200	80			2
22	F						100		1.58	43	2170	160	0			1
23	F	82	58	70	61	62	100		1.66	67	2170	160	55			1
24	F	86	66	76	61	62	100		1.71	71	2166	200	53			2
25	R	84	66	75	60	60	98	96	1.66	64	2734	160	76			1
26	C	90	66	78	60	61	97	98	1.65	60	2170	200	25			1
27	F	92	66	79	61	62	96	97	1.72	71	2180	160	*			2
28	F	82	52	67			94	95	1.62	45	2130	160	*			1
29	F	78	50	64			93		1.48	62	2140	160	*			1
30	R	80	64	72	60	61	91		1.56	64	2160	160	*			1
31	F	76	60	65			93	91	1.56	63	2160	160	57			1
Total									47.47	1894	69303	5160	*	*	*	44
Max.		94	70	81	64	65	100	99	1.77	74	2734	200				5
Min.		70	50	62	58	57	91	91	1.08	28	2130	160				1
Av.		83	60	71	60	61	95	97	1.53	62	2236	166				1.42

REMARKS: * Gas production records incomplete because of failure of gas meters.

PREPARED BY R. D. Craun

DATE August 14, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		PPM		5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	660	588	138	80.4	66	83.3	87	60	7.5	7.4	7.5	7.2	6.0	7.2	7.3
3															
4	584	520	113	88.5	38	89.5	85	49	7.6	7.4	7.5	7.3	5.9	7.1	7.2
5															
6	696	604	177	84.2	73	84.7	116	67	7.6	7.4	7.4	7.2	6.1	7.2	7.5
7															
8															
9	856	544	178	84.8	46	97.8	114	58	7.6	7.4	7.4	7.3	6.1		
10	624	528	152	88.8	50	94.0	95	58	7.6	7.4	7.4	7.3	6.0	7.1	7.2
11	632	536	112	93.7	48	97.9	88	58	7.5	7.4	7.4	7.3	6.1	7.1	7.3
12	600	516	111	80.2	53	92.5	66	37	7.5	7.4	7.4	7.3	5.8	7.0	7.3
13	720	560	220	85.0	58	82.8	138	57	7.5	7.3	7.4	7.4	5.9	7.1	7.3
14															
15															
16	772	536	235	82.1	71	81.7	130	72	7.5	7.3	7.4	7.2	6.2		
17	660	504	132	89.4	65	89.2	88	41	7.5	7.3	7.4	7.3	5.8		
18	788	600	135	85.9	55	90.9	98	55	7.5	7.5	7.4	7.3	6.1		
19	632	596	110	87.3	52	84.6	85	59	7.6	7.3	7.4	7.3	6.0	7.1	7.1
20	648	564	127	92.1	58	93.1	86	60	7.5	7.4	7.5	7.4	5.8	7.3	7.3
21															
22															
23	708	628	162	82.7	60	76.7	86	64	7.5	7.4	7.4	7.2			
24	752	652	187	87.2	86	82.6	104	66	7.5	7.3	7.4	7.3	6.0	7.2	7.5
25	664	512	143	86.7	54	81.5	114	74	7.5	7.4	8.6	7.3	5.8	7.0	7.1
26	716	628	106	89.6	48	89.6	116	67	7.5	7.3	7.4	7.3	6.1	7.0	7.1
27	660	540	126	87.3	49	97.9	94	69	7.5	7.4	7.4	7.3	5.8	7.1	7.2
28															
29															
30	728	548	179	91.1	55	94.5	152	82	7.5	7.3	7.4	7.2	6.1	7.1	7.2
31															
Total															
Max.	856	652	235	93.7	86	97.9	152	82	7.6		8.6		6.2	7.3	7.5
Min.	584	504	106	80.2	38	76.7	66	37		7.3		7.2	5.8	7.0	7.1
Av.	694	563	150	86.7	57	88.7	102	61					6.0	7.1	7.3

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	694	274845	563	222892	131	51953	18.9
SUSPENDED SOLIDS	150	59385	57	22566	93	36819	62.0
5 DAY B.O.D.	102	40382	61	24150	41	16232	40.2

PREPARED BY R. D. Craun, Chief Operator

DATE August 14th 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...July...1956..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS — Supernatant Liquor: GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS From No.
1	1989												
2	1989	4.0		82.5									
3	2431												
4	2652	3.8		78.6									
5	2431												
6	1768	3.0		80.0		29172	.8				29172	.25	2
7	1768												
8	1768												
9	1768	4.1		83.6									
10	1989	3.1		72.2									
11	2873	3.8		76.1									
12	4420	4.0		75.6									
13	1326	4.3		75.9		9280							
14	1768												
15	1547												
16	1326	2.3		83.3									
17	1547	5.5		80.6									
18	1105	4.4		79.7									
19	1989	4.5		75.0									
20	1989	4.5		74.1									
21	2431												
22	1768												
23	1768	4.4		74.5									
24	1105	5.7		68.5		26520	.5				26520	.23	2
25	2210	4.4		73.8									
26	2652	4.2		76.3									
27	2210	4.2		75.6									
28	1768					2431					* 2431		
29	1547												
30	1768	3.1		81.1									
31	2652	3.5		83.1		2431					* 2431		
Total	62322		21189		16326	69834		3858			60554		
Max.	4420	5.7		83.6		26520	.8				29172	.25	
Min.	1105	2.3		68.5		0	.5				0	.23	
Av.	2010	4.0	684	77.5	527	2253	.65	124			1953	.24	

REMARKS: 4½" or 1990 gal. con. scum to didestor on 12th.
Cleaned # 10 bed on 23rd. 2½" cake (9 cu.yd.)
" " 7 " " " and 24th. 4" cake (15 cu.yd.)
* 4862 gal. supernate from # 2 to lawn areas.

PREPARED BY R. D. Craun, Chief operator

DATE August 15, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....July...1956..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9								
10	64	8.3		1.5	same	8.3		1.7
11	65	8.2		1.6		8.4		1.7
12	67	8.4		1.8		8.2		1.8
13								
14								
15								
16								
17	70	8.2		1.4		8.4		2.0
18	69	7.7		1.8		8.1		2.3
19	68	9.2		1.0		9.2		2.2
20								
21								
22								
23								
24	68	8.0		1.6		8.7		1.9
25	70	8.6		1.6		8.7		1.9
26	69	8.0		1.7		8.0		2.0
27								
28								
29								
30								
31								
Average	70	9.2		1.8		9.2		2.3
Maximum	69	8.5		1.0		8.0		1.6
Minimum	67	8.3	89.3	1.5	67	8.4	90.4	1.9

COMMENTARY

The plant was in contineous operation throughout the month and a satisfactory effluent was produced at all times.

The gas meter on the "utilized" line failed completely on the 8th after several days of erratic action. The new meter that had been ordered to replace the waste gas meter which failed last month was delivered on the 9th and was placed in service on the utilized line. Both of the original meters have been sent to Rockwell Mfg. for inspection and the waste gas will not be metered until they are returned or replaced.

The North, or #2, clarifier was completely dewatered and cleaned for a thurough inspection. It was out of service from 3:pm on the 13th until about midnight of the 18th. It took 4 days for dewatering as the sludge pump has to be used and it is slow and is not available most of the daytime hours. Most of the pumping had to be done at night. The tank and mechanism was in such excellant condition in all respects that it was decided to wait until next summer to dewater the other one.

A peculilarity, which may be only a coincidence, has been noticed. On the 13th of June and the 13th of this month both of which were on a Wednesday, there has been a period of several hours that there was a chlorine demand which could not be satisfied at full capacity of our chlorinator. There is no particular visable difference in the sewage nor is the pH deviated from normal. The effluent B.O.D. does not indicate an excessive organic loading. It will be interesting to see if it re-occures on the mid-Wednesday of August. (note, it did).

REMARKS: No samples the first week because of vacation schedual.

PREPARED BY ....R. D. Craun, Chief Operator....

DATE....August 16, 1956....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....August 1956..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X100	GAS PURCHASED (cu. ft.) X 100
1	F	81	55	68	59	60	93	91	1.56	61	2240	120	7090			2
2	F	78	56	67			92	94	1.56	61	2220	160	71			1
3	F	83	65	74	60	61	95	94	1.56	65	2190	160	9			1
4	F	95	71	83				93	1.68	64	2140	200	0			1
5	F	90	64	77				94	1.55	67	2150	120	0			2
6	C	90	60	75	60	61	90		1.54	66	2180	200	64			1
7	F	88	64	76				94	1.61	62	2140	160	24			1
8	F	87	67	77	61	62	93		1.65	64	2170	160	32			1
9	R	80	60	70			93	93	1.64	59	2150	160	40			1
0	F	83	59	71	61	63	95		1.65	66	2120	160	39			2
1	R	78	60	69			98		1.62	54	2230	160	90			1
2	R	84	66	75			96		1.55	62	2100	160	20			1
3	R	82	60	71			94		1.66	66	2150	200	9			5
4	F	82	60	71	61	61	94		1.66	66	2240	160	96			6
5	R	88	62	75			97		1.69	71	2110	200	42			4
6	C	86	64	75			97		1.65	64	2420	200	38			2
7	F	88	70	78	61	62	96		1.70	66	2190	200	107			1
8	R	82	56	69			100		1.69	60	2150	160	21			6
9	F	72	58	65			100		1.48	56	2190	160	6			2
0	C	72	46	59	60	60	96		1.56	67	2140	160	40			1
1	C	72	54	63	60	61	98		1.55	51	2210	160	33			2
2	C	74	60	67	60	60	98		1.56	68	2150	160	32			1
3	R	76	46	61	60	61	97		1.54	63	2170	200	34			2
4	F	72	44	58	60	60	96		1.56	72	2230	160	37			1
5	F	74	50	62			96		1.53	64	2130	160	29			2
6	F	77	63	70			96		1.40	60	2150	160	92			1
7	F	88	66	77	62	63	102	82	1.59	74	2100	200	75			1
8	F	90	66	78	62	62	98	87	1.63	71	2120	160	14			1
9	C	86	66	76	60	61	96	86	1.59	76	2130	200	70			6
0	R	85	66	75	64	64	95		1.59	57	2160	160	92			1
1	C	86	67	76			94	90	1.63	71	2170	200	99			1
tal									49.43	1994	67340	5280	1362			61
ax.		95	71	83	64	64	102	94	1.70	74	2420	200	107			6
in.		72	44	58	59	60	90	82	1.40	51	2100	120	0			1
v.		82	60	71	61	61	96	90	1.59	64	2172	170	4374			197

REMARKS: There is still no waste gas meter so the total gas production is unknown. It is assumed that it is something over 10000 cu.ft. per day as is indicated by the amount used on the 17th when the heat exchanger was in service for the whole 24 hour period.

PREPARED BY R. D. Craun, Chief operator

DATE July 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....August...1956..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED SOLIDS PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	708	548	162	75.3	51	76.5	125	70	10.4	7.4	7.7	7.0	6.1	7.1	7.2
2													5.8	7.1	7.2
3	688	604	135	88.1	44	88.6	161	62	7.5	7.4	7.4	7.2	6.0	7.1	7.2
4															
5															
6	636	576	136	85.3	50	72.0	133	76	7.5	7.4	7.4	7.1	6.0	7.1	7.1
7															
8	656	596	139	88.5	52	86.5	113	73	7.5	7.3	7.4	7.3	6.0	7.1	7.1
9															
10	636	524	141	87.2	51	90.2	116	75	7.5	7.2	7.4	7.3			
11															
12															
13	776	632	221	83.7	61	83.6	150	90	7.6	7.4	7.4	7.3	5.8	7.2	7.2
14	664	556	139	85.6	51	82.3	131	74	7.5	7.4	7.4	7.2	5.3	7.1	6.9
15	716	580	199	69.3	46	76.7	116	70	7.5	7.4	7.4	7.3	6.0		
16	660	560	146	80.8	55	85.5	129	67	7.5	7.4	7.4	7.3	6.0	7.0	6.9
17	676	516	143	88.8	51	98.0	122	72	7.5	7.4	7.4	7.3	5.9	7.1	7.2
18															
19															
20	696	600	193	84.5	67	89.6	120	76	7.5	7.3	7.4	7.3			
21	676	588	147	83.0	56	87.5	126	74	7.5	7.4	7.4	7.2	5.8	7.1	7.1
22	724	500	143	NG	33	N.G.	127	33	7.5	7.4	7.4	7.3	5.9	7.1	7.2
23	716	580	114	88.6	45	93.3	130	73	7.5	7.4	7.4	7.3	5.9	7.1	7.1
24	780	612	167	89.8	55	92.7	124	63	7.5	7.4	7.4	7.3	5.9		
25															
26															
27	772	620	294	89.1	63	92.1	152	74	7.5	7.4	7.4	7.2	5.9	7.2	7.1
28	840	548	166	80.5	43	95.3	109	46	7.5	7.4	7.4	7.2	5.8	7.1	7.1
29	692	548	135	87.4	59	89.8	113	74	7.5	7.4	7.4	7.1			
30	704	632	172	87.2	58	84.5	115	70	7.5	7.4	7.4	7.3	5.8	7.1	7.0
31	632	584	127	87.4	54	87.0	105	63	7.5	7.4	7.4	7.4	5.8	7.2	7.1
Total															
Max.	840	632	294	89.8	67	98.0	161	90	10.4	7.4	7.7	7.4	6.1	7.2	7.3
Min.	632	500	114	75.3	33	72.0	105	33	7.5	7.2	7.4	7.0	5.8	7.0	7.0
Av.	702	575	161	84.2	52	86.5	126	69	7.6	7.4	7.4	7.2	5.9	7.1	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	702	289400	575	237044	127	52356	18.1
SUSPENDED SOLIDS	161	66372	52	21437	109	44935	67.7
5 DAY B.O.D.	126	51944	69	28445	57	23499	45.2

Green sewage on the 2nd, noticed at 8:45 am, clarifiers already tinged. Assistant operator on vacation first two weeks so sampling was on alternate days

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernatant Drawoff — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1989	3.8		72.6									
2	2210	3.4		81.4									
3	2431					6850					*6850		
4	1768												
5	1326					5750					* 5750		
6	1547	3.5		85.4									
7	1768	3.2		83.7									
8	1768	2.8		75.8		12600					* 12600		
9	1989	4.2		83.6									
0	2210	4.1		77.1									
1	2210												
2	1768												
3	3094	5.2		78.0		6630					* 6630		
4	3757	5.4		85.5									
5	1768	3.4		82.5									
6	2873	4.8		70.8		4200					* 4200		
7	2210	4.1		72.2		8180	1.8		57.9		* 8180		
8	1547												
9	1989												
0	1547	3.2		79.0									
1	1768	3.5		80.0		5970					* 5970		
2	1768	4.6		N.G.									
3	2873	3.9		79.2									
4	2210	4.0		80.0									
5	1768					4640					* 4640		
6	1768												
7	2210	4.8		80.0		9720	.8		45.5		* 9720		
8	1768	3.9		77.1									
9	1989	4.0		78.4									
0	2873	3.8		75.0									
1	2431	4.3		77.4		4860	1.0		69.1		* 4860		
Total	65195		21906		17262	69400		6996		4023	69400 * 51400		
Max.	3757	5.4		85.5		12600	1.8		69.1		12600		
Min.	1547	2.8		70.8			.8		45.5		0		
Av.	2103	4.0	707	78.8	557	2239	1.2	224	57.5	130	2239		

REMARKS: * Supernate drawn to lawn areas, only 18000 gal. back into wet well. Filled No. 3 drying bed on the 16th to 7½ inches (5625 gal.). Very thin, only 2.5% solids and 55.6% vol.
10 inches in digester (4400 gal.) of digested scum on the 14th.

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 12, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1956 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9								
0								
1								
2								
3								
4	69	7.7		1.5	Same	7.7		1.5
5	68	8.2		1.4		8.0		1.6
6	69	8.0		1.8		8.0		2.0
7								
8								
9								
0								
1	64	8.6		1.2		8.4		1.4
2	64	8.4		1.4		8.4		1.8
3	63	8.0		1.2		8.0		1.6
4								
5								
6								
7								
8	67	8.6		1.3		8.6		2.1
9	69	8.8		1.4		8.8		1.7
0	69	8.4		1.8		8.4		2.0
1								
tal								
ax.	69	8.8		1.8		8.8		2.1
in.	63	7.7		1.2		7.7		1.4
v.	67	8.3	89.2	1.4	67	8.3	89.2	1.7

COMMENTARY

The sewage flow received continuous treatment throughout the month and an effluent of satisfactory quality was produced at all times.

The assistant operator was on his vacation the first two weeks so the sampling and laboratory work were done on alternate days and the river samples were omitted. The month was without incidents of note and the operation was very routine. Some minor maintenance was required for the gas pressure regulator and the hot water circulator pump on the heat exchanger.

Green sewage was observed at 8:45 a.m. on the 2nd.

A chlorine demand that taxed the capacity of our chlorinator for several hours occurred on the 15th, the middle Wednesday again.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 12, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...September...1956. SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	R	70	52	61			94	93	1.48	57	2150	160	90	*	*	1
2	F	76	54	65			100	92	1.38	23	2640	160	82			1
3	F	80	60	70			98	95	1.38	66	2140	160	74			1
4	F	84	60	72			97	97	1.52	69	2400	160	88			2
5	F	85	59	72	62	62	96	99	1.55	72	2130	200	85			1
6	F	67	41	54	60	60	96	102	1.44	72	2150	160	92			1
7	C	64	41	52	59	60	96	103	1.44	74	2150	160	29			4
8	R	63	43	53			95		1.42	66	2140	160	0			3
9	R	71	51	61			93		1.36	68	2160	160	0			5
10	R	72	50	61			90		1.47	75	2120	160	49			2
11	F	76	52	64	60	61	94		1.46	72	2130	160	65			1
12	F	80	56	68	60	61	94	96	1.48	68	2140	200	67			1
13	F	88	60	74	61	62	93	97	1.50	48	2130	160	75			2
14	C	72	46	59			97		1.44	67	2120	160	74			1
15	R	67	50	58			100		1.38	65	2130	160	67			2
16	R	78	52	65			97	96	1.38	72	2170	160	70			1
17	F	66	38	52	61	62	96	99	1.43	116	2060	160	70			1
18	C	64	44	54	59	60	94	99	1.37	132	2040	160	17			2
19	R	60	33	46	59	59	92		1.35	130	2010	200	87			4
20	F	54	32	43	58	58	97		1.33	130	2040	160	73			6
21	C	60	42	51	59	59	96	96	1.34	28	590	160	81			6
22	LR	78	56	67			95	97	1.35		1	160	83			2
23	F	68	42	55			100		1.26		5	160	73			1
24	F	70	40	55			98	98	1.38		41	120	80			2
25	F	74	48	61	59	60	98	100	1.34		371	200	80			2
26	F	68	42	55	59	60	97	101	1.32		67	160	85			2
27	F	66	48	57	60	60	96	103	1.35		38	160	89			1
28	F	72	44	58	59	60	96	104	1.36		52	160	91			2
29	F	78	50	64			102		1.38		3	160	86			2
30	F	59	35	47			100	106	1.24		3	160	77			2
31																
Total									41.88	1570	44511	4920	2079			64
Max.		88	60	74	62	62	102	106	1.55	132	2640	200	92			6
Min.		54	32	43	58	58	90	92	1.24	23	1	120	0			1
Av.		71	47	59	60	60	96	99	1.40	75	1484	164	69.3			2

REMARKS: * No waste gas meter, total production unknown

PREPARED BY R. D. Craun, Chief Operator

DATE October 4, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF... September 1956

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3															
4	692	584	137		67		145	95	7.5	7.0	7.4	7.0	5.7	7.2	7.2
5	660	556	110	88.2	51	94.1	107	68	7.5	7.4	7.4	7.3	5.9	7.1	7.2
6	1016	624	121	88.4	42	88.1	130	58	7.5	7.3	7.4	7.3	6.0	7.0	7.1
7	768	656	149	87.2	62	95.2	116	77	7.6	7.4	7.5	7.4	5.8	7.0	7.0
8															
9															
0															
1	716	6.2	137	87.6	67	97.0	130	91	8.1	7.4	7.4	7.3	5.6	7.1	7.0
2	748	684	131	84.7	60	93.3	112	88	7.5	7.4	7.4	7.2	5.8	7.1	7.0
3	640	600	126		60		106	74	7.5	7.4	7.4	7.3	5.8	7.1	7.1
4															
5															
6															
7	772	652	2.0	82.8	79	91.1	188	94	7.5	7.2	7.3	7.2	6.0	7.2	7.1
8	732	596	123	87.0	56	94.7	122	84	7.5	7.2	7.3	7.2		6.8	7.0
9	644	560	121	85.1	49	85.7	123	73	7.5	7.3	7.3	7.2	5.8	7.2	7.0
0	632	580	132	87.1	62	87.1	137	104	7.4	7.2	7.3	7.2	5.9	7.1	7.1
1	824	568	166	84.9	60	75.0	N. G.		7.5	7.1	7.4	7.2	5.9	7.2	7.0
2															
3															
4	720	588	186	78.0	68	80.9	172	110	7.6	7.4	7.4	7.2			
5	652	564	125	80.0	53	88.7	94	66	9.2	7.4	8.2	7.4	6.0	7.1	7.0
6	736	584	155	87.1	58	91.4	165	79	7.5	7.4	7.5	7.3	5.9	7.1	7.0
7	764	592	206	86.4	72	86.1	177	83	7.4	7.3	7.4	7.3	6.0	7.1	7.1
8	708	608	156	85.9	74	86.5	110	66	7.6	7.4	7.4	7.3	5.8	7.0	7.2
9															
0															
1															
tal															
ax.	1016	684	209	88.4	79	97.0	188	110	9.2		8.2		6.0	7.2	7.2
in.	632	556	110	78.0	42	75.0	94	58		7.0		7.0	5.6	6.8	7.0
v.	731	600	146	85.4	61	89.0	133	82					5.9	7.1	7.1

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	731	255324	600	209568	131	45756	17.9
SUSPENDED SOLIDS	146	50995	61	21306	85	29689	52.8
5 DAY B.O.D.	133	46454	82	28641	51	17813	38.3

PREPARED BY R. D. Craun, Chief Operator

DATE Oct. 5, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF. Sept. 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	[illegible] Supernatant overflo — GALLONS DRAWN	PERCENT DRY SOLIDS	[illegible] Dig. No.
1	1989												
2	1547												
3	1326												
4	2210	4.7				6190	1.0				* 6190		2
5	1989	3.6		75.8									
6	2873	3.6		76.0									
7	2210	3.9		82.4		4860					* 4860		2
8	1547												
9	1768												
0	1547	4.4		80.4									
1	1989	4.1		78.8		6850	.8		53.8		* 6850		2
2	2652	4.7		81.3									
3	2873	4.3		76.4									
4	2210												
5	1547												
6	1547												
7	2873	3.2		82.5		23870	1.0		50.0		*23870		2
8	2431												
9	1768	3.8		83.0									
0	1989	3.9		82.0									
1	2431	3.0		82.9		5300	1.8		65.2		* 5300		2
2	1547												
3	1768												
4	1768	2.2		88.0		9950					* 9950		2
5	2210	4.1		79.4									
6	2652	3.9		76.2		7730	1.1		61.5		* 7730		2
7	2873	3.9		80.0									
8	2652	3.7		81.8									
9	1768												
0	2210												
1													
tal	62764		20806			64750		5983		3446	64750		
											*47510		
ax.	2873	4.7		88.0		23870	1.8		68.8		23870		
in.	1326	2.2		75.8		0	.8		50.0		0		
v.	2092	3.9	694q	80.4	558	2158	1.1	199	57.6	115	2158		

REMARKS: * 47510 gal. supernatant drawn to lawn areas, only 17240 returned to the wet well for re-treatment.
10 inches, 4420 gal., scum pumped to digester on the 18th.

PREPARED BY R. D. Craun, Chief Operator

DATE Oct. 5, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF Sept. 1956 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	~~68---9.~~							
2								
3								
4								
5	68	9.4		1.0	same	9.3		1.7
6	70	8.1		2.5		8.1		2.1
7								
8								
9								
10								
11								
12	62	9.2		1.4		9.4		1.8
13	64	9.2		1.4		9.2		1.8
14								
15								
16								
17								
18	60	9.2		1.6		9.2		4.8
19	58	8.8		1.6		8.8		1.5
20								
21								
22								
23								
24								
25	56	9.6		1.6		9.3		2.3
26	58	9.9		2.0		9.9		2.1
27	57	9.6		1.2		9.8		2.4
28								
29								
30								
31								
Total								
Max.	70	9.9		2.5		9.9		4.8
Min.	54	8.1		1.2		8.1		1.5
Av.	61	9.3	93.9	1.6	61	9.3	93.9	2.2

COMMENTARY

There was contineous treatment throughout the month with satisfactory effluent at all times.

The hot water circulator on the heat exchanger would not start on the 8th so the motor was removed and sent to a repair shop. It was returned and placed back in service on the 10th. The starter switch was at fault and a new front bearing was also provided. The pump bearing assembly had had a little leak which could not be corrected from the time that the equipment was first placed in service. The B & G Co. had provided a replacement assembly and it was installed while the motor was being repaired.

The regular chlorination season ended on the 15th so we discontinued our regular schedual on the 17th. The chlorine remaining in the tanks was used for a high rate pre-chlorination period with the aim of cleaning the clarifier tanks of slime, algy and grease formations which are not controlled by our routine brushing operations. A rate of 125 lbs. per 24 hours for 4 days exhausted our chlorine and pretty well accomplished our purpose.

REMARKS:

PREPARED BY R. D. Craun

DATE Oct. 5, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1956 SHEET NO. 1

	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
	F	70	48	59	60	60			1.37		42	160	23			4
	F	74	40	57	60	61	96		1.35		51	160	0			5
	F	71	44	57	60	60	93		1.31		53	160	95			5
	F	70	38	54	60	61	92	102	1.35		23	160	101			2
	F	63	42	52	59	59	100		1.32		301	160	94			1
	R	67	46	56			98	108	1.26		5	160	94			4
	F	57	49	53			96	104	1.19		1	120	89			2
	F	70	32	51	60	59	103	102	1.32		60	160	93			7
	F	54	26	40	58	58	100	102	1.28		27	160	94			6
	F	53	31	42	58	58	100	104	1.29		349	160	92			6
	F	57	38	47	58	58	99	106	1.29		94	200	90			6
	F	74	48	61	58	59	100	107	1.30		27	160	89			3
	F	76	50	63			99	108	1.33		1	160	83			2
	F	77	55	66			98	110	1.23		5	120	75			2
	F	78	50	64	60	61	97	112	1.35		29	160	26			1
	F	79	48	63	65	61	96	108	1.35		68	160	51			1
	F	78	46	62	59	60	99		1.32		123	200	32			1
	F	66	39	52	60	59	94		1.27		45	120	36			5
	F	66	43	54	59	58	94	99	1.31		34	160	64			5
	R	66	50	58			94	101	1.27		3	160	67			3
	C	67	47	57			93	103	1.24		8	120	67			4
	C	72	46	59	59	59	93	104	1.34		43	160	74			0
	F	68	37	52	60	59	92		1.32		47	160	26	24		5
	C	56	40	48	58	58	98		1.29		33	160	90	13	103	10
	F	70	48	59	59	59	100		1.35		58	160	64	28	92	4
	R	58	32	45	58	59	96	97	1.35		29	160	55	1	56	8
	F	59	34	46			95	99	1.27		3	160	79	0	79	5
	F	62	38	50			94	102	1.22		5	120	81	0	81	5
	F	67	46	56	59	59	96		1.32		171	160	87	0	87	3
	C	72	50	61	59	59	100		1.33		29	160	86	5	91	4
	R	68	55	61	58	59	99	100	1.32		19	160	88	0	88	3
									40.41		1786	6040	2185			122
		79	55	66	65	61	103	112	1.37		349	200	101			10
		53	31	40	58	58	92	99	1.19		1	120	0			0
		67	43	55	59	59	97	104	1.30		58	195	70			4

REMARKS: * Heat exchanger off on the days showing low gas utilization. Waste gas meter out of service until afternoon of the 23rd. Purchased gas used for building heat and waste gas burner pilot.

Green sewage from 9 am to 9:10 am on the 2nd.
" " " 2 pm " 2:15 pm " " 31st.

PREPARED BY R. D. Craun, Chief operator

DATE Nov. 3, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	756	616	242	84.3	77	85.7	192	102	7.5	7.2	7.3	7.2	5.8	7.2	7.1
2	660	536	125	89.6	55	92.7	103	64	7.5	7.4	7.5	7.2	5.8	7.0	7.2
3	696	536	139	84.9	58	93.1	130	75	7.6	7.4	7.4	7.3		7.0	7.2
4	676	572	173	84.4	56	87.5	152	73	7.5	7.4	7.5	7.3	6.0	6.9	7.2
5	740	648	148	8855	65	87.7	142	75	7.8	7.4	7.5	7.4	5.9	7.0	7.2
6															
7															
8	792	612	330	87.0	70	91.4	180	82	7.6	7.4	7.4	7.2	6.0	7.1	7.3
9	656	556	143		52		137	76	7.5	7.5	7.5	7.4	5.9	7.1	7.2
10	636	572	143	87.4	57	93.0	131	71	7.5	7.4	7.4	7.3	5.8	7.1	7.2
11	648	588	116	85.3	56	83.9	129	72	7.5	7.4	7.4	7.3	6.0	7.1	7.2
12	656	564	123	91.1	64	69.9	106	69	7.5	7.4	7.4	7.1	6.0	7.1	7.2
13															
14															
15	780	612	200	78.5	69	92.8	154	81	7.5	7.2	7.4	7.1	5.8	7.1	7.2
16	744	692	162	87.0	99	85.9	114	85	7.5	7.5	7.5	7.4	6.2	7.2	7.5
17	740	624	127	85.8	64	89.1	112	79	7.5	7.5	7.4	8.3		7.0	7.3
18	692	592	133	94.7	61	95.1	115	70	7.6	7.5	7.4	7.3	6.0	7.2	6.9
19	768	652	178	87.1	74	87.8	104	67	9.0	7.4	7.5	7.3	6.0	7.1	7.1
20															
21															
22	792	684	234	82.5	72	86.1	168	86	7.6	7.5	7.5	7.3	6.0	7.1	7.8
23	740	544	217	84.8	58	87.9	148	69	7.6	7.5	7.4	7.2	5.9	7.2	7.1
24	756	532	137	84.0	58	86.2	111	65	7.5	7.5	7.5	7.3	5.9	7.3	7.5
25	772	644	187	84.5	65	90.8	146	74	7.6	7.4	7.5	7.3	5.9	7.0	7.3
26	768	656	178	84.3	110	90.9	150	104	7.5	7.5	7.5	7.4	5.9	7.3	7.6
27															
28															
29	820	604	228	79.4	73	80.8	172	80	7.6	7.4	7.4	7.3	5.8	7.1	7.3
30	644	584	144	83.3	65	76.8	139	79	7.6	7.5	7.5	7.3	5.9	7.0	7.3
31	568	540	120	82.5	56	83.9	112	75	7.6	7.4	7.5	7.4	5.8	7.0	7.2
Total															
Max.	820	692	330	94.7	110	96.9	192	104	9.0		7.5		6.2	7.3	7.5
Min.	568	532	116	79.4	52	76.8	103	64		7.2		7.1	5.8	6.9	6.9
Av.	717	596	171	85.5	67	88.5	137	77					5.9	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	717	241629	596	200852	121	40777	16.9
SUSPENDED SOLIDS	171	57627	67	22579	104	35048	60.8
5 DAY B.O.D.	137	46169	77	25949	60	20220	43.8

PREPARED BY R. D. Craun, Chief operator

DATE November, 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	[illegible] — GALLONS DRAWN	PERCENT DRY SOLIDS	[illegible] Dig. No.
	3757	2.6		76.5		10830	1.1		57.1	*	10830		2
	2431	3.8		84.4									
	2210					7510	1.5		56.2		760		2
	2652	3.5		83.7									
	1989	3.9		80.0									
	1989												
	1768												
	2652	2.9		78.6									
	2431	3.8		78.7									
	2210	4.4		81.8									
	1989	3.6		83.7									
	1768	3.0		85.7									
	1768												
	1768												
	3094	3.7		86.0									
	2873	3.7		82.4		25640	.7		66.7		25640		2
	2210												
	2431	3.7		79.6									
	1989	3.7		84.6									
	1547												
	1547												
	2652	3.3		83.7									
	2652	4.4		82.0									
	2210	3.7		81.2									
	2210	3.9		81.5									
	1326	3.7		81.0		25640	.9				25640	.3	2
	1326												
	2431												
	2210	4.1		75.0									
	2210	3.7		81.1									
	1989	4.2		81.0									
	68289		19997		16289	69620		6214		3728	62870		
											* 10830		
	3757	4.4		86.0		25640	1.5		66.7		25640	.4	
	1326	2.6		75.0		0	.7		56.2		0	.3	
	2203	3.7	645	81.5	526	2246	1.05	200	60.0	120	2028	.35	

REMARKS: Filled # 1 drying bed approximately 9 inches (6750) gal/ on 3rd. Only 3.6% solids; 55.5% volatile;
About 4 inches in digester of scum on 3rd. (1770 gal.)
" 3½ " " 8 " " " 17th (1550 gal.)

* Supernate to lawn area, only 52040 gal returned to raw sewage wet well.

PREPARED BY R. D. Craun, Chief Operator

DATE Nov. 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..October. 1956..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
	60	9.2		1.6	same	9.4		2.4
	57	9.0		1.5		9.1		2.0
	58	9.5		1.6		9.7		2.2
	52	10.6		2.0		10.6		2.4
	50	10.8		2.0		10.8		2.5
	51	11.2		2.3		11.5		3.0
	58	9.6		1.8		10.0		2.6
	59	9.8		2.0		9.9		2.7
	59	10.2		2.8		9.8		2.6
	56	9.4		1.8		9.8		2.4
	54	10.2		2.4		10.2		2.6
	52	9.4		1.6		10.2		3.8
	52	10.4		2.0		10.6		2.4
	56	10.1		2.1		10.0		2.6
al								
x.	60	11.2		2.8	60	11.5		3.8
n.	50	9.0		1.5	50	9.1		2.0
.	56	10.0	95.2	2.0	56	10.1	96.2	2.6

COMMENTARY

The plant was in contineous operatio throughout the month and produced a satisfactory effluent at all times.

Green sewage was received on two occasions, as noted under remarks on sheet 1.

Operational proceadures were all of a routine nature, with few mechanical services needed. The hot water circulator on the heat exchanger started vibrating and chattering to a considerable extent and the rubber coupler section between the motor and pump had to be replaced

On the lift station inspection of 16th the pump was found to be running but not pumping. A length of bamboo, about 30 inches long and an inch wide, and a large clump of roots was removed from the impeller section. The suction wetwell was drained and another large root clump removed from it. Evidently a root cutter had been used on someones service and the cuttings flushed to the lift station.

Mr. Stocktnn of the County Health Department had several groups of students here to inspect the plant as part of his field trips. A large portion of his groups are exchange students from foreign countries and as a result our plant has been looked over by represenatives of most nationalitie

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Vov. 7, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..November...1956.

SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) x 100
1	C	66	49	57	58	59	98	102	1.31		39	160	94	0	94	6
2	C	68	46	57	58	59	98	104	1.33		31	160	93	0	93	4
3	C	64	50	57			99	106	1.30		8	120	85	0	85	3
4	C	60	54	57			97	108	1.19		7	160	76	0	76	5
5	C	64	49	56	59	58	96	108	1.31		44	160	80	0	80	5
6	R	62	34	48	58	59	95	109	1.30		31	160	85	0	85	8
7	C	54	34	44	58	58	100		1.32		68	160	73	12	85	15
8	LS	44	29	36	57	58	101		1.30		38	160	60	12	72	16
9	C	48	23	35	58	56	97	101	1.31		62	160	79	0	79	14
10	F	40	24	32			97	100	1.29		11	120	73	0	73	14
11	F	58	38	48	96		96	102	1.22		13	160	68	0	68	9
12	R &S	43	30	36	59	59	95	102	1.33		39	160	68	0	68	14
13	F	50	30	40	57	56	98		1.30		81	160	71	0	71	11
14	C	66	59	62	58	57	96	99	1.32		276	160	88	21	109	3
15	R	60	28	44	58	58	100		1.34		73	160	69	32	101	10
16	S	36	20	28	56	54	97	96	1.29		53	120	81	13	94	21
17	F	38	20	29			101		1.26		7	160	77	13	90	18
18	F	46	22	34			99	96	1.21		10	160	89	1	90	19
19	F	52	32	42	57	57	97	97	1.34		307	160	81	0	81	9
20	R	56	36	46	57	56	101		1.40		50	160	66	6	72	16
21	S	38	26	32	56	55	97	96	1.36		32	160	*7	54	61	17
22	S	28	0	14					1.25		4	120	74	22	96	19
23	F	23	2	12			99		1.29		25	160	67	9	76	16
24	LS	29	15	22			95	89	1.32		20	120	75	2	77	16
25	LS	32	26	29			94	90	1.26		7	160	65	0	65	17
26	C	34	11	22	54	54	94	91	1.36		70	160	65	0	65	17
27	C	36	22	29			96		1.32		10	160	70	2	72	18
28	LS	34	13	23	55	54	95	88	1.31		26	160	68	4	72	17
29	S	30	14	22	55	54	94	88	1.34		27	160	72	3	75	16
30	C	32	14	23	55	54	92	89	1.35		27	160	68	3	71	17
31																
Total									39.13		1496	4600	2187	209	2396	390
Max.		68	59	62	59	59	101	109	1.40		307	160	94	54	109	21
Min.		23	0	12	54	54	92	88	1.19		4	120	7	0	61	3
Av.		46	28	37	57	57	97	98	1.30		49.8	153	7290	697	7987	1300

REMARKS: * Circulating pump out of service for maintenance so heat exchanger also out of service.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 6, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PPM PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE MAXIMUM	PH. DATA RAW SEWAGE MINIMUM	PH. DATA PLANT EFFLUENT MAXIMUM	PH. DATA PLANT EFFLUENT MINIMUM	PH. DATA RAW SLUDGE	PH. DATA DIGESTER NUMBER 1	PH. DATA DIGESTER NUMBER 2
1	656	620	146	87.7	55	90.9	149	85	7.5	7.4	7.4	7.3	5.8		
2	736	616	194	87.1	72	88.9	136	87	7.5	7.2	7.4	7.0	5.5	7.0	7.1
3															
4															
5	752	592	215	83.3	71	81.7	201	97	7.4	7.2	7.3	7.2	5.6	7.0	7.2
6	724	592	163	85.3	65	86.2	160	92	7.5	7.4	7.4	7.3	5.7	7.1	7.4
7	724	624	163	84.7	64	90.6	125	75	8.0	7.4	7.5	7.3	5.9	7.2	7.4
8	* 644	676	163	87.7	116	89.7	118	88	7.6	7.4	7.4	7.2	6.1	7.2	7.6
9	820	540	192	88.0	63	95.2	157	79	7.5	7.5	7.4	7.3	6.0		
10															
11															
12	736	584	191	83.3	70	91.4	117	75	7.6	7.5	7.4	7.2	6.1	7.0	7.3
13	860	644	129	91.5	60	96.7	141	92	7.5	7.4	7.4	7.4	6.2	7.1	7.2
14	1072	644	148	87.8	52	92.3	193	81	7.5	6.8	7.5	7.1	5.6	6.9	7.2
15	668	648	127	85.0	58	82.8	124	78	7.5	7.4	7.5	7.3	5.8	7.1	7.3
16	724	616	155	86.4	60	85.0	131	77	7.6	7.4	7.4	7.3	5.7		
17															
18															
19	924	584**	467	87.2	88	90.9	220	94	7.6	7.4	7.5	7.2	5.8	6.9	7.2
20	* 712	688	160	83.1	111	56.8	132	122	7.6	7.4	7.5	7.4	6.0	7.3	
21	632	460	151	86.1	55	87.3	145	79	7.6	7.5	7.4	7.3	6.0		
22		Thanksgiving													
23															
24															
25															
26	840	588	200	80.0	64	87.5	148	76	7.6	7.5	7.5	7.4	5.9	7.0	7.2
27		At Lawrence Tech.													
28	684	524	131	91.6	51	N.G.	112	71	7.6	7.5	7.5	7.3	6.0	7.1	7.2
29	724	640	166	89.2	57	95.0	132	73	7.7	7.5	7.5	7.4	6.1	6.9	7.2
30	704	584	159	86.8	70	91.4	121	79	7.7	7.5	7.5	7.4	6.0	7.0	7.3
31															
Total															
Max.	1072	688	467	91.6	116	96.7	220	122	8.0		7.5		6.2	6.9	7.6
Min.	632	460	127	80.0	51	56.8	112	71	~~6.8~~	6.8		7.0	5.5	7.3	7.1
Av.	755	603	180	86.4	69	87.8	145	84	7.5		7.3		5.9	7.1	7.3

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	755	246130	603	196578	152	49552	20.1
SUSPENDED SOLIDS	180	58680	69	22494	111	36186	61.7
5 DAY B.O.D.	145	47270	84	27384	61	19886	42.1

* Supernate in effluent, none in raw.

** Heavy, black sewage at 2 & 3 pm on 19th.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 7th 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernatant Liquor — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS Dig. No.
1	2652	4.2		80.7									
2	1989	3.6		80.0									
3	1768												
4	1547												
5	2431	4.1		79.7									
6	2652	4.1		83.9									
7	2210	3.4		82.6									
8	1768	3.4		84.3	~~85480~~	25420	1.2		60.0		25420	.100	2
9	1989	3.2		85.0									
10	1989	~~3.2~~		~~8510~~									
11	1547												
12	2210	3.0		81.0									
13	1989	3.5		85.4									
14	3536	3.8		83.1									
15	1547	4.3		85.2									
16	2652	3.2		81.4									
17	1547												
18	1989												
19	2652	3.4		93.0									
20	1326	3.4		93.0									
21	1326	3.6		80.0		24310	1.2		50.0		24310	.36	2
22	2210	4.0		83.0									
23	2210												
24	2210												
25	1547												
	1547												
	2652	3.3		82.2									
	2431												
	2431	3.3		85.4									
	2652	3.7		84.6									
	2531	3.5		82.6									
al	64315		19680		16393	49730		5272		2790	49730		
c.	3536	4.3		93.0		25420	1.2		60.0		25240	.36	
	1326	3.0		79.7		0	1.2		50.0		0	.10	
	2144	3.6	656	83.3	546	1658	1.2	169	55.0	93	1658	.23	

REMARKS Concentrated scum pumped to digester on 14th. 5" in digester or 2210 gals.

PREPARED BY R. D. Craun, Chief Operater

DATE Dec. 7th 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1956 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1	56	9.4		1.8	Same	9.6		2.4
2								
3								
4								
5								
6	50	8.4		1.8		8.8		2.4
7	51	9.0		1.8		9.2		2.4
8	48	9.2		2.2		9.3		2.9
9								
0								
1								
2								
3	42	11.2		2.4		11.2		2.7
4	44	11.2		2.3		11.2		2.3
5	49	10.1		1.9		10.4		2.8
6								
7								
8								
9								
0	42	11.2		2.4		11.2		3.0
1	44	10.3		2.1		10.4		2.6
2								
3								
4								
5								
6								
7								
8								
9	35	12.2		2.4		12.3		2.7
0								
1								
otal								
ax.	56	12.2		2.4	56	12.3		3.0
lin.	35	8.4		1.8	35	8.8		2.3
v.	46	10.2	86.4	2.1	46	10.4	88.1	2.6

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of satisfactory quality was produced at all times. Maintenance items were all of a routine nature.

The writer attended the operators session conducted by the Mich. Dept. of Health at the Lawerance Institute of Technology on the 27th and 28th. It was a very interesting session with a portion devoted to material which has never been discussed at previous meetings. The importance of representative sampling and meticuleous laboratory technique was stressed and demonstrated

An acceptable method for establishing a strength factor for the differenc in the 8hr. day flow and the 24 hour total flow was outlined and a graphic means of making our data more meaningfull by using a special "normal probability" graph paper was explained.

It was urged that both of these two items be incorporated into our proceedures as soon as possible. The graphs can be included at once, requiring only the special paper and a couple of hours each month for preparation. A set of these graphs are included in this months report. The strength factor is more of a problem, requiring 24 hour sampling over several weeks if done in a consecutive unit of time, or a much longer period if broken up into intermittent periods covering the entire range. At laast 2 or 3,and maybe more, 24 hour samplings must be made for each day to provide a basis for such a facto

REMARKS: Data based on one grab sample collect about 9:30 a.m.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 11, 1956

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1956 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu ft)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu ft) X 100	SEWAGE GAS WASTED (cu ft) X 100	TOTAL GAS PRODUCED (cu ft) X 100	GAS PURCHASED (cu ft) X 100
1	C	36	30	33			92	89	1.27		1	120	68	0	68	16
2	F	41	33	37			96		1.20		9	120	56	5	61	13
3	F	46	26	36	56	56	93	88	1.35		137	160	54	2	56	10
4	F	46	28	37	56	56	94		1.33		335	160	50	15	65	10
5	R	58	41	49	56	55	96	85	1.28		75	160	56	10	66	8
6	LR	56	37	46	55	55	93	86	1.28		74	160	60	9	69	8
7	LR	42	32	37	55	55	92	87	1.29		66	160	60	8	68	13
8	S	34	26	30			96		1.22		25	160	60	4	64	17
9	F	33	19	27			92	86	1.19		22	120	58	0	58	19
10	C	38	20	29	56	56	91	86	1.33		50	160	63	0	63	17
11	F	42	20	31	55	54	94		1.29		30	160	59	1	60	15
12	F	24	12	18	55	52	92	83	1.27		46	120	64	6	70	20
13	C	28	14	21			94	82	1.29		19	160	62	10	72	19
14	C	38	27	32			92	84	1.27		15	160	65	18	83	17
15	R	42	32	37			95		1.27		1	120	66	15	81	21
16	C	38	32	35			91	83	1.12		11	160	64	11	75	14
17	LR	40	16	28	54	52	96		1.23		279	120	66	11	77	15
18	F	30	16	23	54	54	95	82	1.23		62	160	70	25	95	15
19	LR	42	26	34	54	53	94		1.25		30	160	71	31	102	15
20	R	40	34	37	54	53	97	80	1.25		26	160	67	28	95	14
21	LR	44	36	40	54	54	94	81	1.26		275	160	69	34	103	11
22	LR	44	36	40			96		1.23		10	160	70	29	99	11
23	LR	46	36	42			94	82	1.21		8	160	69	14	83	13
24	R&S	38	26	32			97		1.27		279	120	69	9	78	16
25	S	34	28	31			94	80	1.16		6	160	72	1	73	16
26	S	36	25	30	52	52	93	82	1.28		40	160	74	7	81	16
27	C	39	28	33	55	53	96	81	1.30		29	160	74	9	83	15
28	LS	32	22	27	54	52	93	83	1.33		33	160	74	7	81	19
29	C	38	16	27			97		1.25		3	160	66	16	82	19
30	C	38	34	36			93	81	1.19		3	160	72	6	78	19
31	C	36	12	24			97	79	1.29		41	160	76	8	84	18
Total									38.98		2040	4680	2024	349	2373	469
Max.		58	41	49	56	56	97	89	1.35		335	160	76	34	103	21
Min.		24	12	18	53	52	91	79	1.12		1	120	50	0	56	8
Av.				33	55	54	94	83	1.26		66	151	65	11	77	15

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE January 2, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B O D. 20 DEG C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3 ?	1224	624	273	78.4	63	87.3	244	89	7.7	7.1	7.5	7.4	6.0	7.0	7.2
4 *	712	684	130	80.0	94	89.4	152	103	7.6	7.5	7.5	7.4	6.0	7.0	7.2
5	800	600	139	84.9	65	89.2	141	81	7.6	7.5	7.5	7.4	6.1	6.9	7.2
6	704	572	120	93.3	52	84.6	123	68	7.6	7.4	7.5	7.3	6.0	6.8	7.2
7	800	556	138	75.4	51	84.3	119	64	9.7	7.5	7.8	7.3	6.1	6.9	7.2
8															
9															
10	752	564	204	77.5	68	80.9	182	88	7.6	7.4	7.5	7.3	6.0	7.1	7.3
11	724	660	149	83.2	53	84.9	140	78	8.8	7.4	7.7	7.3	6.1	6.8	7.2
12	672	616	137	86.1	59	91.5	123	72	7.6	7.5	7.5	7.4	5.9	7.0	7.2
13															
14															
15															
16															
17	800	536	255	83.9	49	95.9	198	68	7.7	7.4	7.5	7.3	6.1	7.0	7.2
18	652	572	123	82.9	57	80.7	121	66	7.7	7.5	7.6	7.4	6.0	6.9	7.1
19	656	560	138	87.7	55	89.1	140	75	7.6	7.4	7.5	7.4	6.1	7.0	7.2
20	832	680	154	79.2	63	77.8	175	75	7.7	7.5	7.5	7.4	6.2	7.0	7.1
21	660	568	152	87.5	67	85.1	116	69	7.6	7.5	7.5	7.4	6.0		
22															
23															
24															
25															
26	700	536	197	87.3	54	92.6	179	81	7.6	7.5	7.5	7.3	6.0	7.0	7.1
27	828	580	201	75.1	57	86.0	139	72	7.7	7.5	7.5	7.2	6.2	7.0	7.3
28	760	588	173	87.9	66	93.9	158	87	7.6	7.5	7.5	7.4	6.2		
29															
30															
31															
Total	~~23876~~	~~9496~~	~~3683~~												
Max.	1224	684	273	93.3	94	95.9	244	103	9.7		7.8		6.2	7.1	7.3
Min.	652	536	120	75.1	49	77.8	116	64		7.1		7.2	5.9	6.8	7.1
Av.	767	594	168	83.1	61	87.1	153	77	7.5		7.4		6.1	7.0	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	767	249352	594	193109	173	56243	22.6
SUSPENDED SOLIDS	168	54617	61	19831	107	34786	63.7
5 DAY BOD	153	49740	77	25033	76	24707	49.7

* Sampling includes supernate in effluent but not in raw sewage

? Reason for high figure in raw and normal in effluent unknown. One strong sampling in Raw is suspected.

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 3, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1956 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernatant over flow — GALLONS DRAWN	PERCENT DRY SOLIDS	Dig. No.
1	1326												
2	1547												
3	3094	3.7		84.9									
4	1326	3.3		83.7		29610	1.54		55.6		29610	.33	2
5	1989	3.4		81.3									
6	2873	3.3		79.1									
7	1989	2.9		82.9									
8	2210												
9	1768												
10	2652	3.2		86.4									
11	1989	3.6		84.1									
12	2210	4.0		84.8									
13	3094					25410					25410		
14	2652												
15	1768												
16	2210												
17	2431	3.2		82.5									
18	3094	4.1		83.0									
19	1768	3.6		80.0		15470	1.38		58.8		15470	.22	2
20	2210	3.3		81.4									
21	2873	3.6		82.2									
22	1326												
23	1326												
24	1768												
25	1547												
26	3536	3.8		89.4									
27	1989	3.2		73.2		15470	1.40		62.5		15470	.23	2
28	2431	3.4		88.0									
29	1547												
30	1989												
31	2210												
	66742		~~567307~~ 19856		16461	85960		10398		6135	85960		
	3536	4.1		89.4		29610	1.54		62.5		29610	.33	
	1326	2.9		73.2		0	1.38		55.6		0	.22	
	2153	3.5	~~18300~~ 640	82.9	531	2773	1.44	335	59.0	214	2773	.26	

REMARKS:

Pumped 4 inches of scum into # 1 digester on 18th (1770 gal.)

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 2, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1956 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
3	38	11.4		2.2	same	11.6		2.4
4	40	10.8		1.9		10.8		1.8
5	41	11.0		1.6		10.8		1.4
6								
7								
8								
9								
10								
11	34	12.6		2.6		12.6		2.6
12	34	12.4		2.2		12.6		3.0
13								
14								
15								
16								
17								
18	36	11.8		1.4		12.2		2.6
19	36	12.1		2.1		12.0		2.4
20	38	12.0		2.6		11.6		2.8
21								
22								
23								
24								
25								
26	38	11.4		1.4		11.8		2.3
27	38	11.6		1.8		12.0		2.6
28								
29								
30								
31								
Total								
Max.	41	12.6		2.6	41	12.6		3.0
Min.	34	10.8		1.4	34	10.8		1.4
Av.	37	11.7	86.0	2.0	37	11.8	86.8	2.4

COMMENTARY

All the treatment units were in service throughout the entire month and an effluent of satisfactory quality was produced at all times.

Maintenance items were all of a routine nature, the digesting sludge circulating pump requiring the most attention. The packing compression assembly was machined off center which allowed the metal to rub the shaft, but the condition was not discovered until the shaft had become quite worn. As a consequence, the packing will last only from 10 to 14 days and even when newly repacked there is a lot of leakage during the night when there is no one to adjust the gland. The original container provided to catch the drippings overflowed nearly every night with a resulting mess to clean up in the morning, so a container 3 times as large has been provided and this has capacity enough to hold the 16 hour quantity most of the time. A new shaft and gland assembly has been purchased but will not be installed for a while.

Minor acts of vandalism occurred in the afternoon or evening of Saturday the 29th. The site is inclosed with a 6 ft. barbed wire topped Cyclone fence and the gates are kept locked whenever plant personel is not here, but entry was gained in some manner. Our sampling pole was found broken and floating in a clarifier on Sunday morning. Our maximum - minumum temperature thermometer had the mercury tube broken out. The cap on the vent to the chlorine tube manhole was removed and the extention shaft to the valve in the chlorine tube weir chamber was pulled from the valve. We are wondering just how much and what kind of foreign material was thrown into the clarifiers and how soon it will cause trouble.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 2, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....January.....1957... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1	S	21	13	17			94	80	1.16		13	120	6700	800	7500	2000
2	C	28	14	21	53	52	96		1.22		27	160	6500	1400	7900	2000
3	LS	36	18	27	53	51	94	76	1.22		46	120	6500	2600	9100	2100
4	C	36	20	28	53	52	96		1.22		31	160	6700	2200	8900	1700
5	C	28	20	24			93	78	1.18		3	160	5900	1900	7800	1800
6	LS	34	26	30			95		1.06		11	120	5700	1200	6900	1800
7	F	36	20	28	52	51	93	77	1.19		51	160	5500	1800	7300	1700
8	LS	36	20	28	53	51	94		1.16		53	160	6200	2600	8800	1700
9	S	36	7	21	53	52	94		1.16		38	160	6100	2800	8900	1900
10	F	22	3	12	52	51	95		1.14		83	120	6000	1200	7200	2100
11	C	28	4	16	53	51	95	72	1.20		223	160	6700	3500	10200	2000
12	S	31	4	17			93	74	1.15		6	160	5800	1600	7400	2000
13	C	19	3	11			94		1.07		7	120	5900	1200	7100	2200
14	F	17	1	9	53	51	95		1.20		127	160	3100	600	3700	2100
15	C	21	7	14	52	49	91		1.16		31	160	5500	4500	10000	2300
16	C	12	-6	3	51	48	93		1.27		52	160	6000	2200	8200	2300
17	C	14	-2	6			93		1.11		42	120	6100	1200	7300	2300
18	C	20	6	13	51	48	94		1.10		48	160	6500	600	7100	2200
19	F	37	17	27			95		1.07		7	120	5400	3100	8500	1500
20	LR	38	36	37			96		1.01		10	160	4900	3000	7900	1400
21	R	54	36	45	52	51	96	61	1.24		51	120	4900	2700	7600	1100
22	S	50	9	29	52	52	92	62	1.23		70	160	5400	2300	7700	1700
23	F	22	4	13	52	51	92		1.22		47	160	5300	1900	7200	1800
24	S	27	10	18	52	51	93		1.23		44	160	6100	1500	7600	2000
25	S	26	7	16	52	51	94		1.22		38	160	6300	200	6500	2000
26	S	22	10	16			95		1.19		4	120	5100	3600	8700	2200
27	F	23	11	17			95		1.11		10	160	4900	3900	8800	2100
28	S	30	21	25	51	50	94		1.22		87	160	4400	3100	7500	2500
29	LS	30	18	24	52	50	95		1.16		48	160	5600	0	5600	1900
30	C	25	15	20	52	50	96		1.17		37	160	6000	0	6000	1700
31	C	22	18	20	52	51	96	62	1.17		41	120	6800	0	6800	1700
Total									36.21		1380	4560	178500	59200	237700	59800
Max.		54	36	45	53	52	96	80	1.24		223	160	6800	3900	10200	2500
Min.		12	-6	3	51	48	91	61	1.01		3	120	3100	0	3700	1100
Av.				20	52	51	94	71	1.17		44.5	147	5758	1910	7668	1929

REMARKS: Heat exchanger blew sludge gasket on 14th at 3 p.m. Back in service 11 a.m. on 15th.
Green sewage at 3 p.m. on 21st.
(light) Green sewage at 1 p.m. on 28th
Very heavy, black sewage at 10 a.m. On 29th.

PREPARED BY R.D. Craun, Chief Operator

DATE FEbruary 4, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	728	548	140	84.3	56	85.7	160	98	7.7	7.4	7.5	7.4	6.1		
3	* 736	584	179	80.4	58	88.0	156	74	7.6	7.2	7.5	7.4	6.1	7.0	7.5
4	760	616	173	87.9	71	87.3	183	86	7.8	7.5	7.6	7.3	6.1	7.0	7.1
5															
6															
7	872	582	229	77.7	54	81.5	186	76	7.7	7.5	7.5	7.2	6.2	6.8	7.1
8	682	570	128	86.7	52	90.4	190	77	7.6	7.5	7.5	7.4	6.1	7.0	7.1
9	628	598	118	88.1	53	92.5	108	69	7.7	7.5	7.5	7.4	6.1	7.0	7.1
10	818	564	137	92.0	45	95.6	132	66	7.7	7.5	7.5	7.2	6.1	6.9	7.1
11	*1050	676	402	82.6	72	94.4	256	95	7.6	7.5	7.5	7.3	6.0	7.1	7.4
12															
13															
14	730	580	204	82.4	80	85.0	165	107	7.7	7.5	7.5	7.3	5.8	6.9	
15	692	552	158	88.6	46	93.5	156	76	7.6	7.5	7.4	7.4	6.0	6.9	7.1
16	762	604	158	85.4	58	88.0	175	87	7.6	7.5	7.4	7.4	6.0	7.0	7.1
17	* 734	570	143	84.6	52	94.7	175	80	7.6	7.5	7.5	7.4	6.1	7.2	7.3
18	760	654	139	86.9	59	84.3	153	90	7.6	7.5	7.5	7.4	6.1	6.8	7.3
19															
20															
21	1146	600	271	78.6	62	83.9	189	87	7.7	6.9	7.5	7.2	6.1	7.0	7.0
22	782	532	143	80.4	69	68.1	157	75	7.6	7.3	7.5	7.4	6.1	7.0	7.1
23	688	592	117	82.1	61	82.0	137	92	7.6	7.5	7.6	7.4	5.8	6.9	7.1
24	* 718	618	143	90.9	57	87.7	117	72	7.6	7.5	7.5	7.4	6.0	6.9	7.3
25	820	610	148	83.8	72	86.1	143	84	7.6	7.5	7.5	7.4	6.1	6.9	7.1
26															
27															
28	754	598	233	85.8	63	85.7	177	97	7.7	7.5	7.6	7.4	6.0	7.0	7.1
29	906	574	359	83.0	58	87.9	267	84	7.6	7.5	7.5	7.4	6.1	7.0	7.2
30	674	558	117	89.7	52	88.5	117	71	7.6	7.5	7.6	7.5	6.1	7.1	7.1
31	* 706	570	134	84.3	51	90.2	131	76	7.6	7.5	7.5	7.3	6.0	7.1	7.3
Total															
Max.	1146	676	402	92.0	80	95.6	267	107	7.8		7.6		6.2	7.8	7.5
Min.	628	532	117	77.7	45	68.1	108	66		6.9		7.2	5.8	6.8	7.0
Av.	779	589	181	84.8	59	87.3	165	83	7.5		7.4		6.0	7.0	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	779	235242	589	177866	190	57376	24.4
SUSPENDED SOLIDS	181	54658	59	17817	122	36841	67.4
5 DAY B.O.D.	165	49827	83	25064	82	24763	49.7

* Supernate in Effluent but not in Raw.

Heavey black sewage starting at 10 am on 11th. 29th.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 7, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1957 — SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	Dig. No.
1	1768												
2	2210	3.9		85.5									
3	2652	4.0		83.6		15690	1.52		57.9		15690	.38	2
4	1989	3.6		79.5									
5	1768												
6	1326												
7	2652	3.7		81.3									
8	3094	3.0		78.5									
9	2431	3.2		81.4									
10	3094	2.8		73.2									
11	1768	4.2		78.3		16580	1.32		67.8		16580	.65	2
12	1326												
13	1989												
14	1989	3.6		85.0									
15	1768	4.0		78.8									
16	2431	3.7		77.4									
17	1326	2.8		83.8		12600	1.56		63.9		12600	.39	2
18	2873	4.3		74.5									
19	1547												
20	1989												
21	2431	2.8		81.1									
22	2652	3.5		76.6									
23	1768	3.7		81.5									
24	2873	4.1		73.7		16350	1.28		63.7		16350	.37	2
25	2210	4.1		80.4									
26	1768												
27	2210												
28	2431	2.1		78.3									
29	2431	3.6		76.6									
30	2652	3.2		81.1									
31	1768	3.4		83.0		15910	1.62		64.0		15910	.46	2
Total	67184		19987		15920	77130		9572		6078	77130		
Max.	3094	4.3		85.5		16580	1.62		67.8		16580	.65	
Min.	1326	2.1		73.2		0	1.28		57.9		0	.37	
Av.	2167	3.5	645	79.7	514	2488	1.46	309	63.5	196	2488	.45	94

REMARKS: 8.5 lb/gal for sludge, 8.4 lb/gal for supernate.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 7, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3	34	13.0		3.2	Same	12.8		3.1
4								
5								
6								
7								
8	35	12.2		2.6		12.2		3.2
9	36	11.9		2.3		12.0		2.8
10	No samples, heavy snow							
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22	38	10.1		3.8		10.2		4.1
23	32	11.6		3.5		11.6		3.8
24	33	12.0		3.2		12.2		3.6
25								
26								
27								
28								
29	33	11.6		3.0		12.2		3.6
30	34	12.0		2.3		12.0		3.0
31	33	12.2		2.2		12.1		3.5
Total								
Max.	38	13.0		3.8		12.8		4.1
Min.	32	10.1		2.2		10.2		2.8
Av.	34	11.8	83.1	2.9		11.9	83.8	3.4

COMMENTARY

The plant operated without interruption throughout the month and produced an effluent of good quality at all times.

Green sewage was observed on the 21st and 28th. That on the 21st was quite strong and lasted for about 15 minutes. That of the 28th was not seen in the raw sewage but the settling tanks had a green tinge when we arrived at 8 am. On several occasions we had periods of an hour or so of heavy black sewage. On the 29th it was so black and heavy at 10 am that it appeared to be mostly sludge and we checked the inlet sewer to make sure that it was actually coming from that source These conditions are believed to be due to accumulations released from obstructed sewers when they are cleaned.

Condensate in the digester gas is very troublesome. One of the new meters is already inoperative and has been removed from service for repairs. Altho there is provision for draining the cases from the bottom, the upper section fills and the meter has to be removed from the line and dumped every day or so. The gummy residue which accompanies the moisture soon interfere with the operating mechanisms

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	C	30	8	19	52	51	96	66	1.17		30	160	68	00	68	19
2	C	34	20	27			97		1.15		7	160	68	0	68	18
3	F	44	22	33			94	68	1.07		7	120	66	0	66	16
4	F	32	14	23	51	50	96		1.20		55	160	61	0	61	14
5	F	36	14	25	52	52	94	68	1.17		53	160	78	0	78	17
6	C	45	28	36	52	52	92	71	1.20		46	160	70	0	70	15
7	C	37	22	29	52	51	96		1.20		70	160	69	0	69	14
8	R	41	32	36	52	51	93	77	1.21		66	160	74	0	74	14
9	C	42	32	37			95		1.19		12	120	58	7	65	15
10	SL	37	19	28			97		1.14		18	160	72	9	81	19
11	F	32	20	26	52	51	94	77	1.25		80	160	69	0	69	12
12	S	36	18	27	51	50	96		1.23		65	160	54	47	101	18
13	S	42	19	30	51	52	97		1.25		63	160	65	15	80	14
14	F	30	9	19	51	50	94	77	1.21		308	160	67	0	67	20
15	C	36	16	26	51	51	98		1.23		47	160	59	16	75	19
16	S	31	18	24			99		1.20		14	120	69	23	92	21
17	C	32	18	25			95	74	1.12		14	160	52	0	52	20
18	F	40	14	27	52	51	98	72	1.24		52	160	58	24	82	15
19	F	26	12	19	51	49	96	74	1.22		36	160	61	11	72	19
20	F	30	14	22	51	51	94	76	1.22		35	120	56	13	69	17
21	F	42	20	31	51	51	97		1.21		37	160	60	7	67	12
22	C	46	32	39	52	51	98	76	1.20		26	160	65	7	72	17
23	C	42	32	37			95	77	1.16		11	160	60	3	63	14
24	C	54	38	46			100		1.06		6	120	64	1	65	11
25	R	62	46	54	53	51	97	79	1.17		71	160	69	6	75	8
26	R	46	20	33	52	51	94	81	1.18		47	160	65	12	77	21
27	F	30	16	23	50	49	97		1.19		48	160	55	23	78	21
28	F	38	17	27	51	50	98	80	1.19		40	160	63	18	81	19
29																
30																
31																
Total									33.23		1364	4280	1795	242	2037	459
Max.		62	46	54	53	52	100	80	1.25		308	160	78	47	101	21
Min.		26	8	19	50	49	92	66	1.06		6	120	52	0	52	8
Av.		38	21	29	52	51	96	75	1.19		49	150	64	9	73	16

REMARKS: Green sewage 3:00 p.m. on 20th- weak about 10 minutes
Green sewage 3:00 p.m. on 21st- stronger about 15 minutes.

PREPARED BY R.D. Craun Chief Operator

DATE Mar. 4th, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PPM PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE MAXIMUM	PH. DATA RAW SEWAGE MINIMUM	PH. DATA PLANT EFFLUENT MAXIMUM	PH. DATA PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	1338	592	143	87.4	57	94.7	149	77	7.6	7.5	7.5	7.4	6.1	6.9	7.0
2															
3															
4	1028	612	378	83.1	60	81.7	226	76	8.4	7.5	7.5	7.2	6.0	6.9	7.0
5	710	574	137	86.1	54	87.0	140	84	7.6	7.5	7.5	7.5	6.1	6.9	7.0
6	722	596	122	84.4	54	87.0	103	59	7.6	7.5	7.7	7.5	6.0	7.0	7.1
7	* 724	634	137	86.3	60	83.3	136	77	7.7	7.6	7.6	7.4	6.0	7.0	7.3
8	720	582	133	92.5	67	86.6	113	74	7.6	7.6	7.6	7.4	6.1	6.7	7.0
9															
10															
11	768	566	224	82.1	65	80.0	149	74	8.0	7.5	7.5	7.4	5.8	6.8	6.9
12	828	590	152	78.3	55	83.6	126	68	7.7	7.6	7.5	7.4	6.2	6.9	7.0
13	* 666	556	165	80.6	58	79.3	108	64	7.6	7.4	7.5	7.4	5.9	7.0	6.9
14	870	612	175	88.6	49	95.9	100	53	7.7	7.6	7.6	7.4	6.2	6.9	7.1
15	706	596	153	87.6	54	94.4	92	56	8.0	7.5	7.6	7.5	6.1	6.9	7.0
16															
17															
18	780	548	196	83.2	56	89.3	121	65	9.1	7.4	7.5	7.3	6.0	7.1	7.1
19	776	526	155	83.2	47	83.0	101	61	7.7	7.5	7.5	7.3	6.1	6.8	6.9
20	862	540	156	87.8	50	84.0	89	46	7.7	7.5	7.5	7.4	6.2	7.0	7.1
21	* 720	544	149	81.2	66	71.2	96	56	7.7	7.0	7.6	7.4	6.1	7.0	7.1
22	762	630	145	80.7	70	84.3	96	61	7.7	7.6	7.6	7.4	6.0	7.0	7.0
23															
24															
25	868	540	202	84.2	56	87.5	186	79	7.7	7.4	7.5	7.3	6.0	7.0	7.0
26	712	548	161	72.0	59	78.0	124	76	7.6	7.5	7.4	7.3	6.2	6.8	7.1
27	994	576	185	87.6	55	83.8	207	73	7.7	7.3	7.5	7.4	6.1	6.9	7.0
28	* 700	576	167	86.2	62	82.3	137	67	7.6	7.5	7.6	7.4	6.0	7.0	7.3
29															
30															
31															
Total															
Max.	1338	634	378	92.5	70	95.9	226	84	9.1		7.7		6.2	7.1	7.3
Min.	666	526	122	72.0	47	71.2	89	46		7.0		7.2	5.8	6.8	6.9
Av.	813	577	172	84.2	58	84.8	130	67	7.6		7.5		6.1	6.9	7.0

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	813	225307	577	159904	236	65403	29.0
SUSPENDED SOLIDS	172	47666	58	16074	114	31592	66.3
5 DAY B.O.D.	130	36027	67	18568	63	17459	48.5

* Supernate in Eff. but not in Raw.

PREPARED BY R. D. Craun, Chief Operator

DATE March 6 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....February,...1957 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate from # 2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	3094	3.7		78.0									
2	1768												
3	2431												
4	2873	3.8		79.2									
5	2210	3.7		81.6									
6	3094	3.9		80.8									
7	1989	3.3		82.1		16580	1.61		64.5		16580	.40	57.1
8	3094	3.4		86.7									
9	1768												
10	1105												
11	3315	3.9		80.4									
12	2431	3.5		84.0									
13	1105	3.8		82.1		14810	1.64		62.8		3980		
14	3315	3.9		80.4									
15	2652	3.4		79.1									
16	1326												
17	1326												
18	1989	3.8		81.8									
19	2431	3.6		81.4									
20	1989	3.5		74.4									
21	2431	3.3		84.4		18790	1.23		63.6		18790	.40	61.2
22	1105	3.8		77.8									
23	1989												
24	2210												
25	2873	3.4		80.0									
26	2652	3.6		76.6									
27	2210	4.0		77.8									
28	2873	3.3		73.9		16580	1.31		63.9		16580	.36	57.4
29													
30													
31													
Total	63648		19476		15600	66760		8131		5179	55930		
Max.	3315	4.0		86.7		18790	1.64		64.5		18790	.40	61.2
Min.	1105	3.3		73.9		0	1.23		62.8		0	.36	57.1
Av.	2273	3.6	696	80.1	557	2384	1.45	290	63.7	185	1998	.39	58.6

REMARKS: 4" con. scum to dig. on 8th. 10830 gal.(approx. 10.8" in bed) digested sludge to # 1 bed. 9.8% solids and 52.9% vol.

PREPARED BY R.D. Craun, Chief operator

DATE Mar. 4th, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February...1957... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5	34	11.8		2.4	Same	11.6		2.4
6	34	11.6		2.3		11.8		2.7
7	37	11.3		1.7		11.5		2.4
8								
9								
10								
11								
12	35	12.1		2.9		12.2		2.8
13	34	12.0		2.2		12.4		2.6
14	35	12.1		2.5		12.0		2.6
15								
16								
17								
18								
19								
20								
21	35	12.4		2.8		12.4		3.0
22	no samples, assistant ill							
23								
24								
25								
26	43	10.8		2.2		10.6		2.2
27	no samples, assistant ill							
28	"	"		"	writing exam.			
29								
30								
31								
Total								
Max.	43	12.4		2.9		12.4		3.0
Min.	34	10.8	[illegible]	1.7		10.6		2.2
Av.	36	11.8	85.5	2.4		11.8	85.5	2.8

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of good quality was produced at all times.

The total gas production figures are misleading as the waste gas meter was not placed back in service until the afternoon of the 9th. The third meter has also now been returned so we now have a spare for to use as a replacement whenever one has to be taken out of service. Condensate from the gas is still our prime nuisance item. The Pressure Regulator to the waste gas burner has been adjusted so that it operates within a differential of ½ inch of water. Originally there was a differential of 2½ to 3 inches and it often caused an unmetered escape of gas from the pressure relief on the digester cover.

Mr. Swelwell wrote the Class C Operators Certification Examination on the 28th. He is now planning on starting his military service at once and getting it over with so that he can continue his career without an interruption at an awkward time by being drafted.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE March 5 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	44	24	34	51	52	94	82	1.17		30	160	58	21	79	19
2	LS	30	12	21			97		1.16		5	120	67	6	73	24
3	F	28	12	20			94	80	1.12		11	160	58	4	62	22
4	F	34	14	24	52	50	98	77	1.23		40	160	57	11	68	18
5	F	40	24	32	51	51	94	78	1.21		293	160	57	15	72	21
6	F	46	24	35	52	51	96		1.16		37	160	57	13	70	18
7	C	24	18	21	51	50	98	77	1.15		27	160	60	6	66	20
8	F	40	16	28	52	52	95	80	1.18		43	160	60	7	67	15
9	F	38	17	27			98		1.14		4	120	53	8	61	15
10	F	46	26	36			94	78	1.08		10	160	51	10	61	12
11	R	56	36	46	52	52	97		1.27		50	160	45	22	67	13
12	F	56	38	47	52	52	94	77	1.22		90	160	57	7	64	6
13	F	68	39	53	53	54		81	1123		75	160	64	26	90	9
14	F	70	32	51	53	54	94		1.27		30	160	55	37	92	11
15	C	39	30	34	51	50	96		1.24		37	120	62	27	89	20
16	C	42	24	33			92	78	1.21		15	160	50	32	82	13
17	F	47	27	37			94		1.14		18	160	63	13	76	12
18	R	41	29	35	51	50	96	75	1.29		26	160	48	48	96	14
19	C	38	22	30	51	50	96		1.29		18	160	55	35	90	28
20	LS	36	32	34	50	49	94	75	1.27		259	160	59	18	77	20
21	F	49	30	38	52	53	96		1.29		87	160	74	23	97	11
22	F	52	26	39	52	53	93	79	1.28		20	160	68	47	115	15
23	F	55	30	43			96		1.23		8	160	73	10	83	7
24	F	48	24	36			94	81	1.16		14	160	66	8	74	16
25	S	35	31	33	52	50	97		1.30		57	160	62	14	76	22
26	S	38	31	34	52	50		79	1.26		108	160	71	9	80	21
27	C	48	24	36	52	51		81	1.27		66	160	65	5	70	11
28	LS	47	30	39	51	52	97		1.27		42	160	78	28	106	17
29	R	44	24	34	51	52		85	1.24		23	160	74	16	90	20
30	F	48	26	37			98		1.24		5	120	69	4	73	12
31	F	56	36	46			98	84	1.16		9	160	61	0	61	11
Total									37.73		1557	4800	1897	530	2427	495
Max.		70	39	53	53	54	98	85	1.30		293	160	78	48	115	28
Min.		24	12	20	50	49	92	75	1.08		4	120	45	0	61	6
Av.		45	26	35	52	51	96	79	1.22		50	155	61	17	78	16

REMARKS: Green sewage at noon on 5th. At 3:30 on 28th
Red sewage 2 pm on 19th and 3 pm on 26th(Tuesdays) besides usual on Friday

PREPARED BY R. D. Craun, Chief Operator

DATE April 3, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	734	572	155	94.6	61	88.5	131	70	7.6	7.5	7.5	7.3	662	7.0	7.1
2															
3															
4	804	612	203	86.2	61	88.5	178	86	7.6	7.5	7.5	7.4	5.9	6.9	7.0
5	718	542	128	91.4	55	89.1	119	66	7.6	7.3	7.5	7.4	6.0	6.9	7.1
6	678	586	119	85.7	51	92.2	164	79	7.6	7.4	7.5	7.3	5.9	6.9	7.0
7 *	678	564	129	88.4	56	83.9	236	76	7.6	7.5	7.5	7.2	6.0	6.9	7.2
8	848	584	155	79.4	62	80.6	164	79	7.5	7.4	7.4	7.3	6.0	6.9	7.0
9															
10															
11	982	538	284	66.9	62	83.9	164	81	7.7	7.6	7.5	7.2	6.0	6.9	7.1
12	1080	610	304	76.3	53	94.3	195	77	7.7	7.3	7.6	7.3	6.1	6.9	7.1
13	678	604	118	87.3	63	77.8	145	86	7.8	7.4	7.5	7.4	6.0	6.7	7.0
14	958	598	172	90.1	55	94.6	155	76	7.6	7.3	7.5	7.2	6.0	6.8	7.0
15	640	576	133	96.2	50	96.0	131	76	7.6	7.4	7.4	7.3	5.9	6.8	7.0
16															
17															
18	716	550	192	84.9	64	81.3	167	83	7.5	7.4	7.4	7.2	5.9	6.9	7.0
19	614	532	102	92.1	53	90.6	125	75	7.6	7.4	7.5	7.3	6.0	6.8	7.0
20	780	588	177	85.3	58	89.7	175	77	7.6	7.3	7.5	7.2	5.9	6.8	7.0
21 *	852	696	179	85.5	78	88.7	140	87	7.5	7.3	7.6	7.3	6.1	6.8	7.0
22	690	574	147	85.0	56	91.1	136	71	7.5	7.5	7.4	7.2	6.0	6.8	7.1
23															
24															
25	808	594	197	80.9	62	82.5	173	88	7.6	7.4	7.4	7.1	5.9	6.9	7.0
26	670	538	193	89.1	67	88.6	133	86	7.5	7.4	7.4	7.2	6.0	7.0	7.1
27	754	534	175	82.3	52	84.6	157	74	7.5	7.4	7.4	7.2	6.1	7.0	7.1
28 *	628	546	155	89.0	62	91.9	118	73	7.5	7.2	7.5	7.2	6.1	6.9	7.0
29	664	616	118	91.5	58	87.9	91	67	7.6	7.5	7.5	7.3	6.2	7.0	7.1
30															
31															
Total															
Max.	1080	696	304	96.2	78	96.0	236	88	7.8		7.6		6.2	7.0	7.2
Min.	614	532	102	66.9	50	77.8	91	66		7.2		7.1	5.9	6.7	7.0
Av.	761	576	168	86.1	59	87.9	152	78	7.5		7.4		6.0	6.9	7.0

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	761	239464	576	181250	185	58214	24.3
SUSPENDED SOLIDS	168	52865	59	18566	109	34299	64.9
5 DAY B.O.D.	152	47830	78	24544	74	23286	48.7

* Supernate in Eff. but not in raw

PREPARED BY R. D. Craun, Chief Operator

DATE April 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...March..1957..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					[redacted] Supernate of # 2		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2431	3.6		80.0									
2	1989												
3	1989												
4	2431	3.0		78.0									
5	2652	3.3		80.5									
6	2210	3.3		81.8									
7	1989	3.1		79.5		15690	1.26		62.9		15690	.39	54.3
8	2431	3.4		81.8									
9	1768												
10	2431												
11	2431	3.2		79.1									
12	2431	3.9		79.2		11710	1.46		60.4		4860		
13	2210	3.0		75.6									
14	1989	3.3		80.4									
15	4420	3.5		75.6									
16	1768												
17	1989												
18	3094	3.2		75.6									
19	2431	3.2		80.5									
20	3315	3.2		81.6		21660	1.53		62.3		21660	.42	58.2
21	2210	3.2		79.5									
22	3315	3.4		72.0									
23	1105												
24	1989												
25	1547	3.4		76.1									
26	2431	3.9		80.0									
27	2873	3.5		80.4		17020	1.44		62.9		17020	.46	59.1
28	2210	4.3		82.3									
29	3315	3.3		86.5									
30	1105												
31	884												
Total	71383		20630		16360	66080		7882		4895	59230		
Max.	4420	4.3		86.5		21660	1.53		62.9		21660	.46	59.1
Min.	884	3.0		72.0		0	1.26		60.4		0	.39	54.3
Av.	2303	3.4	665	79.3	528	2031	1.42	254	62.1	158	2820	.42	57.2

REMARKS: 6850 gal.(Approx. 9.13 in. on bed) digested sludge from # 2 on the 12th. It was 9.3% Solids and 56.4% Vol. Solids. pH 7.1
Pumped 1770 gal. (4 in. in digester) of scum to digester #1 on 13th.
Pumped 1320 gal. (3 in. in digester) of scum to digester #1 on 21st.

PREPARED BY R. D. Craun, Chief Operator

DATE April 4, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5	36	13.0		3.0	Same	13.0		3.2
6	38	12.4		2.4		12.6		3.0
7	39	12.5		2.6		12.6		3.1
8								
9								
10								
11								
12	42	11.0		3.1		11.2		3.4
13	44	10.4		2.6		10.6		2.8
14	46	10.6		2.3		10.6		2.6
15								
16								
17								
18								
19	40	12.0		2.6		12.2		3.0
20	38	12.4		2.8		12.6		3.4
21	38	13.0		2.8		13.2		3.4
22								
23								
24								
25								
26	39	12.2		3.8		12.0		3.4
27	39	13.2		3.6		13.0		3.8
28	41	13.4		3.8		13.2		3.8
29								
30								
31								
Total								
Max.	46	13.4		3.8		13.2		3.8
Min.	36	10.4		2.3		10.6		2.6
Av.	40	12.2	93.8	3.0		12.2	93.8	3.2

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of good quality was produced at all times.

Green sewage was observed on the 5th and 28th and flowed for a slightly longer period than usual. In addition to the usual Friday shots of red sewage it appeared Tuesdays on the 19th and 26th. There were also hairs that appeared to be hog bristles in the flo and it is now believed that a slaughte house is operating on a limited extent.

Mr. Swalwell, the assistant operator, has decided to get his military service overwith and has enlisted in the Marines for two years. His leave of absence started on the 25th. Mr. David Sebring was employed on the 15th to fill the vacancy. Mr. Sebring has his military obligations completed and believes that he would like to make this field his career.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE April 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...April 1957..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	R	48	24	36	52	51	100		1.28		54	120	52	19	71	11
2	F	46	28	37	53	52	96	83	1.25		50	160	73	5	78	17
3	LS	39	30	35	52	51	94	84	1.27		29	160	69	6	75	21
4	R	45	35	40	52	51	97	86	1.30		52	160	76	31	107	18
5	R	56	24	40	52	51	96	86	1.42		155	200	76	9	85	19
6	C	38	30	34			100		1.38		10	160	71	4	75	18
7	S	42	32	37				84	1.33		6	120	68	0	68	20
8	C	38	20	29	52	51	96	87	1.30		186	160	72	0	72	10
9	LS	46	22	34	52	51	93	88	1.43		37	160	71	5	76	15
10	F	50	34	42	52	53	96		1.42		93	160	72	17	89	7
11	LS	45	33	39	51	53	98	83	1.35		32	160	78	25	103	15
12	LS	35	20	27	51	52		86	1.33		32	160	74	7	81	21
13	LS	38	22	30				88	1.32		1	120	67	0	67	20
14	C	41	21	31			100		1.24		9	160	67	1	68	18
15	F	54	33	43	52	52	97	87	1.35		45	160	67	0	67	8
16	LR	52	34	43	52	51	94	88	1.32		46	160	71	6	77	11
17	R	56	48	52	52	52	98		1.37		40	120	69	11	80	10
18	F	65	51	58	52	53	100	85	1.44		39	160	72	28	100	8
19	F	80	58	69	54	56		90	1.50		28	280	71	15	86	6
20	LR	79	50	66				92	1.56		11	280	69	11	80	5
21	F	69	45	57			100		1.41		14	160	69	5	74	5
22	R	74	53	63	53	52	98	93	1.52		34	160	69	2	71	5
23	R	82	62	72	54	55	96	94	1.59		134	200	67	21	88	5
24	R	82	58	70	54	56	94	97	1.64		45	160	69	34	103	5
25	R	78	56	67	55	56	97	97	1.75		62	200	53	38	91	5
26	R	83	59	71	54	56	95		1.81		292	160	69	12	81	4
27	R	67	52	59			100	94	1.93		3	160	67	8	75	5
28	R	74	40	57			95	96	1.79		8	160	66	1	67	5
29	F	72	45	58	52	53	102		1.91		36	200	66	0	66	5
30	F	79	49	64	53	55	98	96	1.85		134	200	76	0	76	1
31																
Total									44.37		1654	5080	2076	321	2397	323
Max.		86	62	27	55	56	102	97	1.93		292	280	52	38	107	21
Min.		35	20	72	51	51	93	83	1.24		1	120	78	0	66	1
Av.		58	39	49	53	53	97	89	1.48		55	169	69	11	80	11

REMARKS: Red sewage at 10 thru 11 am and again at 2:30 on the first, foamy also. Green sewage at noon thru 2 pm on 1st. pH 6.9 during heavy concentration. Red sewage also on 5 th, 9 th, 12 th, 16 th, 19 th, 23rd, 26th, and 30th. Flow meter cable broke at 9 pm on 8th. Back in service at 12:30 on 9th, flow estimated for both days.

PREPARED BY R. D. Craun, Chief Operator

DATE May 2, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..April...1957..... SHEET NO. 2

DATE		TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
		RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1		746	520	221	88.2	63	84.1	163	72	7.5	7.3	7.4	7.2	6.1	7.0	7.1
2		844	552	193	82.9	70	84.3	142	68	7.5	6.9	7.4	7.2	5.8	7.0	7.1
3		842	544	160	81.9	70	79.4	146	71	7.7	7.4	7.4	7.3	5.9	7.1	7.1
4	*	712	534	162	80.3	75	88.0	104	60	7.6	7.5	7.5	7.4	6.2	7.0	7.1
5		700	540	246	60.6	70	75.7	120	68	7.6	7.4	7.5	7.4	6.0	6.9	7.1
6																
7																
8		792	524	277	75.8	59	83.1	160	65	7.7	7.5	7.4	7.3	6.1	7.0	7.1
9		652	636	136	86.8	66	94.0	113	73	7.5	7.4	7.5	7.3	6.2	7.0	7.2
10		682	538	155	87.7	55	89.1	137	69	7.6	7.4	7.5	7.2	6.0	6.9	7.1
11	*	632	554	149	80.5	65	84.6	110	63	7.6	7.4	7.5	7.3	6.2	7.0	7.1
12		738	548	140	90.0	57	87.7	89	49	7.6	7.5	7.5	7.2	5.9	6.8	7.2
13																
14																
15		822	554	317	82.0	66	78.8	159	74	7.6	7.2	7.4	7.1	6.0	6.9	7.0
16		664	540	135	87.7	55	83.6	107	62	7.5	7.4	7.4	7.2	6.0	7.0	7.1
17		638	568	182	84.6	55	81.8	103	63	7.5	7.2	7.4	7.3	6.0	7.0	7.1
18	*	694	564	205	85.9	80	86.3	139	67	8.5	7.4	7.4	7.2	5.9	7.1	7.1
19		682	536	191	88.0	73	91.9	126	62	7.6	7.4	7.5	7.2	5.9	7.0	7.1
20																
21																
22		816	524	184	83.2	58	84.5	154	70	7.6	7.4	7.4	7.2	5.9	6.9	7.1
23		734	586	195	79.0	61	82.4	112	71	7.5	7.4	7.5	7.2	5.8	7.0	7.1
24		828	622	330	62.8	81	66.7	126	80	7.6	7.3	7.4	7.2	5.7	7.1	7.2
25	*	954	536	442	35.3	62	67.7	116	55	7.6	7.4	7.4	7.3	6.0	7.1	7.2
26		790	560	197	87.8	63	85.7	152	71	7.7	7.5	7.5	7.4	6.2	7.0	7.2
27																
28																
29		654	520	138	82.6	54	88.9	115	58	7.6	7.5	7.4	7.2	6.1	7.1	7.2
30		934	544	147	85.0	52	80.8	122	60	7.5	7.1	7.4	7.2	6.1	7.1	7.2
31																
otal																
Max.		954	636	442	90.0	81	94.0	163	80	8.5		7.5		6.2	7.1	7.2
Min.		632	520	135	35.3	52	66.7	89	49		6.9		7.1	5.7	6.8	7.0
Av.		752	552	205	79.9	64	83.1	128	66	7.5		7.4		6.0	7.0	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	752	278270	552	204262	200	74008	26.6
SUSPENDED SOLIDS	205	75858	64	23683	141	52175	68.8
5 DAY B.O.D.	128	47365	66	24423	62	22942	48.4

* Supernate in Eff. but not in raw.

PREPARED BY R.D.Craun, Chief Opr.

DATE May 6, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...April...1957..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate from 2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2873	3.4	80.9	80.9									
2	2431	4.2		80.0									
3	3094	4.5		83.6									
4	1989	4.5		81.8		15910	1.16		66.6		15910	.49	56.6
5	2873	4.1		80.4									
6	1326												
7	1768												
8	2873	3.9		77.4									
9	2652	4.6		72.2									
10	2210	4.4		75.0									
11	2431	4.4		71.9		17680	1.12		62.6		17680	.33	54.4
12	2210	3.1		78.4									
13	1326												
14	1547												
15	1768	3.5		79.5									
16	3094	4.8		77.8									
17	2210	4.0		78.8									
18	1989	4.0		80.8		13480	1.31		63.3		13480	.52	61.8
19	2210	4.7		78.6									
20	2210												
21	1547												
22	2873	3.3		80.8									
23	3094	sample spilled											
24	3315	4.9		74.3									
25	2510	6.9		65.3		21290	1.40		61.3		12940	.39	55.2
26	1547	6.8		61.1									
27	663												
28	1768												
29	2210	6.1		63.4									
30	2652	6.7		64.4									
31													
Total	67263		26300		21855	68360		7178		4558	60010		
Max.	3315	6.9		83.6		21290	1.40		66.6		15910	.52	61.8
Min.	663	3.1		61.1		0	1.12		61.3		0	.33	54.4
Av.	2242	4.6	877	75.5	729	2279	1.25	239	63.5	152	2000	.43	57.0

REMARKS. 2½ in.(1100 gal.) scum to #1 digester on 10th.
11 inch fill in # 5 drying bed (8250 gal.) 9.2% solids or 6527 lb. dry solids, and 53.8% vol. or 3805 lbs. volatile solids.

PREPARED BY R. D. Craun, Chief Operator

DATE May 3, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..April 1957..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1	~~45~~	~~11.0~~		~~2.8~~	~~same~~	~~11.0~~		~~3.0~~
2	45	11.0		2.8	same	11.0		3.0
3	44	10.4		2.5		10.6		2.8
4	40	11.4		2.6		11.4		3.0
5								
6								
7								
8								
9	37	12.0		3.2		12.0		3.2
10	38	12.0		3.4		12.2		3.0
11	43	11.8		2.6		11.8		2.8
12								
13								
14								
15								
16	44	11.6		2.4		11.8		2.8
17	46	10.2		2.1		10.2		2.4
18	47	9.4		1.6		9.6		1.8
19								
20								
21								
22								
23	59	8.8		1.8		8.8		2.2
24	64	9.2		2.9		9.0		2.9
25	64	9.0		2.8		8.6		2.8
26								
27								
28								
29								
30								
31								
Total								
Max.	64	12.0		3.4		12.2		3.2
Min.	37	8.8		1.6		8.8		1.8
Av.	49	10.6	93.0	2.6		10.6	93.0	2.7

COMMENTARY

All treatment units were in continueous service throughout the month and an effluent of good quality was produced at all times. Although we have primarily a separate sanitary collection system, some storm water and much more infiltration occurrs during heavy rainfalls. Consequently, our flow from mid-month on, increased about 25% and we had temporary peaks at rates up to 3.75 M.G.D. It was interesting to note that our effluent maintained it's normal level in BOD and S. Solids, indicating that we have a capacity for good treatment at a much greater rate of flow.

There wes one heavy concentratic and a couple of trace indications of green sewage. It has been pretty well established that our red sewage has its origin from a small pork processing plant. They are slaughtering on Tuesdays as well as on Fridays now, but are still not of enough consequence to be of any concern to our treatment.

The flow meter wes out of service from 9 pm on the 8th until 12:30 pm on the 9th due to a broken cable. The flow for both days had to be estimated.

The County Health Dept. brought a group of college students to inspect the plant on the 29th. This is the first such group this season. They generally average a group or two a month from early spring until late in the fall.

REMARKS:

PREPARED BY R. D. Craun, Chief Opr.

DATE May 6, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....May...1957..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	84	42	62	54	55	100		1.79	38	35	160	81	1	82	2
2	F	58	32	45	53	54		101	1.72		21	160	4	94	98	7
3	F	48	37	42	53	53	94		165		35	160	81	10	91	12
4	F	58	32	45			98		1.65		7	160	70	7	77	10
5	F	62	36	49			97	96	1.59		12	160	65	0	65	4
6	F	72	34	53	54	55	96	99	1.68		36	160	67	5	72	4
7	F	77	52	65	54	56	99		1.67		48	160	66	8	74	2
8	F	80	58	69	54	56		97	1.71		20	160	79	2	81	1
9	R	80	62	71	55	56		101	1.71		75	160	25	62	87	2
10	R	68	53	60	54	54	96		1.64		17	120	55	29	84	1
11	R	66	52	59			97		1.59		3	160	60	2	62	4
12	F	71	55	63				96	1.54		17	160	59	0	59	1
13	R	76	60	68	55	55	100		1.74		70	160	3	59	62	4
14	R	82	60	71	56	57	96		1.75		122	160	3	68	71	4
15	C	64	36	50	55	55	92		1.65	43	1850	160	49	20	69	10
16	F	64	42	53	55	56	95		1.59	67	3260	160	73	5	78	8
17	R	50	44	47	56	56	100	88	1.60	56	2130	160	73	18	91	15
18	R	52	44	48				92	1.64	53	1170	160	77	0	77	16
19	R	48	44	46				94	1.71	54	2190	160	78	0	78	17
20	C	54	47	50	54	53	100		1.77	59	2180	160	78	3	81	8
21	C	70	50	60				94	1.78	59	2150	160	80	4	84	3
22	F	82	64	73	56	57		97	1.84	62	2170	160	88	14	102	5
23	R	74	46	60				100	1.77	56	2170	160	84	14	98	3
24	F	74	50	62	55	57	101		1.72	60	2170	120	23	37	60	4
25	R	64	64	64			100		1.76	52	2180	160	* 3	36	39	5
26	C	75	49	62			96		1.68	55	2200	160	77	9	86	4
27	C	78	38	58	55	56	95	97	1.73	74	2150	160	75	6	81	7
28	F	76	48	62	56	57	100		1.77	75	2200	160	25	49	74	7
29	F	82	54	68	56	57	98		1.73	59	2490	160	3	55	58	4
30	F	88	54	71			96		1.65	53	2200	160	3	76	79	4
31	F	84	64	74	59	60	94		1.79	67	2160	160	52	21	73	5
Total									52.61	1004	37532	4880	1659	714	2373	183
Max.		88	64	74	56	60	101	101	1.84	75	3260	160	88	94	102	17
Min.		48	32	42	53	53	92	88	1.54	52	3	120	3	0 *	39	1
Av.		70	48	59	55	56	97	96	1.70	59	1211	157	54	23	77	6

REMARKS: Strong green sewage 1:15 to 1:30 on the 7th, pH 6.9

* Waste gas line full of condensate and the heat exchanger was off on the 25th. Gas escaped thru pressure release and was not metered.

PREPARED BY .....R. D. Craun, Chief Operator.....

DATE.....June 5, 1957.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..... May 1957..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	634	566	170	85.3	53	81.1	103	67	9.5	7.5	7.5	7.4	6.0	7.2	7.3
2	684	538	101	91.0	51	74.5	110	66	7.6	7.5	7.5	7.4	5.9	7.2	7.3
3	636	554	106	94.2	46	93.5	110	70	7.6	7.5	7.5	7.3	5.9	7.1	7.2
4															
5															
6	748	554	229	85.2	73	78.1	152	82	8.0	7.3	7.2	7.1	6.0	6.9	7.0
7	660	554	137	83.2	53	96.2	137	63	7.6	6.9	7.4	7.1	6.1	7.0	7.0
8	650	526	204	91.7	62	83.9	139	79	7.6	7.4	7.5	7.3	6.0	7.2	7.3
9	666	536	112	85.7	56	87.5	113	68	7.7	7.5	7.5	7.4	6.1	7.2	7.3
10	672	552	136	85.3	67	80.6	116	79	7.6	7.4	7.4	7.3	6.1	7.1	7.2
11															
12															
13	702	610	182	80.2	61	80.3	153	80	7.5	7.4	7.4	7.2	5.8	7.0	7.1
14	656	572	177	87.0	77	89.6	145	85	7.5	7.4	7.5	7.2	5.6	7.0	7.1
15	762	550	171	86.0	50	88.0	130	71	7.6	7.4	7.4	7.2	6.0	7.0	7.1
16	644	558	144	84.8	63	79.4	117	77	7.6	7.4	7.4	7.3	6.0	6.9	7.1
17	722	526	151	83.4	54	83.3	142	69	7.5	7.4	7.4	7.4	6.0	6.9	7.1
18															
19															
20	718	506	160	83.1	46	82.6	133	58	7.6	7.4	7.4	7.2	5.9	7.0	7.1
21															
22	672	582	164	85.4	55	87.3	124	71	7.6	*3.4	7.4	7.2	5.9	7.1	7.2
23															
24	680	608	155	80.6	70	75.7	132	68	7.8	7.4	7.5	7.2	5.9	7.1	7.2
25															
26															
27	792	562	330	73.0	63	84.1	210	67	7.8	7.5	7.5	7.0	6.2	7.1	7.2
28	684	538	160	84.4	59	88.1	135	76	7.6	7.4	7.5	7.2	5.9	7.2	7.3
29	794	568	140		51		112	46	7.6	7.4	7.4	7.2	6.1	7.1	7.2
30															
31	886	604	310	84.5	79	82.3	207	76	7.6	7.4	7.5	7.3	6.0	7.2	7.3
otal															
Max.	886	610	330	94.2	79	96.2	210	85	9.5		7.5		6.2	7.2	7.3
Min.	634	506	101	73.0	46	74.5	103	46		* 3.4		7.0	5.6	6.9	7.0
Av.	703	559	172	84.9	60	84.0	136	71	7.5		7.4		6.0	7.1	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	703	308455	559	245272	144	63183	20.5
SUSPENDED SOLIDS	172	75468	60	26326	112	49142	65.1
5 DAY B.O.D.	136	59673	71	31153	65	28520	47.8

* Regular sample 3.4, but a recheck within 5 minutes tested normal 7.4

PREPARED BY R. D. Craun, Chief Operator

DATE June 6, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1957 SHEET NO. 3

DATE	SLUDGE HANDLING DATA													
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate from #2			
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS	
1	2210	5.6		69.2										
2	2210	3.9		69.6										
3	2652	5.5		73.3										
4	1105													
5	1547													
6	2652	3.3		77.5		6630	1.95		55.3		* 6630			
7	2431	5.0		82.5										
8	2652	5.1		76.5										
9	2210	4.8		76.3		4200	1.85		59.5		4200			
10	1989	4.1		77.8										
11	1105													
12	2210													
13	2431	3.6		81.0										
14	3094	6.4		87.7		21440	1.33		57.7		13560			
15	884	5.2		78.4										
16	2873	4.4		77.1										
17	2210	4.4		76.7		4640	1.7		61.5		4640			
18	1768													
19	2652													
20	1768	5.1		82.5										
21	2210													
22	2431	5.3		79.6		6410	1.1		61.9		6410			
23	2652													
24	1989	4.8		81.1										
25	2431													
26	2873													
27	2431	2.7		82.7		8180	1.79		60.0		8180			
28	1989	4.1		82.8										
29	1989	4.6		81.9										
30	2210													
31	2431	4.9		78.9		6190	1.05		59.1		6190			
Total	68289		26700		21013	57690		7464		4426	49810			
Max.	3094	6.4		87.7		21440	1.95		61.9		13560			
Min.	884	2.7		69.2		0	1.05		55.3		0			
Av.	2203	4.6	861	78.7	678	1861	1.54	241	59.3	142	1581			

REMARKS: Approx. 10.5 inch (8780) digested sludge to #7 drying bed on the 14th.
10.3% solids and 51.0% Vol.
4 inches in digester of concentrated scum to #1 on the 14th.
* All supernate wasted to land area

PREPARED BY R. D. Craun, Chief Operator

DATE June 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...May 1957.....

SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE				COMMENTARY
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	
1	62	8.6		2.1	same	8.6		2.1	All treatment units were again in contineous operation thrughout the month, and a effluent of good quality was produced at all times.
2	61	9.0		2.2		9.0		2.0	
3									The heavy blood flows on Tuesdays and Fridays have moderated but quite a large amount of clots are in evidence. Evidently the pork that was being slaughtered is now being processed on those days.
4									
5									
6									
7	57	10.2		2.0		11.0		2.0	Only one strong concentration of green sewage was observed although there were weak indications several othdr times. The 1 pm sample on the 22nd had a pH of 3.4 but there were no visual indications in the sewage, and a recheck within 5 minutes was back to a normal of 7.4.
8	60	10.8		2.0		10.0		2.1	
9	61	9.8		2.6		10.2		3.0	
10									
11									
12									
13									
14	63	8.8		2.4		9.2		2.6	
15	63	7.9		2.1		8.0		1.9	This operator was absent during the week of 19th thru 26th to attend the Annual Conference of the Michigan Association and to visit the plant at Frankenmuth. Mr. Sebring, the assistant operator, did a very fine job of operating alone during that time and maintained the sampling and analyses on an alternate day routine.
16	59	8.8		2.6		8.8		2.4	
17									
18									
19									
20									
21	51	9.4		3.0		9.4		2.4	
22									
23	55	8.6		1.4		9.0		2.2	
24									
25									
26									
27									
28	59	8.6		2.6		8.4		2.0	
29	59	9.6		2.6		9.6		2.8	
30									
31									
Total									
Max.	63	10.8		3.0		11.0		3.0	
Min.	51	7.9		1.4		8.0		1.9	
Av.	59	9.2	90.2	2.3		9.4	92.2	2.3	

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE June 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE				SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER					X 100	X 100	X 100	X 100
1	R	76	44	60				94	1.72	59	2180	160	66	0	66	4
2	F	72	42	57			96		1.57	58	2200	160	63	1	64	6
3	Fl	81	51	66	56	56	94	96	1.68	61	2160	160	66	0	66	4
4	F	87	54	70	58	59		98	1.69	68	2170	160	64	17	81	4
5	F	86	60	73	57	58		97	1.72	65	2160	160	22	58	80	4
6	F	83	58	70	57	58	96		1.73	64	2160	160	56	31	87	4
7	R	65	48	56	56	56	98		1.67	64	2230	160	71	4	75	1
8	F	74	48	61				96	1.59	55	2170	160	62	1	63	2
9	F	78	56	67			100	100	1.55	64	2160	160	64	10	74	5
10	F	90	70	80	57	58	100	99	1.79	66	2180	160	1	72	73	4
11	R	80	62	71	58	58	96		1.78	69	2140	160	3	82	85	5
12	R	86	66	76	58	59	94		1.79	64	2180	160	57	33	90	5
13	R	85	64	74	58	58	96	96	1.71	62	2170	160	48	37	85	5
14	R	86	68	79	58	59	98		1.89	68	2150	160	90	2	92	2
15	F	92	70	81			101		1.85	55	2580	160	* 0	38	* 38	4
16	R	99	72	85				98	1.75	63	3220	160	58	24	82	2
17	F	100	70	85	60	61	97	100	1.98	62	2170	160	2	76	78	6
18	R	90	58	74	60	61	94		1.87	65	1330	160	58	56	114	1
19	F	74	52	61	58	59	97		1.74	61	2150	160	20	72	92	3
20	F	88	62	75	59	60	97	94	1.78	58	2170	200	1	79	80	4
21	F	90	64	77	59	60		94	1.84	59	2130	120	2	105	107	4
22	R	94	70	82			92		1.89	59	2160	160	59	15	74	4
23	F	85	55	70			96	92	1.73	59	2510	160	70	9	79	4
24	R	90	58	76	59	57	95	97	1.75	61	1970	160	81	26	107	5
25	LR	79	61	70	59	59	100		1.74	64	2190	160	* 15	47	* 62	5
26	R	83	65	74	58	58	99	94	1.79	60	2160	160	75	37	112	4
27	R	78	65	71	58	59	96	98	1.84	58	2160	160	76	23	99	4
28	R	73	58	65	58	59	101		1.88	62	2150	160	22	79	101	4
29	F	78	58	68			100		1.86	59	2150	160	62	31	93	4
30	F	78	53	65			97	98	1.68	56	2180	160	* 1	49	50	5
31																
Total									52.85	1848	65630	4800	*1335	*1114	*2449	118
Max.		100	72	85	60	61	101	100	1.98	69	3220	200	90	105	114	6
Min.		65	42	56	56	56	92	92	1.55	55	1330	120	* 0	* 0	* 38	1
Av.		83	59	71	58	59	97	96	1.76	62	2188	160	* 45	* 37	* 82	4

REMARKS: * Gas venting under holder cover skirts, therefore production not metered in entirety.

Power interrouption at 11:15pm on the 13th until 2:03am on the 14th. The flow was automatically bypassed during most of this time.

PREPARED BY R. D. Craun, Chief Operator

DATE July 10, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....June...1957..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3	870	532	194	81.4	61	80.3	167	73	7.5	7.3	7.4	7.3	6.2	7.1	7.2
4	628	580	130	89.2	61	90.2	114	75	7.6	7.4	7.5	7.3	6.0	7.1	7.2
5	644	544	135	88.1	55	90.9	133	70	7.6	7.5	7.4	7.3	5.9	7.2	7.3
6	656	600	169	87.6	61	88.5	129	73	7.6	7.3	7.5	7.3	6.0	7.1	7.2
7	688	534	168	82.7	56	82.1	124	63	7.6	7.5	7.5	7.3	5.9	7.0	7.3
8															
9															
10	722	584	183	81.4	72	87.5	183	85	7.5	7.4	7.4	7.2	6.4	7.1	7.3
11	758	542	146	75.3	58	82.9	126	71	7.5	7.4	7.4	7.2	5.8	7.0	7.3
12	658	542	136	84.6	59	79.7	116	66	7.5	7.4	7.3	7.2	5.9	7.1	7.3
13	710	556	113	85.0	50	84.0	92	59	7.5	7.4	7.4	7.2	5.9	7.0	7.2
14	758	566	181	85.7	62	80.6	122	75	7.6	7.5	7.4	7.3	6.0	7.0	7.2
15															
16															
17	694	558	188	84.6	75	89.3	153	98	7.5	7.4	7.4	7.3	6.1	7.0	7.2
18	612	500	136	83.8	62	83.9	148	77	7.5	7.3	7.5	7.2		7.0	7.3
19	662	520	144	85.4	52	90.4	121	67	7.5	6.8	7.4	7.2	5.7	7.1	7.2
20	730	562	146	84.2	49	83.9	153	65	7.6	7.4	7.4	7.2	5.7	7.0	7.2
21	780	596	162	82.1	64	75.0	113	72	7.5	7.2	7.4	7.1	5.9	7.2	7.3
22															
23															
24	694	528	191	81.7	61	88.5	156	70	7.5	7.3	7.4	7.1	6.0	7.1	7.2
25	658	538	216	88.9	58	93.1	140	84	7.5	7.4	7.4	7.1	6.0	7.0	7.1
26	650	520	141	84.4	53	85.1	112	61	7.5	7.4	7.4	7.2	5.9	7.1	7.2
27	732	586	131	83.2	60	81.7	122	65	7.6	7.3	7.4	7.2	5.9	7.0	7.2
28	680	556	170	74.1	73	74.0	112	57	7.6	7.4	7.5	7.3	5.7	7.0	7.2
29															
30	~~870~~														
31															
Total															
Max.	870	600	216	89.2	75	93.1	183	98	7.6		7.5		6.2	7.0	7.3
Min.	612	500	113	74.1	49	74.0	92	57		7.3		7.1	5.7	7.2	7.1
Av.	699	552	159	83.7	60	84.6	132	71	7.4		7.3		5.9	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	699	308098	552	243305	147	64793	21.0
SUSPENDED SOLIDS	159	70082	60	26446	99	43636	62.3
5 DAY B.O.D.	132	58182	71	31295	61	26887	46.2

PREPARED BY .....R. D. Craun, Chief Operator.....

DATE.....July 15, 1957.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.... June 1957 ..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate off #2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1989												
2	1989												
3	1989	spilled											
4	1989	5.4		78.1		7070	1.52		56.3		7070		
5	1989	5.8		78.1									
6	1989	4.8		78.3		7070					7070	.28	56.6
7	1768	4.9		77.9									
8	1326												
9	1105					10970	1.05		71.4		10970		
10	2652	4.2		85.1									
11	2652	5.7		80.9									
12	1768	5.6		80.2		9500	1.42		56.7		9500		
13	2431	4.6		81.4									
14	2652	5.7		75.6									
15	1768												
16	1768												
17	2652	3.5		75.0									
18	1768					11050	1.63		73.7		2760		
19	1326	5.1		77.2									
20	1768	5.7		78.1									
21	1326	4.8		77.4									
22	2431												
23	1547												
24	1768	4.4		76.2		11490	1.55		62.5		11490		
25	2110	4.9		75.7									
26	1768	4.6		79.6									
27	2431	4.8		75.0		7070					7070		
28	2210	5.4		76.7									
29	1989												
30	2652												
31													
Total	59670		25360		19806	64220		7714		4945	55930		
Max	2652	5.8		85.1		11490	1.63		73.7		11490		
Min.	1105	3.5		75.0		0	1.05		56.3		0		
Av.	1989	5.0	845	78.1	660	2141	1.43	257	64.1	165	1864	.28	56.6

REMARKS Cleaned #1 bed on 13th. 3½" cake (13 cu.yds.), 60% moist.
Filled bed #9 on 18th. Approx.11½" fill (8290 gal.) 10.9% sol. 56.9% vol.
Scum equal to 3" in digester (1326 gal.) pumped to #1 digester on 18th.

PREPARED BY R. D. Craun, Chief Operator

DATE July 16, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...June 1957..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4	65	9.0		2.0	same	9.4		2.6
5	65	8.8		2.2		9.2		2.2
6	65	8.6		2.6		8.6		2.8
7								
8								
9								
10								
11	65	7.2		white		7.8		white
12	66	8.4		2.2		8.8		2.5
13	68	8.6		1.4		8.8		1.6
14								
15								
16								
17								
18	66	9.6		4.4		9.4		4.2
19	71	8.4		2.8		8.4		3.1
20	70	8.6		3.0		8.8		3.2
21								
22								
23								
24								
25	66	7.4		1.8		7.2		2.2
26								
27								
28								
29								
30								
31								
Total								
Max.	71	9.6		white		9.4		white
Min.	65	7.2		1.4		7.2		1.6
Av.	67	8.5	91.4	2.5	67	8.6	92.5	2.7

COMMENTARY

The plant was automatically by-passed for 2¾ hours starting at 11:15 pm on the 13th due to a power failure. Otherwise, all treatment units were in continuous service at all times and an effluent of good quality resulted from the process.

Operational duties were all of a routine nature, as was the flow and loading pattern.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE July 17, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....July 1957..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	82	56	69	58	58	93		1.74	61	2260	160	55	22	77	4
2	F	92	68	80	59	59	98	94	1.81	66	2090	160	66	31	97	5
3	C	88	68	78	59	60	96	97	1.81	64	2020	160	19	72	91	3
4	R	86	62	74			96		1.65	55	1960	160	2	64	66	4
5	F	78	56	67			94	93	1.69	64	2020	160	58	14	72	2
6	R	84	58	71			94	96	1.68	60	2020	160	57	0	57	1
7	R	92	68	80			98		1.69	61	2040	160	10	58	68	2
8	R	84	68	76	61	61	96		2.05	68	1950	160	3	64	67	6
9	F	78	52	65	61	62	94	92	1.86	67	1800	160	62	13	75	4
10	F	82	62	72	59	60	93	94	1.78	66	1890	160	61	0	61	1
11	F	88	64	76	60	62	100		1.84	61	1780	160	2	67	69	5
12	R	90	70	80	60	61	96		1.92	60	1890	160	54	17	71	5
13	R	86	62	74			94	96	1.86	55	1910	160	70	2	73	5
14	F	94	64	79			100		1.75	51	1910	160	1	73	74	5
15	F	84	56	70	61	61	97		1.85	44	1990	160	1	59	60	3
16	F	88	64	76	60	61	94		1.78	60	2040	160	1	70	71	4
17	F	88	56	72	60	61	92	92	1.79	63	2080	160	64	1	65	4
18	F	92	58	75	60	62	92	94	1.74	62	2310	160	70	30	100	4
19	F	98	66	82	60	62	96		1.78	65	2530	160	59	39	98	4
20	F	96	72	84			96	97	1.76	57	2080	160	64	27	91	4
21	F	94	74	84			100		1.63	59	2150	160	1	82	83	4
22	R	84	60	72	61	61	97		1.88	70	2120	160	2	50	52	4
23	F	74	52	63	61	62	95		1.71	72	2150	160	2	47	49	5
24	F	81	64	72	60	61	93		1.69	61	2130	200	35	19	54	4
25	F	86	62	74	59	60	94		1.67	61	2110	160	50	0	50	4
26	F	84	64	74	60	60	98		1.74	66	2160	160	16	46	62	4
27	F	90	64	77			96		1.76	54	2100	160	34	0	34	4
28	F	94	66	80				92	1.65	50	2100	160	39	0	39	4
29	F	96	66	81	62	63	96		1.80	68	2060	160	14	28	42	2
30	F	92	62	77				92	1.76	65	2080	160	19	44	63	1
31	F	89	61	75	61	62	95	92	1.70	64	2060	160	40	14	54	3
Total									54.81	1900	63790	5000	1031	1053	2084	114
Max.		98	74	84	62	63	100	97	2.05	72	2530	200	70	82	100	6
Min.		74	52	63	58	58	92	92	1.63	44	1780	160	1	0	34	1
Av.		88	63	75	60	61	96	94	1.77	61	2060	160	33	34	67	4

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Aug. 7, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...July 1957..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B O.D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	754	516	194	82.5	67	86.6	175	70	7.5	7.3	7.3	7.2	6.0	6.9	7.1
2	664	556	127	81.1	68	82.4	99	50	7.5	7.4	7.4	7.1	6.0	7.2	7.3
3	740	548	219	82.7	62	77.4	145	70	7.5	7.4	7.4	7.2	5.9	7.1	7.2
4															
5															
6															
7															
8	1132	524	431	58.5	92	57.6	224	49	7.4	7.2	7.2	7.2	6.2	7.1	7.1
9	642	562	147	83.0	72	86.1	117	82	7.4	7.3	7.3	7.2	6.0	7.0	7.1
10	612	560	114	70.2	70	65.9	77	65	7.4	7.2	7.3	7.0	5.8	7.0	7.1
11	698	540	146	70.6	533	82.0	115	63	9.9	7.4	7.5	7.2	6.1	7.0	7.1
12	726	566	157	79.6	60	85.0	108	67	7.5	6.9	7.3	6.8	5.8	7.1	7.2
13															
14															
15	632	510	143	81.8	59	90.0	131	77	7.4	7.1	7.3	7.1	5.9	7.0	7.2
16	634	538	153	84.3	62	75.8	110	73	7.6	7.4	7.4	7.3	5.9	7.1	7.2
17	612	504	121	81.0	50	86.0	90	57	7.5	7.4	7.4	7.2	5.8	7.2	7.3
18	588	536	117	82.9	59	83.1	110	66	7.5	7.4	7.4	7.2	5.8	6.9	7.1
19	732	610	191	84.8	72	76.4	145	81	7.5	7.4	7.4	7.3	5.8	7.1	7.3
20															
21															
22	824	548	325	57.5	73	82.2	169	85	7.4	7.2	7.3	7.2	5.8	7.0	7.2
23	1346	642	155	87.1	68	88.2	153	73	7.5	7.4	7.4	7.0	6.1	7.1	7.3
24	640	564	140	89.3	50	88.0	119	63	7.5	7.4	7.4	7.2	6.1	7.0	7.2
25	722	566	129	79.1	55	80.0	114	58	7.5	7.4	7.4	7.3	6.1	7.0	7.2
26	678	570	171	78.9	59	84.7	114	74	7.5	7.3	7.3	7.3	6.8	6.8	7.1
27															
28															
29	740	584	229	72.5	74	80.0	144	72	7.5	7.3	7.3	7.1	5.5	6.9	7.2
30															
31	600	523	131	88.5	53	86.6	107	70	7.5	7.2	7.3	7.1	5.7	6.8	7.3
Total															
Max.	1346	642	431	89.3	92	90.0	224	85	9.9		7.4		6.2	7.2	7.3
Min.	588	504	114	57.6	77	57.6	77	49		7.1		6.8	5.5	6.8	7.1
Av.	736	553	177	79.6	69	81.2	128	68	7.4		7.3		6.0	7.0	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	736	336440	553	252787	183	83653	24.9
SUSPENDED SOLIDS	177	80910	69	31541	108	49369	61.0
5 DAY B O.D	128	58511	68	31084	60	27427	46.9

PREPARED BY R. D. Craun, Chief Operator

DATE Aug. 7, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1957 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS — Supernate # 2 Dig. GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2210	4.6		76.7		7510					7510		
2	2431	4.3		79.0									
3	2210	4.4		79.5									
4	2431												
5	1326					8400	1.38		61.3		8400	.29	66.7
6	2210												
7	3094												
8	2873	4.6		73.0									
9	1326	6.0		65.6		13480	.95		54.5		13480		
10	1574	6.5		66.2									
11	2210	4.8		68.1									
12	1105	7.3		68.9		7510	1.47		50.0				
13	2652												
14	1547												
15	1768	3.4		77.2									
16	2652	5.7		71.5									
17	1768	5.7		74.3									
18	2873	6.5		76.7									
19	1768	5.6		78.0									
20	2210												
21	2431												
22	2210	4.9		81.3									
23	1989	4.9		74.8		24530	1.35		64.5		20990	.20	
24	1989	4.8		73.6									
25	1768	2.7		78.8									
26	1547	6.8		69.1									
27	1768												
28	2210												
29	2210	5.3		78.4									
30	1989												
31	1989	4.7		81.8									
Total	64338		27890		20890	71600		7760		4470	60550		
Max.	3094	6.8		81.8		24530	1.47		64.5		20990	.29	
Min.	1105	2.7		65.6		0	.95		50.0		0	.20	
Av.	2075	5.1	900	74.9	674	2310	1.29	250	57.6	144	1950	.25	66.7

REMARKS: Filled #1 bed on 11th, 10 inches (7510 gal.) 10.6% sol., 47.4% vol.
Filled #3 bed 4¾ in. (8540 gal., out of thick sludge) on 23rd. 5.7% sol., 59.0% vol.
Cleaned #3 bed on 11th. 4 inch cake (15 cu. yds.)
" #5 " " " 4½ " " (16½ " "). 60.6% moist, 48.8% vol.
" #7 " " 16th. 4 " " (18½ " ").
" #9 " " 25th. 4¼ " " (16¼ " "). 60.4% moist., 50.5% vol.

PREPARED BY R.D.Craun, Chief Operator

DATE Aug. 9, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2	67	8.4		1.6	same	8.2		1.8
3	71	9.0		1.9		9.4		2.3
4								
5								
6								
7								
8								
9	70	8.0		1.8		8.0		2.4
10	68	8.0		2.1		3.0		2.4
11	69	8.0		1.8		8.1		2.3
12								
13								
14								
15								
16	70	9.0		1.8		9.0		2.0
17	71	8.6		2.0		8.4		1.8
18	70	8.8		1.8		9.0		1.2
19								
20								
21								
22								
23	71	8.2		3.0		8.2		2.4
24	69	8.8		2.6		8.8		2.6
25	68	8.2		1.8		8.4		2.2
26								
27								
28								
29								
30	73	10.0		2.2		10.2		1.8
31								
Total								
Max.	73	10.0		3.0		10.2		2.6
Min.	67	8.0		1.6		8.0		1.2
Av.	70	8.6	95.6	2.0		8.6	95.6	2.1

COMMENTARY

All treatment units were in contineous service throughout the month and an effluent of good quality was produced at all times.

• Blood was in evidence in the usual quantities on Tuesdays and Fridays, but only a couple of faint traces of green sewage was observed. The one high pH of 9.9 had not visible indication in the sewage.

The operator was on vacation from the 26th and the assistant operator worked alone and operated in a very crediable manner. Sampling and the laboratory routine was placed on an alternate day schedual during the period.

Archers and anglers have commented on the merked reduction in the carp population in the river this summer and a few game fish have been taken. The river water appears clear and the black sludge bottom is practically flushed clean. The dissolved oxygen content is very high, at times even exceeding the theoretical saturation level at the temperatures recorded.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Aug. 9, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	92	66	79	62	62	92	93	1.72	64	2030	160	70	3	73	2
2	F	94	72	83			98		1.85	69	2010	200	53	26	79	1
3	R	92	68	80			96	96	1.81	60	2110	160	11	99	110	5
4	F	80	48	64			94		1.58	60	2130	120	58	21	79	4
5	F	76	48	60	60	60	100		1.64	63	2130	160	45	33	78	3
6	F	81	51	66	60	61	97	96	1.62	66	2100	160	68	17	85	1
7	F	87	56	71	60	61	97	98	1.64	63	2120	160	11	101	112	5
8	F	88	66	77	62	62	95	97	1.68	58	2100	160	46	37	83	5
9	R	91	68	79	63	64	99		1.74	67	2150	160	68	37	105	5
10	R	86	64	75			98	100	1.73	63	2080	160	9	76	85	5
11	F	90	62	76			97		1.61	65	2170	160	2	63	65	5
12	F	79	50	64	60	60	96		1.65	65	2070	160	1	76	77	3
13	F	84	64	74	61	61	92		1.61	66	2130	160	62	9	71	2
14	R	88	62	75	61	62	98		1.70	64	2130	160	53	31	84	3
15	R	88	58	73	62	64		96	1.73	66	2120	160	50	39	89	2
16	F	78	56	67	61	62	100		1.64	75	2090	200	53	35	88	2
17	F	80	56	68			94		1.65	63	2130	160	45	29	74	3
18	F	78	56	67				96	1.52	60	2140	120	1	65	66	3
19	F	81	50	65	62	63	99		1.65	68	2170	160	2	71	73	2
20	F	82	54	68	61	62	96		1.55	28	2000	160	1	64	65	3
21	F	82	56	69	61	62	94		1.56	62	2190	160	56	33	89	3
22	F	82	50	66	60	61		95	1.53	67	2100	120	54	38	92	3
23	F	84	64	74	61	62	96		1.62	68	2080	160	53	50	103	1
24	R	74	60	67			98		1.60	61	2100	160	44	53	97	2
25	F	76	51	63			100		1.49	61	2100	120	41	51	92	3
26	F	82	54	68				94	1.63	67	2120	160	43	40	83	5
27	F	73	56	64	60	61		96	1.55	68	2110	160	50	54	104	5
28	R	66	58	62	60	59	99		1.60	66	2160	160	12	88	100	1
29	R	80	64	72	61	60	97		1.73	65	2160	160	58	51	109	4
30	R	84	68	76	62	62	96	95	1.74	67	2130	160	55	54	109	3
31	R	87	70	78			99		1.70	60	2130	160	7	73	80	3
Total									51.07	1965	65490	4880	1182	1517	2699	97
Max.		94	72	83	63	64	100	100	1.85	75	2190	200	68	101	112	5
Min.		66	48	60	60	59	92	93	1.49	28	2000	120	1	3	65	1
Av.		83	59	71	61	63	97	96	1.71	63	2110	157	38	49	87	3

REMARKS: Brownish sewage at 1 oclock on 26th.

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 11, 57

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	710	568	226	83.2	73	91.8	153	85	7.4	7.1	7.4	7.0	5.6	6.9	7.1
3															
4															
5	870	568	221	80.0	67	86.6	198	95	7.5	7.4	7.4	7.2	6.0	7.0	7.1
6	744	566	198	80.8	64	86.0	127	66	9.7	7.2	7.4	7.1	5.8	7.2	7.3
7	764	620	183	81.4	61	75.4	131	60	7.5	7.3	7.4	7.3	5.9	7.1	7.2
8	778	582	116	86.2	52	86.5	130	77	7.5	7.4	7.4	7.2	5.7	7.2	7.3
9	664	604	146	79.5	67	77.6	130	79	8.0	7.4	7.4	7.2	5.9	7.0	7.3
10															
11															
12	784	638	163	83.4	66	89.4	157	75	7.4	7.3	7.3	7.2	5.7	7.1	7.2
13	792	654	166	75.9	87	81.6	166	98	7.5	7.4	7.4	7.2	5.6	7.0	7.1
14	656	560	119	85.7	51	86.3	109	67	7.4	7.2	7.4	7.0	5.5	7.0	7.2
15	858	628	171	84.2	56	92.9	139	67	7.3	7.3	7.3	7.2	5.5	7.1	7.3
16	710	618	159	86.2	75	81.3	131	85	7.5	7.1	7.2	7.0	5.6	7.0	7.1
17															
18															
19	870	630	226	87.1	59	96.6	148	78	7.4	7.1	7.4	7.1	5.7	7.0	7.1
20	836	658	151	89.4	61	87.5	148	77	7.5	7.1	7.4	7.0	5.8	7.0	7.1
21	794	562	218	84.8	54	90.7	153	69	7.5	7.0	7.3	7.0			
22	644	580	170	80.0	49	91.8	106	57	7.6	7.3	7.5	7.2	5.6	6.8	7.1
23	786	630	203	83.7	73	79.5	165	92	7.6	7.4	7.4	7.3	5.9	6.9	7.2
24															
25															
26	704	606	172	84.3	71	88.7	142	93	7.4	7.3	7.3	7.2	5.8	7.0	7.2
27	866	592	147	90.5	65	92.3	145	76	7.5	7.3	7.4	7.2	5.7	7.2	7.0
28	742	598	140	80.0	59	84.7	113	57	7.5	7.3	7.3	7.2	5.5	7.1	7.1
29	750	616	146	82.8	54	90.7	125	67	7.5	7.3	7.4	7.2	5.5	7.1	7.2
30	854	724	166	75.9	78	75.6	139	79	7.4	7.3	7.3	7.2	5.8	7.0	7.1
31															
Total															
Max.	870	724	226	90.5	87	96.6	198	98	9.7		7.5		6.0	7.2	7.3
Min.	644	560	116	75.9	49	75.4	106	57		7.0		7.0	5.5	6.8	7.0
Av.	770	610	172	83.6	64	86.4	141	76	7.4		7.3		5.7	7.0	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	770	327958	610	259811	160	68147	20.8
SUSPENDED SOLIDS	172	73258	64	27259	108	45999	62.8
5 DAY B.O.D.	141	60055	76	32370	65	27685	46.1

PREPARED BY R. D. Craun, Chief Operator

DATE Aug. 11, 57

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1957 SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					DRAWN TO DRYING BEDS		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN *	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2210												
2	2210	5.2		83.0									
3	2210					8400	1.72		59.5		8400		
4	1768												
5	1547												
6	2431	5.6		74.4									
7	1768	4.9		77.3		9060	1.63		61.8		9060		
8	1989	5.9		77.8									
9	1547	5.3		78.1		7290	1.51		66.7		7290		
10	2210												
11	1989												
12	1547	4.2		78.3									
13	1768	5.0		77.8									
14	1768	4.9		77.2									
15	2431	5.3		80.0									
16	1105	5.2		79.5		11930	1.39		58.1		11930		
17	1326												
18	1989												
19	2431	4.7		79.2									
20	1989	4.9		79.7		8170	1.44		63.6		420		
21	2431												
22	2210	5.1		76.8									
23	3315	4.4		80.8									
24	1326												
25	1547												
26	2431	4.6		79.6									
27	2210	5.1		79.8									
28	2431	4.8		81.4		12150	1.33		60.0		12150		
29	2431	5.1		81.5									
30	1989												
31	1989												
Total	62543		26049		20605	57000		7182		4424	49250		
Max.	3315	5.9		83.0		12150	1.72		63.6		12150		
Min.	1105	3.8		74.4		0	1.33		58.1		0		
Av.	2018	4.9	840	79.1	665	1839	1.50	2.3	61.6	143	1589		

REMARKS: * All supernate drawn to a drying bed.
Cleaned #1 bed on 14th. 4½ in. cake, 16½ cu.yd.
" #3 " " 15th. 1 in. cake, 4 cu.yd.
Filled #1 bed on 20th. Approx. 10½ in. fill(7730 gal) 5.65 Sol. 56.8% Vol.
Con. scum equal to 5 in. in no.1 digester on 21st.

PREPARED BY R.D.Craun, Chief Operator

DATE August 11, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF Agust 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE				COMMENTARY
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	
1	73	9.2		2.6	same	9.6		2.8	All routine operation with the usual sewage flow and treatment results.
2									
3									
4									
5									
6	66	9.8		2.6		10.0		3.0	
7	66	10.2		3.6		10.4		3.8	
8	68	11.0		4.1		11.2		4.2	
9									
10									
11									
12									
13	68	9.2		2.8		9.6		3.6	
14									
15	71	9.2		3.0		8.8		2.6	
16									
17									
18									
19									
20	66	8.6		2.0		8.4		1.8	
21	70	10.4		2.3		10.4		3.1	
22	67	10.0		2.4		10.2		2.4	
23									
24									
25									
26									
27	67	10.2		3.0		10.2		3.6	
28	64	8.4		2.0		9.0		3.2	
29	64	8.0		1.4		8.0		1.6	
30									
31									
Total									
Max.	73	11.0		4.1		11.2		4.2	
Min.	64	8.0		1.4		8.0		1.6	
Av.	68	9.5	103.3	2.7		9.6	104.3	3.0	

REMARKS:

PREPARED BY R.D.Craun, Chief Operator

DATE Aug. 11, 57

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...September 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons) *	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	90	70	80			96	96	1.64	38	2100	120	46	60	106	1
2	R	87	62	74			95		1.68	0	20	160	46	52	98	3
3	C	80	56	68	62	62	99		1.69	45	1590	160	50	47	97	4
4	F	70	42	56	60	62	100		1.55	66	2150	160	42	67	109	5
5	F	68	45	56	60	60		95	1.54	58	2110	160	45	50	95	5
6	F	72	48	60	61	61	101		1.54	69	2110	160	41	52	93	4
7	F	71	43	57				96	1.52	60	2110	160	55	27	82	5
8	F	72	48	65			96	98	1.44	60	2110	120	53	21	74	4
9	R	70	54	62	61	61	102		1.55	68	2120	160	1	59	60	4
10	R	66	56	61			98		1.54	66	2110	160	43	26	69	6
11	F	80	61	71			96	97	1.63	66	2240	160	20	74	94	4
12	R	84	60	72	60	61	95		1.63	62	2100	160	51	29	80	4
13	F	75	47	61	60	61	99		1.60	69	2140	120	50	57	107	5
14	F	76	54	65				95	1.53	61	2100	160	49	39	88	5
15	R	76	52	64			94	98	1.51	0	225	160	46	55	101	4
16	F	69	42	55	60	60	99		1.57	end	49	120	38	57	95	5
17	F	70	46	58	60	61	100		1.54	of	21	160	36	49	85	5
18	F	75	54	64	60	60	98	96	1.40	season	45	160	16	76	92	4
19	R	84	68	76	62	63	97		1.50		49	160	52	37	89	4
20	C	70	60	65	61	60	101		1.44		289	160	46	38	84	4
21	R	80	56	68			102	93	1.44		9	160	28	78	106	1
22	F	67	49	58				95	1.31		7	120	49	34	83	2
23	R	60	38	49	60	58	96	96	1.35		321	160	50	20	70	3
24	F	65	47	56	60	60	99		1.30		43	160	15	63	78	12
25	F	71	47	59	59	60	99		1.32		65	160	32	60	92	7
26	F	57	31	44	60	59	96	94	.81		127	120	46	20	66	9
27	F	58	32	45	60	59		94	1.22		29	160	41	0	41	9
28	F	61	34	47			98		1.21		3	160	28	14	42	10
29	F	66	38	52			98		1.15		17	120	35	1	36	5
30	F	72	42	57				92	1.16		17	120	38	3	41	7
31																
Total									43.31	788	28426	44480	1188	1265	2456	150
Max.		90	70	80	62	63	102	98	1.69	69	2240	160	55	78	109	12
Min.		57	31	44	59	58	94	92	.81	0	3	120	1	0	36	1
Av.		72	49	61	60	60	98	95	1.44	61	948	149	40	42	82	5

REMARKS: Heavy shot of green sewage 8:50 to 9:20 on 13th.
South Clarifier out of service for inspection and repainting of metalwork from the 18th to 26th: North clarifier out of service from the 26th to the 30th.
Flow meter erratic and unrelyable from 18th on because of clarifier dewatering program, see sheet no.4.

PREPARED BY R. D. Craun, Chief Operator

DATE Oct. 2nd.

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF September 1957

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	808														
2															
3	808	598	203	85.2	67	88.1	176	98	7.4	7.3	7.4	7.2	5.2	6.8	7.0
4	786	568	183	84.7	63	93.7	174	82	7.5	7.3	7.4	7.1	5.5	7.1	7.2
5	940	628	288	52.1	50	100	175	73	7.5	7.3	7.4	7.2	5.5	7.2	7.3
6	788	586	184	82.6	63	79.3	150	74	7.5	7.3	7.4	7.2	5.5	7.2	7.3
7															
8															
9	856	600	199	86.9	79	93.7	154	104	7.4	7.2	7.3	7.2	5.7	7.2	7.3
10	816	616	194	88.0	67	92.5	176	89	7.4	7.2	7.4	7.1	5.7	7.2	7.3
11	774	572	253	84.2	72	90.3	143	87	7.5	7.3	7.3	7.1		7.0	7.3
12	762	602	153	85.0	56	91.1	128	73	7.5	7.3	7.3	7.2	5.5	7.1	7.2
13	804	592	183	77.6	64	71.9	136	76	9.0	7.3	7.4	7.2	6.0	6.9	7.2
14															
15															
16	854	600	207	84.1	69	97.1	142	82	7.5	7.4	7.4	7.3	5.5	7.0	7.1
17	752	600	164	87.8	64	92.2	136	76	7.5	7.4	7.4	7.2	5.8	7.1	7.2
18	810	666	148	88.5	102	89.2	134	122	7.5	7.2	7.3	7.1	5.7	7.1	7.2
19	650	618	154	82.5	81	84.0	109	80	7.7	7.3	7.5	7.3	5.9	7.1	7.3
20	758	596	216	86.6	93	90.3	160	100	7.8	7.3	7.4	7.3	5.8	7.0	7.2
21															
22															
23	736	572	290	90.0	84	95.2	174	105	7.4	7.3	7.4	7.3	5.6	7.0	7.2
24	678	580	140	90.7	79	88.6	124	79	7.5	7.3	7.4	7.2	5.8	7.0	7.2
25	666	686	174	87.4	69	87.0	111	73	7.5	7.3	7.4	7.2	5.9	7.0	7.2
26	650	568	151	92.1	74	78.4	122	75	7.5	7.4	7.5	7.3	6.0	7.1	7.2
27	732	522	170	87.1	60	76.7	132	72	7.5	7.4	7.4	7.3	6.1	6.9	7.1
28															
29															
30															
31															
Total															
Max.	940	686	290	92.1	102	100	176	122	9.0		7.5		6.1	7.2	7.3
Min.	650	522	140	52.1	50	71.9	109	72		7.2		7.1	5.2	6.8	7.0
Av.	769	598	192	84.4	71	88.4	140	85	7.4		7.3		5.7	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	Not computed because of inaccurate flow measurement						22.2
SUSPENDED SOLIDS							63.0
5 DAY B.O.D.							39.3

PREPARED BY R. D. Craun, Chief Operator

DATE Oct. 3rd.

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..September...1957.. SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernatant * — GALLONS DRAWN From # 2 Digester	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2210					7510					7510		
2	2431												
3	2210	5.2		76.3									
4	1326	5.6		72.0		10830	1.13		59.3		10830		
5	2210	4.9		72.7									
6	1326	5.6		76.6		7950	1.34		61.8		7950		
7	1768												
8	1989												
9	2431	4.1		80.8									
10	1326	5.5		78.3									
11	1326												
12	1326	5.1		81.0									
13	2431	4.2		82.4		13040	.93		60.0		13040		
14	2210												
15	1547												
16	1989	4.9		83.2									
17	1768	5.6		78.6									
18	2873	5.0		77.2									
19	1105	5.7		71.6									
20	2873	6.1		78.7		11490	1.29		63.3		11490		
21	1989												
22	1326												
23	1326	4.8		82.3									
24	2652	6.1		77.0									
25	1105	4.4		82.7		11710	1.35		63.6		11710		
26	1768	4.0		81.9									
27	1105	2.1		97.5									
28	1105												
29	884												
30	1989												
31													
Total	55250		23012		18295	62530		6356 [illegible]		3915	62530		
Max.	2873	6.1		97.5		13040	1.35		63.6		13040		
Min.	884	2.1		71.6		0	.93	912 [illegible]	59.3		0		
Av.	1842	4.9	767	79.5	610	2084	1.21		61.6	131	2084		

REMARKS * All supernate siphomed to drying bed.
Concentrated scum equal to 3 inches in no.1 digester on the 11th

PREPARED BY R. D. Craun, Chief Operator

DATE October 2nd

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...September...1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4	65	8.0		2.1	same	8.0		1.9
5	64	8.2		1.8		8.2		1.4
6								
7								
8								
9								
10	61	8.8		2.2		8.8		2.4
11	60	8.7		1.4		8.9		2.0
12	62	9.6		2.0		8.8		1.6
13								
14								
15								
16								
17	60	9.2		2.2		9.8		2.4
18	61	9.6		1.7		9.6		2.0
19	64	10.8		2.5		10.8		3.2
20								
21								
22								
23								
24	57	9.1		1.3		9.4		1.2
25	57	9.8		1.4		10.0		1.9
26	56	9.7		1.9		10.0		2.0
27								
28								
29								
30								
31								
Total								
Max.	65	10.8		2.5		10.0		3.2
Min.	56	8.0		1.3		8.0		1.2
Av.	61	9.2	92.9	1.9	61	9.3	93.9	2.0

COMMENTARY

Between the 18th and the 30th the two clarifiers were alternately out of service for inspections and repainting of the metalwork to slightly below the waterline. Even with the reduced settling capacity a good grade of effluent was produced. The 5 Day B.O.D. averaged 88 ppm for the period against 84 ppm for the rest of the month. The suspended solids had a slightly higher differential with 77 ppm and 65 ppm respectively.

It was noticed that our flow dropped appreciably on the first day that the north clarifier had the full load plus the amount pumped from the south tank. The meter was zeroed out and checked for calibration. The meter checked O.K. so some speculation ensued as to the cause. It was observed that the effluent was striking the south wall of the approach channel with such velocity that a great amount of turbulance and whirlpool eddies was created in the vicinity of the "tell-tale pipe" opening. A piece of 4"x 4" angleiron was placed across the approach channel opening but this accomplished little in leveling the flow. A concrete block was then placed at several locations until it appeared as if the bubbles etc. were evenly distributed and with a tendancy to concentrate in mid-stream. This arrangment increased the flow reading at the meter to near normal. When the tanks were alternated in service and the south tank was taking the full load the concrete block could not be used because of the abrupt incline from the effluent channel to the approach section. As an experiment, the strap-iron grating from the top of the scum well was placed across

(over)

REMARKS:

PREPARED BY .....

DATE.....

the entrance to the approach channel and apparently did a beautiful job. The flow striking the straps from the obliqua angle straightened out the flow and practically obliviated the turbulance. The meter recorded about .6 MGD increase with it in use. There is always a degrease in flow from September until May, so some of the low recordings are probably normal. In our metering range, ¼ inch of float travel is equal to about .2 MGD. The flume approach section is only 48 inches long and the telltale pipe opening is only 66 inches from the convergance point of the two channels which have a considerable incline and produce considerable turbulance. After the two tanks were both back in service the rate of flow was checked with and without the grating in place. Although there wes no appreciable difference, one cannot help but wonder just how accurate our normal flow recordings are. Could inaccuracies partially account for our extremely high flow/per capita ratio? Could it partially account for the wide divergence in the pounds of dry solids removed and the pounds of solids pumped to the digestor? Much speculation can ensue. It would seem that a long approach to the flume with ample time for leveling of the flow would be a desireable feature of original design.

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	66	38	54	59	60	99		1.20		22	160	36	26	62	6
2	F	71	39	55	60	61	96	92	1.20		21	160	44	9	53	7
3	F	64	38	55	60	60	94	94	1.15		38	160	48	16	64	6
4	F	64	40	52	60	59	97		1.20		22	160	46	17	63	15
5	F	64	42	53			100		1.16		4	120	47	1	48	7
6	F	64	40	52				92	1.11		9	160	55	3	58	9
7	F	70	42	56	59	57	95	95	1.24		41	120	53	23	76	6
8	F	72	42	57	59	59	99		1.19		113	160	48	62	110	7
9	F	66	38	52	60	60	98	92	1.19		38	160	48	41	89	13
10	F	58	42	50	59	59		93	1.16		28	160	51	25	76	8
11	F	54	28	41	59	58	94	96	1.16		22	120	50	23	73	13
12	F	56	28	42			98		1.13		7	160	43	31	74	11
13	F	61	33	47			100		1.08		11	120	50	37	87	9
14	F	65	39	52	59	59		94	1.20		51	160	51	31	82	11
15	R	69	51	60			93	97	1.22		19	160	51	32	83	10
16	R	62	56	59	59	59	97		1.34		32	120	49	42	91	5
17	R	60	38	49			99	92	1.29		52	160	47	34	81	13
18	F	49	39	44	58	57		94	1.26		26	120	48	20	68	14
19	F	55	31	43			98	92	1.22		329	120	55	26	81	11
20	F	60	34	47				95	1.17		45	160	48	18	66	8
21	F	61	37	49	59	58	92	97	1.26		16	160	50	24	74	9
22	R	58	52	55			94		1.34		3	160	52	25	77	15
23	R	61	39	50	58	58	97		1.54		15	120	40	51	91	10
24	C	46	30	38			98		1.43		8	160	48	38	86	20
25	F	43	30	36	58	56		90	1.38		15	160	48	21	69	18
26	LS	39	29	34				92	1.38		3	160	49	15	64	24
27	S	40	28	34			92	92	1.29		14	160	48	21	69	15
28	F	54	32	43	59	58	95		1.37		29	160	50	36	86	12
29	R	56	38	46	58	58	97		1.33		43	160	47	30	77	15
30	R	51	41	46	57	56		89	1.34		14	160	49	16	65	15
31	F	54	38	46	58	58		91	1.30		43	160	53	16	69	14
Total									38.83		1123	4640	1502	806	2308	356
Max.		72	56	60	60	61	100	97	1.54		329	160	55	62	110	24
Min.		39	28	34	58	57	92	89	1.08		3	120	36	1	48	6
Av.		58	38	48	59	58	96	93	1.25		36	150	48	26	74	11

REMARKS:

PREPARED BY R. E. Mann

DATE Nov 4 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	748	608	161	88.2	66	87.9	123	75	7.6	7.4	7.6	7.3	6.1	7.1	7.2
2	750	646	158	86.1	53	92.4	117	66	7.5	7.3	7.4	7.3	5.9	7.2	7.3
3	850	682	148	85.1	68	85.3	125	67	7.5	7.4	7.4	7.3	6.0	7.1	7.2
4	999	680	187	85.6	67	79.1	179	78	7.5	7.2	7.4	7.2	5.7	7.1	7.1
5															
6															
7	980	650	298	85.5	74	90.5	176	99	7.4	7.3	7.3	7.2	5.4	7.1	7.2
8	1180	692	185	83.8	53	84.9	155	83	7.4	7.3	7.3	7.1	5.5	6.8	7.0
9	910	634	142	94.4	62	90.3	151	70	7.4	7.3	7.4	7.2	5.7	7.0	7.2
10	830	644	173	87.9	62	88.7	144	75	7.5	7.3	7.3	7.2	5.4	6.9	7.1
11	742	590	142	84.5	62	75.8	125	75	7.4	7.3	7.4	7.2	5.6	6.8	7.1
12															
13															
14	906	626	245	80.8	100	80.0	186	99	7.6	7.3	7.5	7.1	5.8	6.9	7.1
15															
16	788	576	208	79.8	59	88.1	140	75	7.2	6.1	7.2	6.2	5.6	6.9	7.0
17															
18	734	602	215	83.7	62	87.1	143	70	7.4	7.3	7.3	7.2	6.0	7.0	7.1
19															
20															
21	1216	580	217	78.8	62	85.5	154	85	7.4	7.3	7.3	7.1	5.8	7.0	7.1
22															
23	730	590	151	72.2	74	66.2	96	58	7.4	7.3	7.3	7.1	5.6	7.2	7.3
24															
25	722	568	246	83.7	62	79.0	145	75	7.5	7.4	7.4	7.2	5.8	7.2	7.2
26															
27															
28	790	596	239	83.7	75	86.7	169	92	7.5	7.4	7.4	7.2	5.8	7.1	7.2
29	758	624	132	82.6	60	83.3	117	65	7.5	7.4	7.4	7.2	6.0	7.1	7.2
30	654	576	199	84.9	56	91.1	118	67	7.5	7.3	7.4	7.2	5.9	7.0	7.1
31	578	554	118	91.2	57	88.1	107	76	7.5	7.2	7.4	7.2	5.7	7.1	7.2
Total															
Max.	1216	692	298	94.4	100	92.4	186	99	7.6		7.6		6.1	7.2	7.3
Min.	578	554	118	72.2	53	66.2	96	58		6.1		7.2	5.4	6.8	7.0
Av.	835	6.7	182	84.3	65	84.7	141	76	7.4		7.3		5.8	7.1	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	835	270406	617	199809	218	70597	26.1
SUSPENDED SOLIDS	182	58939	65	21050	117	37889	64.3
5 DAY B.O.D.	141	45661	76	24612	65	21049	46.1

PREPARED BY [signature]

DATE Nov. 6

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1957 SHEET NO. 3

DATE	SLUDGE HANDLING DATA													
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					DRAWN TO DRYING BEDS			
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1768	4.5		79.2		9060	.71		58.3		9060		
2	2210	4.0		78.1									
3	3315	4.3		79.7									
4	1768												
5	1989												
6	1547												
7	2652	3.9		84.0		8400	1.30		66.7		8400		
8	3978	4.6		82.4									
9	1326	4.3		80.2									
10	1547	4.4		81.4									
11	1989	4.0		82.4									
12	1326												
13	1768					13700	1.06		65.4		13700		
14	3315	4.2		84.0									
15	1768												
16	1989	4.0		83.5									
17	1768												
18	2431	5.2		74.0		12820	1.11		64.0		12820		
19	2210												
20	2652												
21	3536	4.7		75.5									
22	3094												
23	2652	5.4		77.6									
24	2431					9280	1.25		63.3		9280		
25	1989	5.5		76.2									
26	1989												
27	2652												
28	2873	4.1		81.5		15020	1.08		63.6		15020	.38	61.1
29	1547	4.7		78.4									
30	1768	4.7		80.5									
31	2852	5.0		81.9									
Total	70695		27041		21633	68280		6194		3941	68280		
Max.	3978	5.5		84.0		15020	1.30		66.7		15020		
Min.	1326	3.9		74.0		0	.71		58.3		0		
Av.	2280	4.5	872	80.0	698	2200	1.08	200	63.6	127	2200	.38	61.1

REMARKS: Supernate drawn to Drying Bed
Concentrated scum pumped to #1 digester on 8th. Amount equal to about 3½ inches in digester.
Cleaned #1 drying bed. 2½ [illegible]

PREPARED BY [signature]

DATE [illegible]

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2	54	10.6		2.4	S	10.6		2.2
3	54	10.4		2.2	A	10.6		2.2
4					M			
5					E			
6								
7								
8	54	11.6		3.2		11.6		3.2
9	54	11.2		2.9		11.0		2.9
10	53	12.2		39		12.2		3.6
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29	44	11.6		3.0		11.2		2.6
30	45	10.8		2.7		10.6		2.2
31	46	10.6		2.2		10.4		2.2
Total								
Max.	54	12.2		3.2	54	12.2		3.6
Min.	44	10.4		2.2	44	10.4		2.2
Av.	50	11.1	98.2	2.8	50	11.0	97.3	2.6

COMMENTARY

Due to vacation schedules an alternate day sampling program was used from the 14th through the 25th.

All treatment units were in contineous service and an effluent of good quality was produced at all times.

All floor and stairway areas and the digester sludge circulating pump were repainted during the month.

The director of the Calhoun County Health Dept. had a group of students here on an inspection trip on the 29th as part of their field training program. Several were from foreign countries. Mr. Herbert Larkins of the Michigan Dept. of Health made a plant visitation on the 28th. He informed me that the department has been reorganized and that he and Mr. Richmond each have territories which divides the State into two areas of about equal unit coverage. They hope that this will allow the department to be of much more service and individual help to the operators and comunities in the field.

REMARKS:

PREPARED BY R. H. Mann

DATE Nov. 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	58	38	48	58	58		93	1.33		28	160	51	16	67	8
2	F	58	42	50			93		1.30		4	160	55	14	69	15
3	F	56	42	49			97		1.21		11	120	53	12	65	16
4	C	50	50	45	58	56	100	87	1.35		43	160	52	14	66	16
5	C	46	28	37	58	56		90	1.31		33	160	55	11	66	18
6	F	48	32	40			94	92	1.30		24	160	49	4	53	15
7	R	54	40	47	57	56	97		1.31		43	160	56	19	75	16
8	R&S	52	26	39	58	56	100	89	1.41		48	160	55	13	68	24
9	S	32	16	24			95	89	1.26		4	160	51	7	58	25
10	F	34	22	28			99	84	1.20		10	160	50	6	56	19
11	F	44	26	35	58	56	96	87	1.36		70	160	54	12	66	17
12	F	50	30	40				88	1.27		18	160	53	22	75	14
13	R	54	42	48	56	55	96		1.40		11	160	51	12	63	15
14	R	56	36	46	56	57	98		1.66		66	160	49	33	82	13
15	F	55	44	50	56	56		87	1.57		88	160	56	46	102	10
16	F	54	36	45			96		1.53		6	160	47	42	89	14
17	F	44	34	39			98		1.44		12	160	44	32	76	16
18	R	58	32	45	56	54	99	82	1.57		24	160	54	47	101	14
19	LS	36	30	33	56	54	95	83	1.54		28	200	49	23	72	21
20	S	42	29	35	56	55	96		1.51		40	160	37	56	93	20
21	S	36	26	31	55	53	93	78	1.47		326	160	56	24	80	23
22	C	34	22	28	54	53		81	1.44		41	160	60	21	81	24
23	R	40	26	33			97	80	1.41		1	160	48	* 12	* 60	22
24	C	39	31	35			98	77	1.31		10	160	58	* 0	* 58	23
25	LS	34	30	32				80	1.39		324	160	54	* 0	* 54	19
26	F	39	31	35			95		1.39		59	160	52	* 11	* 63	13
27	F	56	36	46			97	81	1.38		22	160	45	23	68	11
28	R	44	36	42			97	80	1.27		7	160	55	2	57	26
29	C	40	28	34			96	82	1.35		16	160	52	1	53	19
30	S	30	18	24			98	80	1.30		4	160	52	1	53	24
31																
otal									41.54		1421	4800	1553	536	2089	530
Max.		58	44	50	58	58	100	93	1.66		326	200	60	56	102	26
Min.		30	16	24	54	53	93	78	1.20		1	120	37	0	53	8
Av.		46	32	39	56	55	97	84	1.38		47	160	52	18	70	18

REMARKS: * Meter not working, back in service at 4pm on the 26th.
Green Sewage (trace) 4pm on 1st.
" " 11am on 4th.
" " (trace) 1pm on 7th.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..November...1957.... SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	PH. DATA: RAW SLUDGE	PH. DATA: DIGESTER NUMBER 1	PH. DATA: DIGESTER NUMBER 2
1	794	560	151	84.1	58	82.8	123	72	7.5	7.3	7.4	7.2	5.9	6.9	7.2
2															
3															
4	774	576	217	83.4	58	96.6	131	68	7.5	7.2	7.4	7.3	5.6	6.9	7.1
5	692	618	152	85.5	60	98.3	127	73	7.6	7.3	7.4	7.2	5.6	7.1	7.3
6	Assistant attending training session														
7	868	624	217	82.5	64	87.5	150	71	7.5	7.3	7.4	7.3	5.9	7.0	7.2
8	1018	632	277	81.2	67	74.6	154	76	7.4	7.2	7.3	7.1	5.7	7.0	7.3
9															
10															
11	782	644	184	82.1	78	84.6	136	91	7.5	7.3	7.5	7.2	5.7	6.9	7.1
12	732	582	234	79.1	64	78.1	145	64	pH meter sent in to the						
13	Operator attending training session														
14	880	618	259	68.3	78	67.9	130	62	Eberbach Co. for check-up.						
15	660	574	129	85.3	49	83.7	117	61							
16															
17															
18	898	754	197	80.2	56	89.3	121	63							
19	740	628	131	88.6	63	85.7	132	69							
20	774	602	142	86.6	49	93.9	117	61							
21	854	620	97	87.6	36	94.4	113	55							
22	590	570	105	81.0	50	84.0	77	52							
23															
24															
25	810	540	265	79.6	59	83.1	184	64							
26	656	584	107	84.1	62	83.9	96	72							
27	Holliday														
28	Maintenance														
29															
30															
31															
Total															
Max.	1018	654	277	88.6	78	98.3	184	91	7.6		7.5		5.9	7.1	7.3
Min.	590	540	97	68.3	36	67.9	77	52		7.2		7.1	5.4	6.9	7.1
Av.	775	608	175	82.6	59	85.8	126	66	7.5		7.4		5.7	7.0	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	775	268491	608	210636	167	57855	21.5
SUSPENDED SOLIDS	175	60627	59	20440	116	40187	66.3
5 DAY B.O.D.	126	43651	66	22865	60	20786	47.6

PREPARED BY R.D.Craun, Chief Operator

DATE Dec. 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....November....1957..

SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate, # 2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1989	4.3		81.7									
2	1326					10385	1.20		60.7		10385	.26	50.0
3	2431												
4	2431	4.2		82.6									
5	2210	4.2		81.8									
6	1768												
7	2431	3.9		82.1		15470	1.22		60.0		15470	.29	58.0
8	1326	3.4		80.2									
9	1989												
10	1768												
11	3315	4.1		82.2									
12	2210	4.6		82.3									
13	2431												
14	1768	4.1		75.6		12375	1.22		60.0		12375	.26	56.7
15	3315	5.8		78.0							BOD	428	
16	1547												
17	1768												
18	2210	5.2		79.0									
19	2652	4.4		76.9		12595	1.29		62.1		12595	.30	61.7
20	1326	4.1		80.2							BOD	440	
21	1989	4.6		78.4									
22	2210	3.9		76.7									
23	2210												
24	2210												
25	3094	3.4		79.6									
26	1989	3.4		82.0		12260	1.19		56.0		12260	.27	60.9
27	2431	3.3		78.2							BOD	577	
28	1768	No Samples,		Holiday									
29	1547	"	"	Maintenance									
30	1768												
31													
Total	63427		22643		18092	63085		6465		3898	63085		
Max.	3315	5.8		82.6		15470	1.29		63.0		15470	.30	61.7
Min.	1326	3.3		75.6		0	1.19		65.0		0	.26	50.0
Av.	2114	4.2	755	79.9	603	2103	1.22	216	60.3	130	2303	.27	57.6

REMARKS. Scum equal to 4 inches in # 1 digester on 15th (1768 gal.)

PREPARED BY R.D.Craun, Chief Operator

DATE Dec. 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...November...1957... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4	47	9.8	83.8	2.6	same	9.6	82.1	1.8
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19	42	10.6	84.1	3.4		10.4	82.5	2.8
20	39	10.8	81.8	2.0		11.0	83.3	2.4
21	38	11.2	83.6	2.8		11.6	86.6	3.0
22								
23								
24								
25								
26	36	12.2	88.4	3.8		12.0	87.0	3.2
27	38	11.4	85.1	2.4		11.4	85.1	2.6
28								
29								
30								
31								
Total								
Max.	47	12.2	88.4	3.8		12.0	87.0	3.2
Min.	36	9.8	81.8	2.0		9.6	82.1	1.8
Av.	40	11.0	84.5	2.8		11.0	84.4	2.6

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of good quality was produced at all thimes.

On the 18th, a great amount of amber colored condensate began dripping from the check opening of the vent pipe connecting the heat exchanger with the stack. By the following morning about a third of the floor area was covered with this sticky liquid, and it was appearing on the exchange section from between the joints between it and the boiler section. The unit was taken out of service and the rear head section and the front inspection plates were removed for an examination of the interior. It was found that the boiler tubes were fouled very badly. The bottom half of them were stopped up completely with a wet deposit. The tray section under the boiler was filled to overflowing with the liquid. This condition was very surprising as everything had been in excellant shape at the last routine inspection. Tube cleaners could not be found locally and had to be ordered. For a temporary remedy, a length of half inch pipe was notched at one end and slightly flared to produce a cutting action and was used to rod out an opening through all the tubes. The unit was then placed back in service until the flue cleaners are delivered.

The condensate formations stopped at once and the accumulated moisture has dried. A good flame is produced at the burner and the heat exchange is effective. Just what caused this condition to occure so suddenly after nearly a year and a half of trouble free service is still a mystery. There will be quarterly inspections from ~~now on instead of the semi-yearly schedual originally set up.~~

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 5, 1957

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	41	23	32			95	82	1.24		9	160	48	0	48	21
2	F	36	22	29	55	53	96		1.29		35	160	* 35	0	35	16
3	S	30	16	23	54	52	96	77	1.26		34	160	54	10	64	24
4	LS	36	16	26	54	54	92	82	1.35		26	160	42	3	45	21
5	R	46	26	36	54	54	95	79	1.34		34	160	50	0	50	20
6	R	52	32	42	55	55	96	78	1.31		32	160	54	3	57	13
7	S	34	18	26			97	77	1.35		3	160	50	1	51	23
8	C	34	18	26			94	79	1.27		9	160	43	0	43	20
9	F	36	24	30	55	54	96		1.40		59	160	45	15	60	21
10	S	36	8	22	54	52	97	80	1.38		38	200	53	27	80	26
11	S	20	8	14	53	51	96	76	1.34		6	160	44	15	59	23
12	S	27	16	21	54	52	96	74	1.35		66	160	53	15	68	23
13	F	38	26	32	54	52	98	71	1.37		31	160	46	15	61	20
14	F	42	22	32			98	73	1.32		29	160	54	20	74	20
15	R	42	26	34			94		1.31		8	160	* 5	1	* 6	17
16	F	42	28	35	53	53	92		1.38		45	160	48	6	54	14
17	S & R	36	30	33	54	52	94	73	1.40		66	160	50	18	68	20
18	R	52	36	44	54	53	94		1.45		20	200	46	17	63	17
19	R	54	40	47	54	54	96		1.50		25	160	56	3	59	7
20	R	58	32	45	55	54	92	75	1.53		25	160	54	1	55	11
21	F	48	27	37			94		1.50		3	160	40	18	58	8
22	F	52	34	43			94		1.46		13	160	36	20	56	8
23	F	54	28	41	54	53	96		1.65		55	200	46	15	61	10
24	F	40	26	33	54	53	97		1.51		45	160	27	23	50	13
25	R	44	30	37			97	73	1.49		7	160	26	37	63	17
26	R	36	22	29	54	52	95	73	1.53		16	160	44	11	55	17
27	F	40	22	31	54	52	94	72	1.56		24	160	48	8	56	14
28	R & S	36	22	29			94		1.52		3	200	30	24	54	19
29	LS	35	25	30			93		1.44		12	160	47	24	71	16
30	F	43	24	33			93		1.56		7	160	41	24	65	13
31	R & S	36	16	26			97	70	1.43		5	200	31	26	57	21
Total									43.79		790	5160	1346	400	1746	533
Max.		58	40	47	55	55	98	82	1.65		66	200	56	37	80	26
Min.		20	8	14	53	51	92	70	1.24		3	160	5	0	6	7
Av.		41	24	32	54	53	95	76	1.41		25	166	43	13	56	17

REMARKS: * Gas venting at the cover and not metered.

PREPARED BY R.D. Craun, Chief Operator

DATE Jan. 8, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....December...1957.

SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	732	542	155	84.4	55	87.3	117	60	7.7	7.5	7.5	7.4	6.4	7.1	7.2
3	642	570	142	84.5	52	84.6	110	62	7.7	7.5	7.5	7.3	6.1	7.2	7.2
4	952	548	131	87.0	46	91.3	114	56	7.6	7.5	7.5	7.4	6.3	7.3	7.2
5	866	636	216	83.8	56	83.9	144	74	7.6	7.4	7.5	7.4	6.1	7.2	7.2
6	870	610	154	83.1	44	86.4	133	56	7.6	7.4	7.5	7.4	6.0	7.1	7.2
7															
8															
9	970	652	239	80.0	76	84.2	150	86	7.7	7.4	7.4	7.4	6.1	7.2	7.1
10	872	638	152	88.2	53	94.3	114	72	7.7	7.5	7.5	7.4	6.0	7.1	7.2
11	644	580	135	89.6	53	96.2	115	69	7.7	7.5	7.5	7.3	6.0	7.1	7.2
12	666	608	137	88.3	60	85.0	123	83	7.7	7.5	7.5	7.3	6.1	7.1	7.2
13	758	584	181	80.7	52	92.3	122	59	9.5	7.5	7.5	7.4	6.1	7.2	7.1
14															
15															
16	810	590	191	85.9	61	93.4	139	66	7.7	7.5	7.6	7.3	6.4	7.0	7.1
17	742	590	128	87.5	47	89.4	116	67	7.6	7.5	7.5	7.3	6.2	7.1	7.4
18	764	634	153	76.5	59	84.7	99	65	7.6	7.5	7.5	7.4	6.2	7.1	7.3
19	728	620	176	88.6	53	88.6	115	62	7.7	7.5	7.5	7.4	6.2	7.1	7.3
20	754	576	168	84.5	50	78.0	115	67	8.3	7.6	7.5	7.4	6.1	7.1	7.3
21															
22															
23	706	558	207	83.5	60	93.3	133	63	7.6	7.5	7.4	7.3	6.2	7.0	7.0
24	676	556	155	88.4	55	85.5	122	75	7.8	7.5	7.6	7.4	5.9	7.2	7.3
25															
26	654	558	224	91.5	52	90.4	101	67	7.7	7.5	7.5	7.4	6.1	7.1	7.2
27	686	562	147	82.3	59	79.7	111	63	7.6	7.5	7.5	7.4	5.8	7.1	7.3
28															
29															
30	No samples, maintenance														
31	"	"		"											
Total															
Max.	970	652	224	91.5	76	96.2	150	86	9.5		7.6		6.4	7.3	7.4
Min.	642	542	128	76.5	44	78.0	99	56		7.4		7.3	5.8	7.0	7.0
Av.	763	590	168	85.4	55	87.8	121	64	7.5		7.4		6.1	7.1	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	763	277892	590	214884	173	63008	22.7
SUSPENDED SOLIDS	168	61187	55	20032	113	41155	67.3
5 DAY B.O.D.	121	44069	64	23309	57	20760	47.1

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 8, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....December 1957.. SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					DRAWN TO DRYING BEDS		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2210												
2	1989	3.1		84.6		11490	1.34		57.1		11490	.11	61.9
3	1989	3.9		82.5									
4	1326	2.4		84.2									
5	2210	4.3		82.9									
6	2431	4.2		83.4									
7	2210												
8	1768												
9	2652	4.7		82.6		15250	.92		58.8		15250	.27	61.0
10	3094	5.4		83.9									
11	2652	5.1		83.6									
12	1547	3.5		81.7									
13	2210	3.9		82.1									
14	1989												
15	1989												
16	3536	3.2		82.2		16130	1.66		55.9		16130	.28	61.6
17	1768	3.9		82.6									
18	2652	4.1		84.4									
19	1768	4.0		77.7									
20	1768	4.0		80.2									
21	1768												
22	1326												
23	1989	3.6		81.2		16790	1.30		61.3		16790	.28	57.2
24	2210	5.1		82.2									
25	1768												
26	1768	4.9		82.4									
27	2873	5.4		80.1									
28	1768												
29	1989												
30	2652	3.6		82.5		14360	1.42		66.7		14360	.26	53.9
31	2210	4.6		83.6									
Total	66079		23028		18975	74020		8145		4887	74020		
Max.	3536	5.4		84.6		16790	1.66		66.7		16790	.28	61.9
Min.	1326	2.4		77.7		0	.82		55.9		0	.11	53.9
Av.	2132	4.1	743	82.4	612	2388	1.31	263	60.0	158	2388	.24	59.1

REMARKS: Scum equal to 4½ inches in #1 digester pumped on 17th.(1990 gal.)

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 9, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1957 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3	34	12.0		3.0	same	12.0		2.6
4	34	12.0		2.3		11.8		1.7
5	35	11.8		1.2		12.0		2.4
6								
7								
8								
9								
10	3.5	13.0		4.4		12.2		3.5
11	3.3	13.0		2.9		13.0		3.9
12	Sample bottles broken by freezing							
13								
14								
15								
16								
17	35	11.8		3.4		11.8		3.0
18								
19								
20								
21								
22								
23								
24	38	11.4		3.4		11.4		2.8
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	38	13.0		4.4	38	13.0		3.9
Min.	33	11.4		1.2	33	11.4		1.7
Av.	35	12.1	86.4	2.9	35	12.0	85.7	2.8

COMMENTARY

All treatment units were again in continuous service and an effluent of good quality was produced at all times.

Difficulty was experienced during the month in getting a free flow of digester gas to the burner of the heat exchanger. Condensate always presents a problem at this time of year, but we were unable to get normal flow even immediately after drainage of traps, and other accessible points. A new diaphragm and tension spring was installed in the pressure regulator but no improvement could be noticed. The piping above the floor level to the regulator was removed and found to be nearly half full of deposit. This deposit, besides reducing the capacity of the pipe, was also hindering the action of the check valve. After this section was cleaned and replaced some inprovement was noted but it was still not nearly to normal dapacity. It is now planned to take down all of the piping back as far as necessary to clean out any deposition which may be obstructing the gas flow. This will be done the fi first thing next month.

REMARKS: River sampling has to be very sketchy during the winter months. When the river water is at near freezing temperature and the atmosphere is below 20 F the bottles freeze during the transportation time from the sampling point and break the bottles.

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 9, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	S	24	12	18			95	68	1.38		3	120	45	20	65	24
2	S	20	8	14			93	71	1.48		41	160	51	1	52	25
3	F	22	-2	10			95	69	1.45		78	200	49	6	55	21
4	F	24	4	14			96	67	1.43		4	160	48	7	55	20
5	F	33	11	22			98	66	1.38		4	160	50	4	54	20
6	S	36	18	27	53	51	99	66	1.48		35	160	42	13	55	22
7	S	20	-4	8	52	50		74	1.46		86	160	53	4	57	23
8	F	20	6	13	52	50	96	72	1.44		17	200	51	12	63	22
9	F	32	14	23	52	51	97	71	1.44		23	160	52	13	65	20
10	F	39	16	27	52	52	98	70	1.46		34	160	56	0	56	20
11	F	26	12	19				73	1.38		3	160	50	3	53	16
12	F	34	13	23			96	72	1.35		9	160	51	1	52	18
13	F	40	14	27	53	51	98		1.47		43	160	47	10	57	16
14	F	38	24	31	52	52		77	1.44		42	200	60	0	60	19
15	C	32	16	24	52	52	96		1.44		39	160	55	1	56	21
16	C	30	18	24	52	52	98	75	1.35		38	160	54	0	54	20
17	F	32	14	23	52	52	99	75	1.42		28	160	45	2	47	19
18	F	24	8	16			95	75	1.36		11	160	46	0	46	14
19	F	32	18	25			96	75	1.32		11	160	46	0	46	16
20	S	40	30	35	52	52	97		1.43		51	160	45	9	54	23
21	S	34	30	32	52	51		79	1.44		34	160	55	0	55	16
22	LS	34	12	23	52	51	96	79	1.40		90	160	52	0	52	17
23	F	34	27	30	52	51	97	78	1.40		31	200	51	0	51	14
24	S	30	26	28	52	50	98	76	1.40		33	160	56	2	58	18
25	F	38	28	33				78	1.39		7	160	56	0	56	16
26	F	40	30	35			91	81	1.33		19	160	22	18	40	15
27	LS	40	30	35	52	52	90		1.47		76	160	10	51	61	24
28	LS	34	24	29	52	51	89		1.43		30	200	44	19	63	17
29	S	34	24	29	52	51	92		1.43		47	160	55	0	55	17
30	LS	31	23	27	52	50	96		1.38		46	160	13	28	41	21
31	C	32	11	21	52	52	95		1.41		26	160	50	12	62	24
Total									43.84		1039	5120	1460	236	1696	598
Max.		40	30	35	53	52	99	81	1.48		90	200	60	51	65	25
Min.		20	-4	8	52	50	89	66	1.32		3	120	10	0	40	14
Av.		32	17	24	52	51	96	73	1.41		34	165	47	8	55	19

REMARKS: Watt-hour meter changed and sent to Consumers Power for repair on 23rd

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 7, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1958 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	768	560	195	89.7	59	89.8	157	72	7.8	7.5	7.5	7.3	5.7	7.1	7.2
3	774	552	168	87.5	50	96.0	108	56	7.8	7.5	7.5	7.3	6.1	7.2	7.2
4															
5															
6	812	622	223	84.8	72	87.5	142	72	7.6	7.4	7.5	7.4	6.0	7.1	7.2
7	646	628	185	88.1	56	85.7	121	68	7.8	7.5	7.6	7.4	6.1	7.0	7.3
8	676	552	107	84.1	47	87.2	107	67	7.7	7.6	7.6	7.5	6.1	7.1	7.0
9	618	548	112	86.6	44	97.7	99	59	7.8	7.6	7.6	7.5	6.1	7.0	7.0
10	798	566	150	86.0	43	93.0	103	62	7.9	7.6	7.6	7.4	6.2	7.2	7.2
11															
12															
13	738	570	207	76.8	63	81.0	148	71	7.7	7.5	7.6	7.4	6.3	7.2	7.3
14	680	564	141	88.7	49	91.8	102	61	7.7	7.6	7.6	7.4	6.3	7.0	7.2
15	648	594	145	86.2	51	83.4	115	61	7.7	7.6	7.6	7.4	6.0	7.1	7.0
16	672	560	136	87.5	51	96.1	95	54	7.7	7.6	7.6	7.5	6.0	7.1	7.2
17	586	558	107	87.9	51	92.2	97	65							
18															
19															
20	724	610	199	83.9	74	85.1	120	70							
21	710	598	140	85.7	54	85.2	120	58							
22	722	558	131	83.2	49	89.8	108	60							
23	712	610	128	85.9	53	75.5	103	55							
24	654	558	151	86.8	49	83.7	102	61							
25															
26															
27	776	592	224	83.9	71	93.0	114	69							
28	688	588	131	87.0	50	100	112	62							
29	620	534	158	89.2	49	87.8	122	64							
30	890	566	352	84.4	64	92.2	165	80							
31	628	536	147	89.7	52	86.5	109	63							
Total															
Max.	890	628	352	89.2	74	100	165	80	7.9		7.6		6.3	7.2	7.3
Min.	586	534	107	76.8	43	75.5	95	54		7.4		7.3	5.7	7.0	7.0
Av.	706	574	165	86.1	55	85.1	117	64	7.6		7.5		6.1	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	706	258064	574	209814	132	48250	18.7
SUSPENDED SOLIDS	165	60312	55	20104	110	40208	66.7
5 DAY B.O.D.	117	42767	64	23394	53	19373	45.3

PREPARED BY R. D. Craun, Chief Operator

DATE February 7, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate #2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	884												
2	2210	4.8		82.8									
3	2431	2.4		84.5									
4	1768												
5	1768												
6	2431	4.2		81.6		16575	1.30		63.3		16575	.27	58.7
7	2431	4.3		83.5									
8	3094	4.9		82.0									
9	2210	4.3		83.9									
10	1326	3.4		85.8									
11	2210												
12	1547												
13	2431	3.6		85.2		13700	1.53		64.7		13700	.69	56.9
14	2431	4.0		84.8									
15	1768	4.6		82.8									
16	1989	4.5		83.0									
17	1105	4.0		82.0									
18	1547												
19	1768												
20	3094	3.3		84.3		13480	1.36		62.5		13480	.77	60.6
21	1989	3.9		83.2									
22	1989	4.9		83.9									
23	1989	3.6		84.1									
24	2652	4.5		84.0									
25	1547												
26	2652												
27	2873	3.5		83.8		14590	1.44		61.3		14590	.82	58.3
28	1768	4.8		83.1							(BOD 427 ppm)		
29	1989	3.7		83.3									
30	1547	4.2		83.5									
31	1105	3.0		83.6									
Total	62543		21796		18221	58345		6910		4346	58435		
Max.	3094	4.9		85.8		16575	1.53		64.7		16575	.82	60.6
Min.	884	3.0		81.6		0	1.30		61.3		0	.27	56.9
Av.	2017	4.1	703	83.6	588	1882	1.41	223	62.9	140	1882	.64	58.6

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 7, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14	35	12.2		3.6		12.4		3.8
15	33	12.0		3.2		12.0		3.7
16								
17								
18								
19								
20								
21	36	11.4		3.4		11.6		3.0
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	36	12.2		3.6		12.4		3.8
Min.	33	11.8		3.2		11.6		3.0
Av.	35	12.0	85.7	3.4	35	12.0	85.7	3.4

COMMENTARY

All treatment units were again in continuous service. A satisfactory effluent was produced at all times.

The flow meter was out of service on the 16th for several hours. The cable spool shaft again dropped from the rear bearing and the cable had to be rewound on the spool and the meter recalibrated.

The pH meter had been acting erratic for some time and on the 16th the standardization control failed completely so the instrument was sent to Eberbach & Son for servicing.

Also on the 16th, the heat exchanger started dripping from the inside of the jacket of the boiler section. Internal inspection is not possible without removing the jacket so it was decided to call in a factory service man. He is to be here on the week of Feb. 3rd. The exchanger is being kept in service. On the 30th the electrical controls failed but a trace-down located a blown fuze and there was only one night of down time.

REMARKS: River sampling impossible most of the time due to freezing conditions.

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 7, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February...1958... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
									36				X 100	X 100	X 100	X 100
1	F	30	12	21			96		1.55		7	160	45	0	45	20
2	F	29	17	23			98		1.31		16	120	41	8	49	21
3	F	28	12	20	51	48	97	69	1.42		65	200	34	12	46	33
4	F	34	14	24	51	50		74	1.39		29	160	40	11	51	22
5	C	38	32	35	51	50		76	1.39		58	160	36	21	57	17
6	F	40	10	25	52	52	92		1.40		68	160	49	9	58	17
7	F	28	2	15	50	49	94		1.40		84	160	60	0	60	20
8	S	15	1	8			96		1.42		13	160	47	10	57	20
9	S	16	4	10			98	70	1.33		20	160	48	0	48	21
10	S	18	2	10	50	47	93	68	1.42		82	160	51	0	51	26
11	S	21	0	10	50	48	96		1.36		23	160	53	0	53	24
12	S	22	-1	10	50	49	98	64	1.41		40	160	50	0	50	23
13	S	24	14	19	50	49	94	66	1.41		21	160	44	0	44	31
14	S	32	16	24	50	49	96		1.43		43	160	44	15	59	22
15	S	30	0	15			92	72	1.37		10	200	54	0	54	20
16	S	8	-12	-2			95		1.31		14	160	39	1	40	25
17	F	12	-4	4	49	46	96		1.41		27	160	53	5	58	23
18	F	21	10	15	49	48	96		1.39		32	160	48	5	53	24
19	C	30	0	15	50	48	92	66	1.39		30	160	46	0	46	21
20	F	28	18	23	51	50	94		1.39		154	200	54	9	63	15
21	R	38	22	30	51	50	98		1.40		42	160	50	0	50	13
22	F	34	22	28				69	1.36		13	160	47	0	47	13
23	F	42	26	34			97		1.39		13	160	45	1	46	10
24	F	50	32	41	52	52	99		1.57		51	160	45	0	45	9
25	F	47	33	40	51	52		69	1.55		91	160	57	0	57	8
26	LR	50	38	44	51	51	96		1.59		30	200	36	13	49	10
27	S	42	32	37	51	50	92		1.58		90	160	61	14	75	15
28	S	42	31	36	51	50	94		1.62		45	200	30	28	58	16
29																
30																
31																
Total									39.77		1211	4640 ~~6440~~	1307	162	1469	539
Max.		50	38	44	52	52	99	76	1.62		154	200	61	28	75	33
Min.		8	-12	-2	49	46	92	66	1.31		7	120	30	0	40	8
Av.		30	14	22	51	49	95	69	1.42		43	173	47	6	53	19

REMARKS: Small amounts of gas lost to atmosphere when drawing supernate. Escapes under the skirt when holder is against the steps.

PREPARED BY R. D. Craun, Chief Operator

DATE March 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....February...1958.. SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3	1088	706	221	81.9	82	85.4	151	75	pH meter not returned from						
4	704	584	113	84.1	53	84.9	105	61	being repaired yet.						
5	644	562	151	85.4	51	84.3	97	55							
6	922	616	129	83.7	47	83.0	88	52							
7	668	568	144	86.1	53	84.9	118	61							
8															
9															
10	716	536	216	82.4	55	89.1	133	69							
11	814	626	126	88.9	63	87.3	116	62							
12	756	652	160	92.5	65	96.9	122	73							
13	868	646	215	87.9	48	91.7	138	66							
14	746	616	185	90.3	61	98.3	110	74							
15															
16															
17	824	550	191	83.8	55	90.9	133	64							
18	700	574	150	86.0	49	87.8	121	61							
19	736	576	169	81.1	52	75.0	127	61							
20	698	612	171	84.8	57	84.2	110	60							
21	800	634	163	89.0	54	90.7	147	73							
22															
23															
24	808	606	260	65.0	60	86.7	60	76							
25	678	602	211	86.2	51	86.3	133	60							
26	666	586	151	86.1	61	86.9	114	64							
27	602	576	132	84.9	57	84.2	99	62							
28	702	574	119	83.2	61	75.4	99	60							
29															
30															
31															
Total															
Max.	1088	706	260	92.5	82	98.3	151	76							
Min.	602	536	113	65.0	47	75.0	60	52							
Av.	757	600	169	84.7	57	86.7	116	64							

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	757	251082	600	199008	157	52047	20.7
SUSPENDED SOLIDS	169	56054	57	18906	112	37148	66.3
5 DAY B.O.D.	116	38475	64	21228	52	17247	44.8

PREPARED BY R.D.Craun, Chief Operator

DATE March 11

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...February...1958... SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					##########		
											#2 Supernatant		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1547												
2	1768												
3	2652	3.4		83.6		19665	1.33		63.3		19665	.72	57.4
4	1768	4.3		84.2							(B.O.D. 363 ppm)		
5	2431	3.7		83.5									
6	1768	3.7		84.9									
7	1989	3.8		85.6									
8	1768												
9	1326												
10	2431	3.8		83.7									
11	1547	3.7		80.4									
12	1326	3.8		83.5									
13	2210	3.3		83.3									
14	442	4.5		84.6		11490	1.35		67.7		11490	.93	61.1
15	1768										(B.O.D. 258 ppm)		
16	2210												
17	3094	3.9		86.0									
18	2210	3.7		83.3									
19	2210	3.2		86.0									
20	884	3.6		84.9		10600	1.43		66.7		10600	.50	64.3
21	1768	4.7		85.2							(B.O.D. 468 ppm)		
22	1768												
23	1326												
24	1326	3.9		84.6									
25	1768												
26	2210	4.8		80.0		9280	1.15		62.1				
27	3315	5.2		77.6									
28	2652	4.9		78.9									
29													
30													
31													
Total	53482		18184		15165	51035		5616		3644	41755		
Max.	3315	5.2		86.0		19665	1.43		67.7		19665	.93	64.3
Min.	442	3.2		77.6	0	0	1.15		62.1		0	.50	57.4
Av.	1910	4.0	646	83.4	~~1385~~ 542	1823	1.31	201	64.9	130	1491	.72	60.9

REMARKS:

Scum equal to 5 inches in # 1 digester on the 25th.

Approximately 12 inches in # 1 drying bed (9280 gal) on the 26th. 8.6% solids and 59.7% Volatile.

PREPARED BY R. D. Craun, Chief Operator

DATE March 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5								
6	33	12.8	88.9	4.0		12.8	88.9	4.0
7								
8								
9								
10	No sampling because of freezing weather							
11	Bottles break on collection trip.							
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25	35	11.2	80.0	3.8		11.2	80.0	3.0
26	35	11.2	80.0	3.4		11.2	80.0	3.6
27	36	11.2	81.2	3.4		11.6	84.1	3.4
28								
29								
30								
31								
Total								
Max.	36	12.8	88.9	4.0		12.8	88.9	4.0
Min.	33	11.2	80.0	3.4		11.6	80.0	3.0
Av.	35	11.6	82.3	3.7		11.7	83.2	3.5

COMMENTARY

All treatment units were in continuous service and a satisfactory effluent was produced at all times.

Mr. McKnight, serviceman for Walker Process, was here on the 4th to examine our heat exchanger to try to determine the origin of the moisture leaking from inside the jacket. After removing part of the jacket it was found that the cap covering the unused stack outlet on the opposite side of the boiler had burned out. This was allowing combustion products to enter the jacket section where the moisture content condensated and leaked down the side. A refractory material was obtained and used to fill the entire outlet section with a permanent seal. He also stated that to obtain the correct control of our water temps. it would be necessary to have a different type of aquastat and some thermostatic blending valves. He said that he would make those recommendations to the home office and have drawings made of the piping changes that would be required to make the changeover. So far we have not heard anything more about it.

Mr. Don Larkin, of the Mich. Dept. of Health, visited us on the 7th. He appeared to be quite interested in an automatic sampling devise that I had devised for our effluent. It had been in use since the 7th of Jan. in conjunction with our regular hand samplin program and comparitive data recorded. He spent some time reviewing the data and expressed the belief that the automatic devise was doing an excellen job. For 39 days ending the 28th of this month, the the 8 hr. hand samplin at hourly intervals averaged 55 ppm. The 8 hr. automatic sampling at 10 minute intervals averaged 61 ppm (this is probably due to material collected while brushing the tanks). The 16 hr. period from 4 pm to 8 am averaged only 44 ppm and the composited 24 hr. automatic sample averaged 48 ppm. This difference on a very uniform effluent early indicated that a like comparison for the raw sewage was essential. A water sampler for installation in the comminutor room was constructed from odds and ends during the month and was installed on the 24th. It appears to be remarkably effective and free from fouling up. It is planned to make comparitive tests on both raw and effluent for several months if possible. A detailed report on the results will then be prepared.

REMARKS: wheel

PREPARED BY R. D. Craun, Chief Operator

DATE March 11

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	C	40	32	36			93		1.56		12	160	54	30	84	17
2	LS	40	26	33			96		1.52		12	160	43	5	48	21
3	LS	36	28	32	52	51		68	1.63		30	160	50	10	60	20
4	F	40	32	36	51	50		73	1.60		30	200	61	0	61	18
5	LS	46	24	35	51	50	94	74	1.63		27	160	16	63	79	16
6	C	40	24	32	51	51	91		1.63		48	200	21	* 7	28	16
7	F	40	26	33	51	50	90		1.61		53	160	63	13	76	15
8	F	40	22	31			96		1.62		12	160	43	18	61	17
9	F	30	24	27			97		1.54		10	160	43	* 0	43	16
10	F	39	28	33	51	49	98	68	1.60		28	200	63	0	63	22
11	F	38	24	31	51	50		74	1.57		28	160	68	0	68	17
12	F	44	26	37	52	51		80	1.57		93	160	57	23	80	11
13	F	44	26	37	51	51	95		1.56		42	200	44	32	76	12
14	C	38	28	33	51	50	97		1.57		33	160	56	18	74	15
15	LS	36	26	31				79	1.54		10	160	61	0	61	23
16	LS	36	28	32			92	82	1.47		12	160	47	* 1	48	19
17	C	40	32	36	51	50	96		1.60		32	160	59	5	64	11
18	F	48	28	38	51	51	97		1.52		38	160	56	24	80	11
19	C	46	32	39	50	50		85	1.51		19	200	57	5	62	12
20	LS	41	25	33	51	50	96		1.50		40	160	49	23	72	14
21	C	42	24	33	51	50	98		1.51		29	160	15	* 10	25	11
22	F	48	22	35				85	1.48		24	160	43	* 2	45	17
23	F	50	30	40			92		1.42		10	160	53	1	54	7
24	C	45	30	37	51	50	96		1.51		33	200	48	14	62	14
25	F	48	24	36	51	50		78	1.48		39	160	47	21	68	12
26	F	50	30	40	52	52	96		1.50		31	160	45	19	64	9
27	C	46	34	40	51	50	99	77	1.50		62	200	56	0	56	12
28	F	52	29	41	51	51	92	81	1.51		42	160	54	12	66	9
29	F	57	33	45			96		1.50		11	160	56	2	58	7
30	F	55	31	43				83	1.40		8	160	53	1	54	8
31	F	54	28	41			91	86	1.53		30	160	54	0	54	4
Total									47.69		928	5240	1535	359	1894	433
Max.		57	34	45	52	52	99	86	1.63		93	200	68	63	84	23
Min.		30	22	27	50	48	90	68	1.40		8	160	15	0	25	4
Av.		44	28	36	51	50	95	78	1.54		30	169	50	12	61	14

REMARKS: * Gas vented at the digester cover.

PREPARED BY R. D. Craun, Chief Operator

DATE April 3, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		PPM		5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2															
3	732	658	148	87.8	80	80.0	137	77	pH meter in for repairs						
4	698	620	124	87.1	42	92.9	108	62							
5	810	578	124	87.9	45	88.9	87	59							
6	726	616	166	83.1	61	91.8	117	70							
7	712	574	149	85.2	61	86.9	118	69							
8															
9															
10	744	656	220		60		135	64							
11	686	582	122	86.9	47	91.5	113	59							
12	666	572	139	82.0	51	84.3	107	59							
13	702	580	140	79.3	35	82.9	116	58							
14	750	578	150	82.7	48	83.3	110	63							
15															
16															
17	710	578	169	87.6	52	94.2	112	67							
18	714	576	176	72.7	53	84.9	113	66							
19	766	634	148	64.2	53	83.0	104	60	8.5	7.5	8.4	7.4	6.0	7.1	7.1
20	804	590	184	90.8	41	85.4	121	55	7.6	7.5	7.5	7.4	6.0		
21	756	610	172	82.6	47	89.4	115	67	7.8	7.5	7.7	7.4	6.0	7.1	7.1
22															
23															
24	742	572	141	82.3	55	85.5	112	68	7.7	7.5	7.5	7.2	6.4	7.1	7.4
25	668	584	127	89.8	54	90.7	115	69	7.7	7.5	7.6	7.4	6.0		
26	742	598	141	85.0	45	95.6	114	60	7.7	7.4	7.6	7.3	5.8		
27	698	598	109	82.6	41	82.9	99	66	7.7	7.5	7.6	7.4	5.9	7.2	7.4
28	806	616	178	85.4	44	97.7	92	63	7.7	7.3	7.5	7.4	6.1	7.1	7.3
29															
30															
31	700	546	158	84.2	53	88.7	124	68	7.7	7.4	7.5	7.3	6.1	7.1	7.1
Total															
Max.	810	658	220	90.8	80	97.7	137	77	8.5		8.4		6.4	7.2	7.4
Min.	666	546	109	64.2	35	80.0	87	55		7.3		7.2	5.8	7.1	7.1
Av.	730	596	152	83.4	51	88.0	113	64	7.6		7.5		6.0	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	730	290343	596	237047	134	53296	18.4
SUSPENDED SOLIDS	152	60455	51	20284	101	40171	66.4
5 DAY B.O.D.	113	44943	64	25455	49	19488	43.4

PREPARED BY R.D.Craun, Chief Operator

DATE April 8

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate # 2		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1547												
2	1768												
3	2431	4.0		79.3		11050	1.54		63.2		11050	.32	60.3
4	2652	4.3		80.0							(B.O.D. 549)		
5	1547	4.8		80.0									
6	2210	3.7		81.5		21440	1.63		62.9		21440	.33	64.7
7	1768	3.8		83.0							(B.O.D. 427)		
8	1989												
9	1768												
10	3094	2.9		77.6									
11	2652	4.4		80.6									
12	1326	4.7		82.4									
13	1547	3.9		82.6									
14	2210	4.2		82.3									
15	1326												
16	2210												
17	2431	3.1		83.1		12820	1.34		67.9		12820	.38	66.4
18	1547	4.6		83.8									
19	1989	4.7		84.1									
20	2652	4.3		83.3									
21	2431	4.2		81.4		7730	1.45		67.8				
22	1547												
23	1768												
24	2431	3.6		84.3									
25	2431	4.5		80.8									
26	884	5.2		85.0		8620	1.55		63.9				
27	1989	4.9		85.1									
28	2652	4.8		82.9									
29	884												
30	1768												
31	2210	3.7		85.4									
Total	61659		21753		17903	61660		7723		5028	45310		
Max.	3094	5.2		85.4		21440	1.63		67.9		21440	.38	66.4
Min.	884	2.9		77.6		0	1.34		62.9		0	.32	60.3
Av.	1989	4.2	702	82.3	578	1989	1.50	249	65.1	162	1461	.34	63.8

REMARKS: Approximately 10½" in # 2 drying bed (7730 gal.) from # 2 digester on 21st. 8.7% solids and 56.1% vol.
7 ft. of supernate quality liquor was inadvertantly transfered from #2 digester to #1 during the night of the 21st. A like amount was transfered back from 2 to 1 on the 22nd; .86% solids and 63.5% vol.
11⅓ inches (8620 gal) to bed #3 on 26th. 8.7% solids and 56.1% vol.

PREPARED BY R. D. Craun, Chief operator

DATE April 4, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF Mareh 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4								
5	37	12.0		2.6		12.0		2.9
6								
7								
8								
9								
10								
11	37	12.0		3.2		12.2		3.6
12	37	12.2		2.8		12.4		3.0
13	39	11.8		2.6		12.0		2.4
14								
15								
16								
17								
18	38	12.0		3.0		12.2		3.2
19	40	12.0		2.4		12.2		2.7
20	41	11.4		2.0		11.4		2.6
21								
22								
23								
24								
25	41	11.8		3.2		12.0		3.0
26								
27	42	11.6		2.0		11.6		2.8
28								
29								
30								
31								
Total								
Max.	42	12.2		3.2		12.4		3.6
Min.	37	11.4		2.0		11.4		2.4
Av.	39	11.9	90.1	2.6		12.0	90.9	2.9

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of satisfactory quality was produced at all times.

Only routine operation was experienced. The heat exchanger and all the gasline piping was repainted.

The comparison study of hand and automatic sampling was conducted without interouption all month with both raw sewage and the clarifier effluent. Suspended solids comparisons were made on the 8 hr. hand and 8 hr. automatic samples and data is being recorded for 16 hr. and 24 hr. automatic samples of both sewage and effluent. The results for the month (average of 21 days) are as follows:

	RAW	EFF.
8 hr. hand	152 ppm	51 ppm
8 hr. auto.	160	57
16 hr. auto.	88	40
24 hr. auto.	110	46
24 hr. Sat.	118	39
24 hr. Sun.	106	45

The 8 hr. & 16 hr. auto. samples are used as collected but the 24 hr. is composited in proportion to the flow of the 2 periods. Sat. & Sun. are not proportioned but used as collected on a straight 24 hr. run. The 24 hr. raw sewage average is 42 ppm or 27.6% less than the 8 hr. hand. In the more unifor effluent the difference is only 5 ppm or 9.8%. The difference is not as great as I had anticipated, but still a sizeable factor. It is hoped to continue the comparisons for several months to provide ample data for a reliable strength factor.

If the automatic sampling devises continue to function as satisfactorily as they have so far, 8 hr. hand sampling will be discontinued in favor of the 24 hr. automatic proceedure.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE April 4, 1958

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...April 1958..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	58	36	47	52	52	95		1.50		40	160	45	16	61	15
2	C	52	34	43	51	52		86	1.50		20	160	51	10	61	13
3	F	56	36	46	52	52	94		1.51		26	160	50	6	56	7
4	C	60	42	51	52	52	98		1.52		26	160	57	8	65	9
5	R	61	40	50				87	1.54		10	160	57	0	57	11
6	R-LS	65	21	43				90	1.56		9	200	16	14	* 30	15
7	F	50	30	40	51	50	90	96	1.62		58	160	50	1	51	15
8	F	48	24	36	52	52	94		1.60		130	160	53	20	73	10
9	F	48	30	39	51	52	95		1.60		27	200	52	35	87	10
10	C	46	32	39	52	51	98	80	1.60		24	160	49	1	50	14
11	R	40	36	38	52	51		84	1.63		39	200	60	0	60	14
12	LR	46	28	37			97		1.56		6	160	56	1	57	9
13	F	64	34	49			102	82	1.51		15	160	56	0	56	5
14	F	64	36	50	52	51		84	1.63		40	160	51	7	58	3
15	F	71	41	56	52	54	98		1.59		68	160	52	20	72	7
16	F	72	40	56	52	54		90	1.59		60	160	48	19	67	7
17	F	80	52	66	53	54		92	1.57		52	160	52	11	63	3
18	F	78	62	70	54	54	96		1.51		47	160	48	15	63	4
19	LR	80	54	67			99	91	1.49		6	160	50	20	70	6
20	LR	66	44	55				94	1.47		30	160	50	13	63	6
21	F	72	50	61	53	52	93	96	1.56		46	160	58	0	58	5
22	LR	66	34	50	55	56	97	94	1.58		66	200	50	20	70	9
23	R	64	46	55	53	52		96	1.63		44	200	50	20	70	8
24	C	66	32	49	52	52	96		1.58		58	160	62	7	69	15
25	F	54	28	41	52	54	99	91	1.56		35	160	64	7	71	9
26	F	54	32	43				94	1.51		28	160	50	9	59	6
27	LR	57	41	49			92	96	1.46		34	200	62	0	62	6
28	R	61	33	47	53	51	93	97	1.57		39	160	56	0	56	10
29	F	44	30	37	52	52		95	1.53		40	160	50	25	75	6
30	F	60	42	51	52	54	97		1.53		58	160	48	28	76	9
31																
Total									46.61		1281	5040	1553	333	1886	266
Max.		80	62	70	55	56	102	97	1.63		130	200	64	35	87	15
Min.		40	21	36	51	50	90	80	1.46		6	160	16	0	30	3
Av.		60	37	49	52	52	96	91	1.55		39	168	52	11	63	9

REMARKS: * Venting at cover.

PREPARED BY ...R. D. Craun, Chief Operator.....

DATE.....May 8.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April 1958 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	682	564	135	86.0	47	85.1	97	59	7.8	7.5	7.7	7.4	6.1	7.1	7.2
2	622	536	124	85.5	43	86.0	101	65	7.6	7.5	7.7	7.4	6.1	7.1	7.3
3	946	570	132	82.6	42	85.7	128	58	7.6	7.5	7.4	7.3	6.1	7.2	7.3
4	732	592	135	83.7	46	80.4	115	64	7.6	7.5	7.4	7.3	5.8	7.1	7.2
5															
6															
7	736	590	255	87.0	47	91.5	123	63	7.8	7.6	7.7	7.4	6.1	7.1	7.2
8	794	604	161	88.2	47	91.5	141	73	7.8	7.5	7.5	7.4		6.9	
9	880	600	149	86.6	42	92.9	120	60	7.7	7.5	7.7	7.4	5.8	6.9	7.1
10	648	586	123	87.8	53	85.9	97	60	7.7	7.5	7.5	7.4	5.9	7.0	7.2
11	765	616	135	77.0	49	77.6	105	66	7.7	7.5	7.6	7.4	5.9	7.1	7.2
12															
13															
14	742	618	182	84.1	66	84.8	132	86	7.7	7.5	7.5	7.4	6.0	7.1	7.2
15	598	550	115	88.6	48	89.6	104	61	7.6	7.4	7.5	7.4	6.0	7.1	7.2
16	580	556	96	90.6	42	95.2	85	57	7.6	7.4	7.5	7.3	6.1	7.0	7.1
17	764	572	141	88.6	49	89.8	100	55	7.6	7.5	7.6	7.3	6.1	7.0	7.1
18	756	584	90	84.4	41	92.7	83	58	7.6	7.5	7.5	7.4	6.1	7.1	7.2
19															
20															
21	684	600	153	81.0	54	92.6	108	69	7.6	7.4	7.5	7.3	6.0	7.1	7.2
22	804	612	257	84.4	64	84.4	176	72	7.6	7.4	7.5	7.4	6.3		
23	694	568	147	74.8	51	86.3	118	58	7.6	7.5	7.5	7.4	6.5	7.0	7.2
24	678	580	147	84.4	52	82.7	114	62	7.6	7.5	7.6	7.3	6.1		
25	746	568	135	83.7	46	84.8	99	69	7.8	7.5	7.5	7.4	6.0	7.1	7.2
26															
27															
28	684	548	151	81.5	45	95.6	107	66	7.6	7.4	7.4	7.2	5.9	7.1	7.2
29	704	626	140	87.1	52	90.4	126	72	7.6	7.5	7.6	7.4	5.9	7.1	7.2
30	834	592	159	88.1	54	92.6	138	82	7.5	7.4	7.5	7.4	5.8		
31															
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
Max.	946	626	257	90.6	66	95.6	141	86	7.8		7.7		6.5	7.2	7.3
Min.	580	536	90	74.8	41	77.6	83	55		7.4		7.2	5.8	6.9	7.1
Av.	728	583	148	84.8	49	88.1	114	65	7.5		7.4		6.0	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	728	282995	583	226630	145	56365	19.9
SUSPENDED SOLIDS	148	57532	49	19048	99	38484	66.9
5 DAY B.O.D.	114	44315	65	25267	49	19048	43.0

PREPARED BY R. D. Craun, Chief Operator

DATE May 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....April 1958..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					[illegible]		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate from #1 GALLONS DRAWN *	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2210	4.3		83.8									
2	1989	5.0		83.3									
3	1105	4.0		83.3									
4	2210	4.9		83.9		12150	1.41		63.6		12150	.42	63.3
5	1547												
6	1768												
7	2652	3.8		82.1									
8	1768												
9	1768	4.9		81.8		13700	1.11		65.2		13700		
10	1547	4.5		82.0									
11	2431	4.5		83.5									
12	1326												
13	1768												
14	2652	3.5		83.1									
15	1768	3.5		83.1		10830	1.33		66.7		3760	.27	54.3
16	2210	4.4		84.2									
17	1768	4.3		82.1									
18	2210	3.9		82.4									
19	1547												
20	1768												
21	1768	3.7		81.8									
22	1989	4.5		81.5		12160	1.34		62.5		12160	.28	63.3
23	3049	3.8		82.3									
24	2210	4.2		83.0									
25	2431	4.5		80.8									
26	1989												
27	1547												
28	1326	4.2		82.9									
29	2873	4.4		82.5		12380	1.20		60.0		12380	.29	52.4
30	2431	4.5		82.7									
31													
Total	59670		21569		17971	61220		7941		5050	54150		
Max.	3094	5.0		84.2		13700	1.41		66.7		13700	.42	63.3
Min.	1105	3.5		80.8		0	1.11		60.0		0	.27	52.4
Av.	1989	4.3	727	82.4	599	2040	1.28	265	63.6	168	1805	.31	58.3

REMARKS: * Supernate on drying bed or land areas.

5 inches (2210 gal.) of scum to # 1 digester on the 8th.
Filled drying bed #4 to a depth of 9.3 inches (7070 gal.) on 15th. 6.2% solids and 64.7% volatile.

PREPARED BY R. D. Craun, Chief Operator

DATE May 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...April...1958..... SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1	47	12.0	***	4.0		12.0		3.6
2	47	10.4		2.8		10.6		2.8
3	46	12.0		3.6		12.2		3.4
4								
5								
6								
7								
8	46	10.6		4.0		10.8		3.8
9	45	11.2		3.1		11.0		3.1
10	46	11.0		2.6		11.0		2.8
11								
12								
13								
14								
15	52	11.0		3.2		11.0		3.0
16	55	10.8		2.6		11.2		3.0
17	57	11.0		3.4		11.2		3.0
18								
19								
20								
21								
22	58	10.0		2.8		10.2		2.8
23	53	11.2		3.0		11.3		3.1
24								
25								
26								
27								
28								
29	50	10.4		2.6		11.0		2.8
30	50	11.0		3.1		11.2		2.9
31	52	11.6		3.2		11.4		3.0
Total								
Max.	58	12.0		4.0		12.2		3.8
Min.	46	10.0		2.6		10.2		2.8
Av.	50	11.0	97.3	3.1		11.2	99.1	3.1

COMMENTARY

Operational functions were all of a routine nature. A satisfactory effluent was produced at all times.

The experimental comparison of suspended solids in hand and automatic sampling was continued throughout the month. The data collected from the 22 days averaged as follows:

RAW SEWAGE - 8 hr. hand, 148 ppm; 8 hr. auto, 130 ppm; 16 hr. auto, 82 ppm; 24 hr. auto, 109 ppm. A difference of 39 ppm or 26.4% in the 8 hr. hand and 24 hr. automatic.

EFFLUENT - 8 hr. hand, 49 ppm; 8 hr. auto, 49 ppm; 16 hr. auto, 39 ppm; 24 hr. auto, 43 ppm. A difference of 6 ppm or 12.2% between the 8 hr. hand and 24 hr. automatic.

Unproportioned 24 hr. samples were run on weekends. In the raw sewage, the Saturdays averaged 104 ppm and Sundays 109 ppm. In the effluent, Saturdays were 39 ppm and Sundays 51 ppm. These are close comparisons to the proportioned 24 hr. samples collected throught the week.

The experiment will be continued during May. In addition, single dilutions of the 24 hr. automatic samples of raw sewage and effluent will be tested for B.O.D. in an effort to set up a comparison factor in that catagory also.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE May 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	68	36	52	54	56	100	90	1.53		44	160	65	3	68	5
2	F	66	44	55	54	54		94	1.57		69	200	55	7	62	6
3	R	76	44	60			99	92	1.66		16	160	62	0	62	6
4	F	53	33	43			96	96	1.50		11	160	52	0	52	2
5	F	58	36	47	54	54		97	1.58		34	160	50	25	75	21
6	F	58	36	47	52	53	98		1.53		38	160	46	3	49	10
7	F	66	33	49	54	55	101	90	1.56		48	160	57	9	66	9
8	F	64	36	50	54	54		94	1.57		63	200	53	2	55	3
9	F	58	40	49	54	54		97	1.53		44	160	64	6	70	5
10	F	80	48	64			97		1.53		4	160	55	0	55	2
11	F	82	42	62			102	94	1.46		15	160	63	0	63	2
12	F	74	40	57	55	55	98	97	1.56		43	160	52	13	65	2
13	F	82	48	65	54	56	102	96	1.50		90	200	54	13	67	1
14	F	82	60	71	55	56		99	1.55		92	160	52	11	63	1
15	F	82	40	61	56	56	94	102	1.56		85	160	* 2	8	10	2
16	F	86	40	63	54	56	92		1.54		42	160	62	4	66	1
17	R	86	62	74			97		1.56		16	200	* 12	2	14	2
18	F	76	46	61			94		1.46		11	160	68	21	89	2
19	F	70	48	59	55	56	98		1.47	60	2026	160	74	1	75	9
20	F	66	40	53	55	56	102		1.45	60	2140	160	60	13	73	2
21	F	73	47	60	55	56		96	1.46	65	2170	160	56	0	56	1
22	R	70	36	53	55	56	96	99	1.47	71	2090	200	25	38	63	5
23	F	74	38	56	55	57	95		1.46	76	2150	160	57	34	91	3
24	F	78	52	65			102	93	1.44	76	2080	160	63	7	70	2
25	F	70	36	53				97	1.36	69	2090	160	61	1	62	2
26	F	76	50	63	56	57		100	1.48	75	2110	200	58	0	58	1
27	F	82	50	66	56	57	92	102	1.48	74	2190	160	68	0	68	2
28	F	64	38	51	55	56	99		1.45	63	2060	200	70	0	70	3
29	F	76	54	65				100	1.43	61	2130	160	80	0	80	2
30	R	87	61	74			99		1.38	60	2030	160	59	2	61	2
31	R	86	62	74			103	97	1.55	61	2050	160	66	11	77	1
Total									46.63	871	28081	5240	1721	234	1955	117
Max.		87	62	74	56	57	103	102	1.66	76	2190	200	74	38	91	21
Min.		53	33	43	52	53	92	92	1.36	60	4	160	2	0	10	1
Av.		73	44	59	55	56	98	96	1.50	67	906	169	56	8	63	4

REMARKS: * Gas venting at the cover.
Used gas motor, shorted and sent to Consumers Power for repair

PREPARED BY R. D. Craun, Chief Operator

DATE June 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..... May 1958 .....

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	678	582	152	84.9	~~115~~ 53	84.9	115	73	7.7	7.3	7.4	7.3	5.9	7.0	7.1
2	692	570	122	84.4	57	86.0	108	58	7.6	7.5	7.5	7.4	6.1	7.1	7.2
3															
4															
5	748	634	191	77.9	66	89.4	142	89	7.7	7.5	7.5	7.4	5.9	7.1	7.2
6	634	584	114	88.9	52	84.6	112	67	7.7	7.5	7.6	7.4	6.0	7.1	7.2
7	710	578	148	87.2	52	82.7	124	68	7.7	7.4	7.5	7.4	5.9	7.1	7.2
8	690	546	169	85.9	51	86.3	140	73	7.8	7.5	7.5	7.3	6.0	7.0	7.2
9	660	562	125	81.6	49	81.6	125	77	7.8	7.5	7.7	7.4	5.9	7.0	7.2
10															
11															
12	920	598	199	82.9	69	85.5	244	55	7.6	7.4	7.5	7.3	5.8	7.2	7.0
13	844	672	136	78.7	49	81.6	133	87	7.7	7.4	7.5	7.2	6.0	7.2	7.0
14	656	560	135	86.7	70	85.7	113	68	7.6	7.5	7.5	7.3	5.9	7.0	7.3
15	632	606	147	88.4	56	92.9	122	73	7.7	7.4	7.5	7.4	6.0	7.0	7.3
16	656	568	193	85.0	57	86.0	143	80	7.7	7.5	7.6	7.4	6.0	7.0	7.3
17	~~790~~	~~566~~	~~200~~	~~84.0~~	~~63~~	~~85.7~~	~~139~~	~~71~~	~~7.7~~						
18															
19	790	566	200	84.0	63	85.7	139	71	7.7	7.5	7.5	7.2	5.9	7.0	7.2
20	760	554	162	88.3	48	100	132	65	7.7	7.5	7.5	7.3	6.0	7.0	7.0
21	648	598	127	85.5	53	90.6	102	65	7.7	7.4	7.6	7.3	5.9	7.0	7.2
22	800	600	156	86.5	54	92.6	99	67	9.4	7.4	7.5	7.3	6.0	6.9	7.2
23	736	600	148	85.1	58	87.9	131	83	7.6	7.4	7.5	7.4	6.0	7.0	7.2
24															
25															
26	800	586	236	85.2	71	84.5	171	86	7.7	7.3	7.5	7.2	5.8		
27	648	574	177	87.0	54	98.1	123	69	7.6	7.4	7.5	7.3	5.8	7.0	
28	714	622	123	85.4	52	75.0	105	67	7.6	7.4	7.6	7.3	5.8		7.1
29															
30															
31															
Total															
Max.	920	672	236	88.9	71	100	244	89	9.4		7.7		6.1	7.2	7.3
Min.	632	546	114	77.9	48	75.0	99	55		7.3		7.2	5.8	6.9	7.0
Av.	721	588	158	85.0	57	87.1	131	72	7.6		7.5		5.9	7.0	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	721	280390	588	228667	133	51723	18.4
SUSPENDED SOLIDS	158	61446	57	22167	101	39279	63.9
5 DAY B.O.D.	131	50945	72	28000	59	22945	45.0

PREPARED BY R.D.Craun, Chief Operator

DATE June 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate from #2 digester — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1326	4.1		84.6									
2	1768	2.7		84.1									
3	1547												
4	1547												
5	2210	4.6		84.5		14440	1.14		65.4		14440	.56	60.7
6	2431	3.8		81.7									
7	1326	4.1		83.3									
8	1768	4.3		83.1									
9	1768	4.6		83.2									
10	1547												
11	1547												
12	2431	4.3		82.9		11930	spoiled				11930	.31	66.3
13	1989	4.2		82.0									
14	1326	4.5		83.1									
15	1989	5.1		82.7									
16	1768	3.6		84.5									
17	1768												
18	1989												
19	1547	4.7		81.8									
20	1326	3.5		81.8		11490	1.33		63.9		11490		
21	1105	5.1		82.9									
22	3094	4.8		66.6									
23	1547	4.3		83.3		10830	1.20		62.1		10830		
24	1989												
25	1326												
26	1768	4.0		83.5									
27	1989	4.7		82.9		6850	1.56		62.9				
28	1768	4.9		83.3									
29	1768												
30	1105												
31	1326												
Total	53703		19628		16154	55540		6112		3887	48690		
Max.	3094	5.1		84.6		14440	1.56		65.4		14440	.56	66.3
Min.	1105	2.7		66.6		0	1.14		62.1		0	.31	60.7
Av.	1732	4.3	633	82.3	521	1792	1.31	197	63.6	125	1571	.43	63.5

REMARKS: Cleaned #1 drying bed on 7th. 4½ inch cake (17 cu yds),63.7% moist - 60% Vo
Filled #1 bed approx. 9 inches (6850 gal.) on 27th. 7.2% solids & 60.1% Vol.
Scum equal to 7 inches in #1 digester pumped on the 29th.

PREPARED BY R.D.Craun, Chief Operator

DATE June 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4								
5								
6	52	10.4		3.4	same	10.6		3.0
7	51	11.6		3.0		12.2		3.5
8	54	11.6		3.2		11.6		2.6
9								
10								
11								
12								
13	63	12.0		3.4		12.0		3.0
14	64	13.2		3.9		13.6		4.1
15	62	9.6		3.0		9.6		4.4
16								
17								
18								
19								
20	61	8.4		2.6		8.6		2.4
21	60	8.4		2.6		9.2		2.8
22								
23								
24								
25								
26								
27	62	9.4		3.1		9.6		2.3
28	62	8.8		2.8		8.8		2.4
29	61	10.6		2.4		10.4		2.4
30								
31								
Total								
Max.	64	13.2		3.9		13.6		4.4
Min.	51	8.4		2.4		8.6		2.3
Av.	59	10.4	102.0	3.0		10.6	103.9	3.0

COMMENTARY

All treatment units were in continuous service and a satisfactory effluent was produced at all times.

Chlorination of the effluent was st started on the 19th, the 4 day delay was necessitated by a faulty make-up water float valve which couldn't be repaired until Monday.

The comparison study of strength values of hand and automatic sampling was concluded on the 9th of this month In addition to the 3 month study of suspended solids, 5 Day BOD tests were also made on the 24 hour automatic samples during this month. The average BOD of the 8 hr. hand samples of Raw sewage was 131 ppm; of the 24 hr. automatic, 95 ppm or 27.5% lower. The 8 hr. hand of the effluent was 72 ppm while the 24 hr. automatic was 51 ppm or 29.2% weaker. Although the comparisons were made on only 20 days of data, it appears that a factor of abou 78% could be used to determin the 24 hour strength from 8 hr. hand sampling data.

The 3 months suspended solids data are tabled below. A detailed report of equipment and techniques used and the conclusions obtained will be prepared as soon as time allows. As it is quite obvious that more accurate data on plant loadings and efficiencie can be obtained by the full day automatic sampling, we are discontinuing the 8 hour hand sampling practice in favor of the automatic sampling during 24 hours of every day of the week.

The Saturday and Sunday items listed in the table are unproportione to flow, the others are proportioned for 8 hr. day and 16 hour night flows

REMARKS:

1958	PPM Suspended Solids in Raw Sewage: 8 hr Hand	8 hr Auto	16 hr Auto	24 hr Auto	24 hr Auto. Sat.	24 hr Auto. Sun.	PPM Suspended Solids in Effluen: 8 hr Hand	8 hr Auto	16 hr Auto	24 hr Auto	24 hr Auto. Sat.	24 hr Auto. Sun.
March	152	160	88	110	118	106	51	57	40	46	39	45
April	148	130	82	109	104	109	49	49	39	43	39	51
May	158	161	99	116	134	135	56	50	41	45	50	46
Average	153	150	90	112	119	117	52	52	40	45	43	47

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...June 1958..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE				SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER								
1	R	68	50	59				102	1.49	64	2050	160	63	0	63	3
2	F	68	44	56	56	56		103	1.52	73	2060	160	69	0	69	3
3	F	82	54	68			102		1.50	65	2040	160	7	68	75	3
4	F	87	63	75				99	1.54	69	1890	200	50	45	95	7
5	F	78	40	59			102	97	1.55	60	2130	160	66	13	79	5
6	F	76	42	59				101	1.50	57	2170	200	7	83	90	8
7	R	82	60	71			95	99	1.49	63	2140	160	6	69	75	6
8	R	81	61	71			92		1.55	61	2120	160	60	7	67	6
9	R	68	58	63	57	57	98		1.61	55	2160	160	51	19	70	2
10	C1	82	56	69	59	59	101		1.68	62	2110	200	69	26	95	3
11	F	74	50	62				99	1.56	56	2110	160	70	0	70	0
12	F	80	64	72	59	60	94	103	1.59	58	2120	160	67	0	67	1
13	R	76	46	61	58	59	101		1.68	66	2150	200	* 12	20	32	4
14	F	76	48	62				98	1.53	59	2130	160	60	11	71	8
15	F	68	44	56			96	101	1.43	57	2120	160	67	1	68	8
16	F	72	44	58				101	1.50	78	2220	160	57	10	67	1
17	LR	76	52	64			96	102	1.52	60	2020	160	60	0	60	3
18	LR	78	54	66			102	100	1.50	60	2130	200	5	64	69	3
19	LR	79	59	69				97	1.54	64	2120	160	44	23	67	5
20	F	80	46	63			102		1.55	60	2170	200	66	12	78	6
21	F	80	44	62			97	100	1.44	62	2100	160	66	3	69	5
22	R	79	52	65			104	104	1.35	60	2100	160	5	60	65	5
23	R	74	50	62	57	58		96	1.50	60	2090	160	47	22	69	5
24	R	80	60	70			96	98	1.51	57	2100	160	62	7	69	5
25	R	68	50	59			102	96	1.58	67	2080	160	58	10	68	6
26	F	62	52	57				99	1.52	58	2120	200	62	1	63	5
27	F	78	50	64	57	57	103	96	1.52	61	2140	160	56	6	62	5
28	F	86	60	73				99	1.53	65	2090	200	13	66	79	2
29	F	86	60	73			98		1.46	54	2120	160	4	67	71	5
30	F	92	66	79			96		1.65	64	2100	160	43	36	79	2
31																
Total									45.89	1855	63200	5120	1372	749	2121	130
Max.		92	66	79	59	60	104	103	1.68	78	2220	200	70	83	95	8
Min.		62	40	56	56	55	92	96	1.35	54	2020	160	4	0	32	0
Av.		77	53	65	58	58	99	100	1.53	62	2107	171	46	25	71	4

REMARKS: * Venting at cover

PREPARED BY R. D. Craun, Chief Operator

DATE July 3

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1958 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	[redacted] Av.	[redacted]	[redacted] Av.	[redacted]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1															
2	690	562	188	86.7	48	87.5	137	66					5.9	6.9	7.1
3	750	572	99	80.8	54	79.6	112	60	7.7		7.6		5.7		7.1
4	628	592	163	92.0	52	90.4	90	55	7.7		7.5		5.5	7.0	
5	546	516	88	88.4	43	86.4	92	61	7.6		7.4		5.6		7.1
6	686	570	93	82.7	41	82.9	85	55	7.7		7.7		5.9	7.0	
7	638	576	133	81.9	70	87.1	91	85	7.7		7.4				
8	546	494	110	81.8	46	93.5	99	55	7.4		7.3				
9	648	562	100	85.0	44	88.6	89	71	7.4		7.2		5.6	7.0	7.1
10	628	564	117	88.0	51	90.2	74	53	7.6		7.4		5.8	7.2	
11	624	564	112	88.4	44	84.1	98	63	7.5		7.5		5.7		7.2
12	564	528	102	90.2	66	97.7	80	61	7.6		7.4		5.6	7.0	
13	576	528	87	83.9	44	81.8	69	57	7.6		7.5		5.8		7.2
14	538	502	99	86.9	46	89.1	98	62	7.6		7.4				
15	540	474	106	90.6	65	97.8	103	63	7.6		7.5				
16	722	548	146	84.2	48	79.2	113	58	7.4		7.2		5.8	7.1	
17	640	610	133	85.7	52	76.9	125	67	7.6		7.4		5.7	7.1	
18	592	572	114	89.5	55	83.6	82	59	7.7		7.6		5.7		7.2
19	572	548	117	85.5	43	76.7	89	65	7.5		7.5		5.7	7.0	
20	602	558	102	86.3	48	83.3	93	67	7.4		7.3		5.5		7.2
21	550	562	121	86.0	58	84.5	107	78	7.7		7.6				
22	578	532	112	95.5	59	79.7	100	61	7.6		7.6				
23	748	580	141	90.1	68	88.2	98	65	7.5		7.4		5.8		7.3
24	652	594	112	89.3	54	92.6	95	69	7.6		7.6		5.8	7.1	
25	656	582	100	85.0	48	81.3	94	64	7.6		7.5		5.6		7.2
26	670	538	133	88.0	37	100	107	55	7.6		7.4		5.7	7.0	
27	656	572	123	90.2	51	90.2	90	61	7.7		7.5		5.7	7.1	7.1
28	628	534	184	77.2	57	78.9	130	75	7.6		7.5				
29	550	488	107	85.0	36	83.3	100	52	7.4		7.3				
30	720	554	130	86.2	39	94.9	110	70	7.5		7.3		5.8	7.1	
31															
Total															
Max.	750	610	188	95.5	70	100	137	85	7.7		7.6		5.9	7.2	7.3
Min.	538	474	87	77.2	36	76.7	69	52	7.4		7.2		5.5	6.9	7.1
Av.	625	551	120	86.6	50	86.6	98	63	7.6		7.4		5.7	7.0	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	625	239200	551	210879	74	28321	11.8
SUSPENDED SOLIDS	120	45926	50	19136	70	26790	58.3
5 DAY B.O.D.	98	37507	63	24111	35	13396	35.7

* See comentary for explanation concerning pH recordings.

PREPARED BY R. D. Craun, Chief Operator

DATE July 8

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA													
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate from # 2 Digester		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1547												
2	1989	4.9		82.4									
3	1768	5.4		81.8		9720	1.25		61.5		9720	.28	58.8
4	1989	5.2		81.9									
5	1989	4.4		81.3									
6	1547	3.8		81.6		7070	1.74		70.5		7070		
7	2210												
8	1768												
9	1989	4.7		82.4									
10	1547	4.4		82.4		9940	1.16		64.5		9940	.29	64.5
11	1768	4.3		81.3									
12	1768	4.0		81.7									
13	1989	4.3		80.7									
14	1326												
15	2210												
16	1768	4.1		81.8		10170	1.41		63.9		10170		
17	1768	4.7		81.1									
18	1768	5.8		82.3									
19	1326	4.5		81.5									
20	1547	5.1		82.6		9280	1.34		63.9		9280		
21	1989												
22	1547												
23	2210	4.6		84.6									
24	1989	4.7		83.3									
25	1326	4.5		81.1									
26	1547	5.4		82.9									
27	1547	5.2		82.7		11050	1.49		66.7		11050	.30	57.5
28	1547												
29	1989												
30	2431	4.2		81.4									
31													
Total	53703		21554		17674	57320		6741		4395	57320		
Max.	2431	5.8		84.6		11050	1.74		70.5		11050	.30	64.5
Min.	1326	3.8		80.7		0	1.16		61.5		0	.28	57.5
Av.	1790	4.7	718	82.0	589	1911	1.40	225	65.2	147	1911	.29	60.3

REMARKS:

No. 2 Bed cleaned on the 4th, 4 inch cake (15 cu yd).
" 3&4 " " " " " 5th, 3 " " (22 cu yd). } 51.7% moist & 59.6 Vol.

PREPARED BY R. D. Craun, Chief Operator

DATE July 3

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3	61	7.8		2.0	same	8.2		2.2
4	62	8.3		2.1		8.3		2.3
5	65	8.6		2.4		8.8		2.0
6								
7								
8								
9								
10	63	7.6		2.6		7.4		2.4
11	64	8.2		2.0		8.6		2.3
12	64	9.4		2.0		9.2		2.0
13								
14								
15								
16								
17	61	9.6		2.0		9.8		2.2
18	60	10.0		2.0		9.6		2.2
19	63	11.4		2.2		11.6		2.4
20								
21								
22								
23								
24								
25								
26	60	10.3		2.3		10.8		2.6
27								
28								
29								
30								
31								
Total								
Max.	65	11.4		2.6		11.6		2.6
Min.	60	7.6		2.0		7.4		2.0
Av.	62	9.1	93.1	2.2		9.2	94.2	2.3

COMMENTARY

All treatment units were in continuous service throughout the month and a satisfactory effulent was produced at all times.

Mr. Richmond of the Mich. Dept. of Health was contacted by phone and permission was granted for us to use our automatic sampling devises for all of our routine analyses. This provides for 24 hour sampling, 7 days a week and is believed to be much more representative than the restricted peak strength grab samlpes collected in the past. A much closer balance between the suspended solids removed and the pounds of solids pumped to the digester indicate the value of 24 hour sampling.

Hourly pH recordings of raw sewage and the effluent were discontinued with the hourly sample collections. Nearly 3 years of testing has shown that the pH is very stable, and that the few deviations were of very short duration and never in the critical range. A pH is taken of the 24 hour samples and will indicate any change of very great magnitute.

The writer attended the Annual Meeting of the Michigan Sewage and Industrial Wastes Association on the 23rd, 24th and 25th.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE July 3

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	91	71	81			98	96	1.62	63	2230	160	67	4	71	3
2	R	92	70	81	59	60	96	101	1.70	60	2570	200	3	75	78	5
3	R	83	65	74			93		1.68	60	2090	160	54	18	72	5
4	R	92	68	80			99		1.61	53	2110	160	62	18	80	5
5	R	90	60	75			95	102	1.69	38	2130	200	11	39	* 50	5
6	F	90	66	78			94		1.55	48	2140	160	55	32	87	5
7	F	84	60	72	59	59	100		1.71	67	2090	160	41	28	69	2
8	F	80	54	67			104		1.65	60	2120	160	51	32	83	4
9	F	88	70	79				102	1.68	59	2130	160	0	84	84	6
10	R	86	58	72				100	1.67	60	2110	160	0	51	51	5
11	R	84	64	74	59	59	94	98	1.63	62	2180	160	10	103	113	4
12	F	88	62	75			92		1.59	60	2080	160	45	29	74	7
13	F	90	66	78			98	95	1.50	60	2100	160	46	38	84	5
14	R	88	66	77	59	60	94	100	1.71	63	2100	160	47	20	67	5
15	C	88	62	75			97		1.70	61	2090	160	55	34	89	5
16	F	76	52	64			95	104	1.58	63	2070	160	49	29	78	6
17	C	82	62	72	59	60	102	102	1.50	60	2090	160	0	93	93	5
18	F	80	56	68			~~100~~	100	1.60	60	2060	120	0	79	79	6
19	F	78	52	65			96	98	1.50	56	2100	160	45	52	97	4
20	F	81	51	66			100	96	1.34	55	2100	120	52	32	85	2
21	C	84	64	74	60	61	96	100	1.53	66	2070	160	50	29	79	3
22	F	86	56	71			102	99	1.58	72	2020	120	49	30	79	2
23	F	88	58	73			99	103	1.54	61	2040	160	16	83	99	2
24	F	90	64	77	59	61	99		1.55	67	1990	160	0	64	64	4
25	R	80	56	68			96	99	1.56	63	2130	160	53	59	112	4
26	F	90	60	75			102	97	1.48	63	2100	120	47	43	90	5
27	R	89	69	79			99	102	1.36	52	2120	160	54	44	98	5
28	LR	84	60	72	60	62	104	100	1.62	67	2090	160	11	42	53	4
29	R	82	62	72			100	100	1.54	63	2150	160	0	100	100	6
30	R	82	66	74	60	60	97	97	1.54	66	2140	160	36	43	79	5
31	R	71	48	59			101	96	1.43	59	2060	120	51	29	80	5
Total									48.94	1867	65600	4840	1060	1456	2516	139
Max.		92	71	81	60	62	104	104	1.71	72	2570	200	67	103	113	7
Min.		71	48	59	59	59	92	95	1.34	38	1990	120	0	4	50	2
Av.		85	61	73	59	60	98	99	1.58	60	2116	156	34	47	81	4.5

REMARKS: * Venting at cover

PREPARED BY R. D. Craun, Chief Operator

DATE August 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...July 1958..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	[redacted] Average	[redacted]	[redacted] Average	[redacted]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	612	578	116	88.8	47	91.5	101	65	7.7		7.5		5.8		7.1
2	650	522	189	89.9	43	97.7	83	52	7.5		7.2		5.5	7.1	
3	698	634	104	74.3	51	80.4	87	61	7.7		7.5		5.6		7.1
4	594	502	121	88.4	44	81.8	80	43	7.6		7.5				
5	614	506	101	88.1	43	95.3	93	49	7.7		7.5				
6	544	482	107	85.0	42	90.5	92	59							
7	682	530	118	89.0	49	81.6	100	49	7.4		7.2		5.8	7.1	
8	626	558	114	81.6	51	84.3	87	64	7.7		7.4		5.5	7.2	
9	644	538	116	84.5	48	81.3	84	52	7.6		7.6		5.5		7.1
10	588	556	107	87.9	49	87.8	79	64	7.6		7.5		5.6		
11	628	548	102	85.3	53	86.8	87	52	7.7		7.4			6.9	
12	614	536	156	88.5	45	91.1	100	62	7.5		7.3				
13	590	498	130	82.3	42	78.6	117	36	7.3		7.2				
14	670	540	140	83.6	46	80.4	90	55	7.3		7.2		5.7		7.0
15	602	536	114	85.1	43	83.7	94	53	7.6		7.5		5.5	7.0	
16	652	536	119	82.4	38	84.2	96	44	7.5		7.3		5.7		
17	654	546	123	86.2	49	87.8	107	58	7.6		7.4		5.7		7.0
18	604	530	169	91.1	47	96.7	115	59	7.5		7.3		5.6	7.0	
19	888	568	176	84.7	51	82.4	138	73	7.5		7.4				
20	650	552	130	86.9	37	94.6	135	58	7.6		7.5				
21	744	630	127	85.0	59	88.1	98	76	7.4		7.3		5.7	6.9	
22	694	596	143	91.7	49	91.8	113	63	7.6		7.5		5.5		7.0
23	734	552	150	86.7	37	94.6	101	55	7.6		7.4		5.5	6.8	
24	580	556	131	90.1	48	91.7	130	68	7.6		7.4		5.6	7.1	7.4
25	640	552	146	78.1	45	86.7	102	54	7.5		7.4		5.6	6.8	
26	686	538	260	88.5	38	86.8	123	65	7.5		7.3				
27	574	498	130	86.9	44	88.6	114	61	7.7		7.2				
28	682	578	133	87.2	55	87.3	107	61	7.4		7.3		5.8	6.9	7.1
29	628	552	123	89.4	51	94.1	100	47	7.5		7.3		5.6	6.9	7.1
30	608	552	112	87.5	64	89.1	103	70	7.6		7.4		5.7		
31	706	550	163	82.8	46	87.0	102	49	7.5		7.4		5.6		7.0
Total															
Max.	888	634	260	91.7	64	97.7	138	76	7.7		7.6		5.8	7.2	7.4
Min.	544	482	101	74.3	37	78.6	79	36	7.3		7.2		5.5	6.8	7.0
Av.	648	547	135	86.3	47	87.8	102	57	7.6		7.4		5.6	7.0	7.1

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	648	264488	547	223624	101	41224	15.6
SUSPENDED SOLIDS	135	55102	47	19184	88	35918	65.2
5 DAY B.O.D.	102	41632	57	23265	45	18367	44.1

* 24 hour automatic sampling

PREPARED BY R.D.Craun, Chief Operator

DATE August 6th

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate from #2 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1326	3.7		77.2									
2	1547	6.3		79.3									
3	1768	5.5		81.6		8400	1.55		64.9		8400		
4	1989												
5	1768												
6	1768												
7	1768	5.3		80.4									
8	1326	6.3		79.0		9500	2.22		67.6		9500	.32	66.8
9	1768	5.8		78.8									
10	1768	6.7		77.7									
11	1768												
12	1989												
13	1326												
14	2652	4.3		79.5									
15	1326	4.5		79.1		12150	1.42		67.6		12150		
16	2210	4.4		81.5									
17	1547	4.8		80.3									
18	1547	4.9		80.9									
19	2873												
20	1768												
21	1989	4.4		78.8									
22	1326	6.0		79.0									
23	1989	5.7		79.5									
24	2431	5.1		80.1		15910	1.43		62.9		8410	.37	71.3
25	3315	4.9		80.9									
26	1768												
27	2873												
28	1547	3.8		81.4									
29	1547	5.3		80.6		8400	1.62		63.8		0		
30	3094	4.6		81.4									
31	1989	5.0		82.0									
Total	59670		26374		21099	63200		~~5471~~ 8972		~~5688~~	47300		
Max.	3315	6.7		82.0		15910	2.22		67.6		12150	.37	71.3
Min.	1326	3.7		77.2		0	1.42	187	62.9	183	0	.32	66.8
Av.	1925	5.2	851	80.0	681	2039	1.69	~~176~~	63.4	~~98~~	1526	.35	69.0

REMARKS: #1 drying bed cleaned on 10th. 3½" cake(13 cu.yds.) 65.5% Moist. & 58.7%Vol.
Approx. 10" (7500 gal. sludge to #1 bed on 24th. 8.2% Solids & 57.7% Vol.
" 8½" (6400 gal) " " #2 " " 29th. 5.9% " " 55.0% ".

Scum equal to 6" in # 1 digester pumped on the 11th.

PREPARED BY R. D. Craun, Chief Operator

DATE Aug. 6th

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF July 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1	70	9.8		2.2	same	10.0		2.4
2	72	9.2		2.8		9.4		2.9
3	73	8.0		3.3		8.0		3.2
4								
5								
6								
7								
8	69	8.1		2.1		8.0		1.8
9	68	8.6		2.0		8.8		2.2
10	70	8.6		1.8		9.0		2.0
11								
12								
13								
14								
15	69	6.8		1.8		6.8		1.6
16	68	7.0		1.7		7.4		2.0
17	65	7.8		1.8		7.8		1.8
18								
19								
20								
21								
22								
23								
24	64	8.6		4.0		9.4		2.2
25								
26								
27								
28								
29	66	8.4		3.2		9.3		3.1
30	70	7.9		3.3		7.9		3.5
31	68	7.6		3.2		7.6		3.3
Total								
Max.	72	9.8		4.0	72	10.0		3.5
Min.	64	6.8		1.7	64	7.4		1.6
Av.	69	8.2	90.1	2.6	69	8.4	92.3	2.5

COMMENTARY

All treatment units were in contineous service throughout the month and an effluent of satisfactory quality was produced at all times.

Mr. R.H.Gaukel, field service man for the Wm DaLee Co., called on the 9th to investigate a vibration that had developed in the #3 raw sewage pump. It had also become necessary to repack the pump every 7 to 10 days. It was determined that the trouble was due to operating the pump with the suction valve throttled to even out the flow for chlorinating purposes. He reccommended that not less than a 2 MGD rate be allowed to pass through the pump. At that rate the pump appeared to operate smoothly. It had been known, of course, that suction throttling caused cavication but it had been tried anyway on the advise of the design engineer.

Two University of Michigan students from Venezuela visited the plant on the 2nd. They were very impressed with our operation in general and the physical appearance in particular. They were intrigued with the simplicity and effectiveness of our automatic sampling devises. The word ingenuous was repeated several times.

The automatic sampling over 24 ~~hr~~ hours continues to produce a much truer concept of actual flow characteristics than did the 8 hour sampling routine of the past. It has also liberated a considerabl amount of time that can be used for maintenance duties.

REMARKS:

PREPARED BY R.D.Craun, Chief Operator

DATE August 7th

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	84	52	68				100	1.46	64	2120	160	64	33	97	5
2	F	90	54	72			94	104	1.41	60	2160	120	57	9	66	5
3	F	91	57	74			104	102	1.39	63	2140	160	49	15	64	4
4	F	90	58	74			100	106	1.52	69	2110	120	47	14	61	5
5	LR	92	72	82			106	104	1.58	66	1970	160	0	67	67	4
6	R	88	66	77	60	60	102	102	1.65	68	2100	200	0	72	72	4
7	LR	88	64	76			~~100~~	100	1.59	63	2150	160	0	94	94	4
8	F	84	54	69	60	61	96	98	1.55	63	2130	160	39	29	68	5
9	F	86	64	75			102	96	1.50	62	2130	160	41	31	72	5
10	R	88	60	74			97	101	1.49	52	2120	120	48	31	79	4
11	F	88	70	79	61	63	103		1.73	64	2090	160	31	20	51	4
12	F	88	66	77			101	102	1.67	62	2040	200	18	63	81	5
13	F	84	60	72			104	100	1.62	63	2110	160	31	19	50	4
14	R	86	66	76	61	63		104	1.66	60	2140	160	0	46	46	4
15	F	84	60	72			99	102	1.60	63	2100	160	0	78	78	5
16	F	76	54	65			95	100	1.49	60	2110	160	56	0	56	4
17	F	81	45	63			93	106	1.45	56	2160	160	61	1	62	5
18	F	75	47	61	60	61	102		1.45	66	2160	160	27	48	75	4
19	F	80	62	71			104	100	1.45	62	2140	160	27	39	66	4
20	R2½"	87	63	75				103	1.80	66	2130	160	49	21	70	4
21	F	76	56	66	61	61	96	105	1.64	62	2170	160	66	18	84	4
22	F	72	48	60			104	102	1.59	62	2160	160	37	23	60	4
23	F	78	60	69			~~104~~	104	1.51	31	2090	160	0	86	86	4
24	C	74	48	61			98	101	1.41	54	2100	160	0	65	65	6
25	F	68	48	58			94		1.48	63	2080	160	34	36	70	5
26	F	76	52	64			98	96	1.47	62	2070	160	38	36	74	4
27	F	78	52	65				100	1.49	62	2060	120	33	30	63	5
28	F	85	65	75			94	102	1.60	64	2080	160	48	26	74	5
29	F	89	73	81			100		1.70	67	2050	160	45	22	67	5
30	F	90	66	78			105	100	1.65	80	2080	160	40	18	58	4
31	F	71	51	61				103	1.43	57	2100	120	41	12	53	4
Total									48.03	1916	65350	4840	1027	1102	2129	138
Max.		92	73	82	61	63	106	106	1.80	80	2170	200	66	94	97	6
Min.		68	45	58	60	60	93	96	1.39	31	1970	120	0	0	46	4
Av.		82	58	71	60	61	99	102	1.55	62	2108	155	33	36	69	4.5

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 4

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..August..1958..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS		SUSPENDED PPM		5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA RAW SEWAGE		PH. DATA PLANT EFFLUENT		RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	[redacted]	[redacted]	[redacted]	[redacted]			
									Average		Average				
1	626	594	120	77.5	52	76.9	89	57	7.5		7.4		5.7	7.0	7.1
2	634	534	124	82.3	49	83.0	121	69	7.6		7.3				
3	620	502	114	82.5	41	90.2	98	60	7.4		7.2				
4	644	596	131	84.7	65	84.6	118	73	7.4		7.2		5.6		7.0
5	652	580	161	88.8	52	92.3	94	55	7.6		7.5			7.0	
6	684	614	161	71.4	65	72.3	92	55	7.6		7.4		5.4		7.1
7	580	550	125	82.4	49	81.6	90	64*	7.5		7.3		5.6	7.0	
8	668	588	119	85.7	48	81.3	93	59	7.5		7.4		5.7		7.0
9	678	558	129	79.8	46	78.3	121	59	7.4		7.3				
10	676	544	124	77.4	54	68.5	101	63	7.6		7.4				
11	588	568	123	82.9	64	78.1	96	63	7.3		7.2		5.4	6.9	7.0
12	620	550	121	87.6	47	91.5	107	78	7.6		7.4		5.4	7.2	7.0
13	592	544	100	82.0	55	83.6	93	70	7.6		7.5		5.2		7.0
14	568	522	137	86.0	54	85.2	97	58	7.5		7.4		5.5		
15	628	530	115	83.5	50	66.0	105	58	7.5		7.2		5.6	6.9	
16	670	528	188	83.5	50	80.0	149	74	7.5		7.4				
17	638	480	143	86.7	44	95.5	90	57	7.4		7.2				
18	734	602	162	83.3	53	81.1	135	70	7.4		7.1		5.3	7.1	6.9
19	636	564	135	87.4	60	91.7	122	63	7.6		7.5		5.4		7.0
20	662	592	192	72.4	83	73.5	108	78	7.4		7.2		5.3		
21	584	534	116	81.9	48	81.3	76	59	7.5		7.3		5.7		7.1
22	638	536	105	86.7	57	87.7	96	67	7.5		7.3		5.5		
23															
24															
25															
26															
27															
28															
29															
30															
31															
Total															
Max.	734	614	192	88.8	83	95.5	149	78	7.6		7.5		5.7	7.2	7.1
Min.	568	480	100	71.4	41	66.0	76	55	7.3		7.1		5.2	6.9	6.9
Av.	637	555	134	82.6	54	82.0	104	64	7.5		7.4		5.5	7.0	7.0

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	637	255162	555	222316	82	32846	12.9
SUSPENDED SOLIDS	134	53676	54	21631	80	32045	59.7
5 DAY B.O.D.	104	41659	64	25636	40	16023	38.5

PREPARED BY R. D. Crayn, Chief Operator

DATE Sept. 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.. August 1958 ..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate # 2 Dig. — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2652	4.3		80.2		10830	1.82		64.6		10830	.34	64.1
2	1547												
3	1547												
4	1768	5.0		79.9									
5	1326												
6	1989	5.2		78.8									
7	2210	5.0		76.0		10610	1.41		66.2		10610	.32	61.6
8	2431	5.2		75.9									
9	2210												
10	2431												
11	1768	5.6		76.2		11270	1.55		61.9		11270	.40	63.7
12	1989	5.1		75.2									
13	1326	5.3		77.0									
14	1989	5.8		76.7									
15	2210	5.5		76.9									
16	1989												
17	1105												
18	1547	5.1		78.6		10390	1.37		62.5		10390	.34	66.3
19	1989	5.7		79.7									
20	1768	6.1		78.2									
21	3315	5.7		75.0									
22	1989	5.9		74.5		10170	1.51		65.0		10170	.31	61.6
23	1768												
24	2431												
25	1768	No sampling, operator											
26	2210	on vacation.											
27	1989												
28	1989												
29	1105												
30	1768					10610					10610		
31	1768												
Total	59891		27489		21249	63880		8210		5254	63880		
Max.	3315	6.1		80.2		11270	1.82		66.2		11270	.40	66.3
Min.	1105	4.3		74.5		0	1.37		61.9		0	.31	61.6
Av.	1932	5.4	887	77.3	685	2061	1.53	265	64.0	169	2061	.34	62.5

REMARKS 2200 gal. scum pumped on the 5th.

PREPARED BY R. D. Craun, Chief Operator

DATE Sept. 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF August 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5	64	7.9		3.5	same	8.4		3.6
6	74	8.8		3.0		9.2		3.2
7	72	7.8		2.6		7.8		3.2
8								
9								
10								
11								
12	70	8.0		1.7		8.4		2.0
13	73	10.8		3.1		11.0		3.5
14	71	9.4		4.3		9.8		5.3
15								
16								
17								
18	No. Samples, operator on vacation							
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	74	10.8		4.3		11.0		5.3
Min.	64	7.8		1.7		7.8		2.0
Av.	71	8.8	98.9	3.0	71	9.1	102.	3.5

COMMENTARY

All treatment units were in continuous service and an effluent of satisfactory quality was produced at all times.

A University of Michigan student from Okinawaw visited the plant on the 8th.

The Operator was on vacation the last week of the month. Mr. Sebring, the assistant, performed all duties by himself during the absence and managed everything in a very creditable manner.

Mr. Graham of the Walker Process Co. was here on the 22nd to install a different type aquastat for controlling the water temperature in the heat exchanger. The one he brought could not be installed so he will return at a later date with still a different one.

About half the scum pumped on the 5th went to #1 drying bed on top of the sludge cake because the pipe plug of the fill line worked out. It will be necessary to make some kind of different disposal of the cake when the bed is cleaned, as the grease will make it unsuitable for use as a soil conditioner.

Sludge recirculator and # 3 sewage pump repacked during the month.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE... Sept. 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF... September 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	64	44	54			98	105	1.42	58	2100	120	49	* 0	49	5
2	R	74	54	64			104		1.57	67	2090	160	35	* 0	35	3
3	R	74	64	69			106	98	1.61	69	2060	120	52	33	85	3
4	LR	85	64	74				104	1.68	49	2060	160	42	29	71	4
5	F	82	64	73			107		1.60	67	2070	200	0	60	60	0
6	R	83	60	71			101		1.63	74	2060	160	40	21	61	2
7	F	70	50	60			98		1.43	81	2070	160	4	** 31	35	2
8	F	70	48	59	62	61	102		1.55	60	2100	160	32	40	72	3
9	R	73	47	60			106	94	1.55	65	2220	160	4	70	74	5
10	F	64	40	52				92	1.47	69	2180	160	63	2	65	5
11	F	66	40	53	60	59		98	1.44	64	2170	160	67	0	67	4
12	F	70	46	58			96		1.44	64	2080	160	40	39	79	3
13	F	76	52	64			108	96	1.45	70	2170	120	47	21	68	8
14	F	80	62	71				100	1.40	66	2140	160	65	0	65	5
15	LR	80	60	70			100	106	1.61	70	2100	160	60	6	66	16
16	R	78	62	70			108		1.56		171	160	0	69	69	5
17	R	60	50	55			102		1.59		21	160	1	52	53	5
18	F	66	42	54			98		1.45		67	160	50	10	60	5
19	F	70	48	59			106	95	1.49		71	160	43	12	55	6
20	F	74	54	64				99	1.52		93	160	58	0	58	8
21	LR	71	43	57			99	104	1.42		68	160	63	1	64	9
22	F	72	46	59	60	61	107		1.56		151	160	28	31	59	6
23	F	76	58	67			109	100	1.50		150	160	57	10	67	5
24	LR	84	70	77				104	1.58		39	160	53	0	53	6
25	R	83	57	70	60	60	101	109	1.62		42	160	55	0	55	5
26	F	72	50	61			109	105	1.52		29	160	24	28	52	5
27	F	78	38	58				106	1.46		46	160	0	70	70	7
28	F	62	40	51			100	102	1.38		25	160	24	38	62	8
29	F	64	46	55	59	61	102	[illegible]	1.50		74	160	6	44	50	7
30	R	58	32	45			98		1.46		75	160	33	41	74	12
31																
Total									45.46	993	32800	4720	1095	758	1853	167
Max.		85	70	77	62	61	109	109	1.68	81	2220	200	67	70	79	16
Min.		58	32	45	59	59	96	92	1.38	49	21	120	0	0	35	0
Av.		73	51	62	60	60	103	101	1.52	66	1093	157	37	25	62	5.6

REMARKS: * Waste gas meter out of service and sent to Consum[illegible]

** Venting at cover

PREPARED BY R. D. Craun, Chief Operator

DATE October 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....September 1958 SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B.O.D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT		RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	[redacted]	[redacted]	[redacted]	[redacted]			
									Average		Average				
1		No samples, assistant operator ill.													
2															
3															
4															
5															
6															
7															
8	718	658	141	83.0	65	84.6	110	72	7.6		7.4		5.6	7.2	7.2
9	890	724	141	88.7	50	96.0	103	61	7.6		7.4				
10	772	616	121	77.6	45	88.9	122	68	7.6		7.3		5.5		
11	634	600	115	90.4	58	94.8	111	73	7.7		7.3		5.5	7.2	7.2
12	682	584	141	85.8	53	83.0	118	65	7.6		7.4		5.5		
13	758	618	184	82.6	49	79.6	136	73	7.5		7.4				
14	622	510	115	82.6	32	81.3	113	35	7.5		7.4				
15	652	606	142	82.4	60	85.0	113	85	7.6		7.4		5.5		
16	664	590	115	88.7	57	89.5	112	70	7.5		7.4		5.4	7.2	7.2
17	632	574	173	83.2	57	87.7	102	63	7.5		7.5		5.4		
18	692	536	163	85.9	45		133	46	7.5		7.4		5.6	7.2	
19	756	514	153	88.9	61	75.4	112	55	7.8		7.7		5.6		7.2
20	610	504	134	87.3	37		109	61	7.6		7.5				
21	640	550	168	84.5	57	80.7	206	146	7.5		7.4				
22	704	608	132	78.8	57	75.4	107	66	7.4		7.3		5.8	7.1	7.3
23	742	648	122	89.3	55	89.1	118	72	7.7		7.4		5.5		
24	640	542	137	89.8	42		107	55	7.6		7.4		5.5		
25	568	538	103	82.5	57	80.7	94	74	7.5		7.4		5.5	7.0	7.2
26	626	526	164	89.6	47		91	65	7.5		7.3		5.5		
27	740	546	251	81.3	57	73.7	147	84	7.4		7.4				
28	612	516	127		68	85.3	206	81	7.4		7.3				
29	782	530	148	85.1	47		110	55	7.4		7.2		5.8	7.0	7.3
30	660	568	137	79.6	54	88.9	115	58	7.6		7.3		5.7	7.0	
31															
Total															
Max.	890	724	251	90.4	68	96.0	206	146	7.8		7.7		5.8	7.2	7.3
Min.	568	504	103	77.6	32	73.7	91	35	7.4		7.2		5.4	7.0	7.2
Av.	687	574	145	84.9	53	84.4	122	69	7.5		7.4		5.6	7.1	7.2

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS	687	260469	574	217626	113	42843	16.4
SUSPENDED SOLIDS	145	54975	53	20094	92	34881	63.4
5 DAY B.O.D.	122	46255	69	26161	53	20094	43.5

PREPARED BY R.D.Craun, Chief Operator

DATE October 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF September 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate #2 Dig.		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2652												
2	3094	4.7		80.9		13080	1.56		60.8		13080	.39	61.1
3	1768												
4	1768												
5	2210												
6	884												
7	2652												
8	1989	4.5		80.5		9280	1.31		61.8		9280	.31	66.0
9	1768												
10	1768	5.4		78.2		5300	1.78		65.1		5300		
11	2873	4.7		79.7									
12	1105	4.8		80.6									
13	1547												
14	2652												
15	2652	5.0		82.0									
16	2210	5.2		81.1		9060	1.43		58.0		1210		
17	1768	5.0		80.5									
18	1547	4.7		78.7									
19	1326	4.7		78.4									
20	2210												
21	1989												
22	1547	5.6		79.5		15810	1.65		63.2		15810	.31	63.5
23	1326	6.3		75.0									
24	1768	5.3		74.7									
25	2431	4.8		74.5									
26	1326	5.2		75.2									
27	1768												
28	2431												
29	2431	5.2		76.6		13260	1.70		66.0		13260	.35	64.5
30													
31													
Total	59449		25771		19978	65790		8621		5388	57940		
Max.	3094	6.3		82.0		15810	1.78		66.0		15810	.39	66.0
Min.	884	4.5		74.5		0	1.31		58.0		0	.31	61.1
Av.	1982	5.1	859	78.3	666	2193	1.56	287	62.5	180	1931	.34	63.8

REMARKS: Cleaned #3 drying bed on 8th & 9th. Approx. 2½" cake (9 cu yd)
Filled #3 bed approx. 10⅓" (7850 gal) on 17th. 8.1% sol., 57.6% vol. pH 7.1
6½" [illegible] (2521 gal) on 9th

PREPARED BY R.D.Craun, Chief Operator

DATE October 9

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF September 1958

SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9	58	7.4		5.2	same	7.4		5.2
10	58	8.1		1.3		8.7		1.9
11	59	8.2		1.9		8.1		1.6
12								
13								
14								
15								
16	62	7.4		2.0		7.3		2.7
17	63	7.0		1.8		6.8		2.2
18								
19								
20								
21								
22								
23	60	8.6		1.4		9.4		2.0
24	62	8.2		1.9		8.2		1.5
25	66	7.0		.8		7.0		1.0
26								
27								
28								
29								
30	58	9.0		.8		9.0		.8
31								
Total								
Max.	66	9.0		5.2		9.4		5.2
Min.	58	700		.8		6.8		.8
Av.	61	7.9	79.8	1.9		8.0	80.8	2.1

COMMENTARY

All treatment units were in continuous service and an effluent of good quality was produced at all times.

A new float control was installed on the plant water system on the 3rd. The old control was still working but had developed a contineous leak from the bleeder pipe.

A new type of horn for outside phone alarm was installed on the 9th. The old one had fallen off its mounting on Aug. 19th. The phone Co. said it was not worth repairing and had ordered this one and there was some delay in shipmen

The fouling of the electrodes which control the sewage lift pumps has been a source of constant annoyance. They hung unprotected in the open wet well and the great turbulance around them caused them to bob around in the water and caused uneven operation of the pumps. The wires caught quantities of debris which slid down the wires to the porcelain housings, got hung up the there and soon caused a stoppage. It was necessary to take the system out of service to clean the electrodes from several times a day to several times a week. On the 23rd a length of 4" transite pipe was purchased and anchored temperarily in the wet well to provide a stilling well. It was thought that this would protect the electrodes and wiring so that they would not catch so much foreign material. It helped smooth out the operation and there was less fouling but a lot of ground gargabe and greases were driven into the bottom of the tube by the velocity of sewage falling from the comminutor channel into the wet well since the impact is right at the location of the tube. On

REMARKS: the 30th an elboe and a short length of pipe was installed so that it extended to a quiet place in the north west corner of the wet well. It is believed that this will allow the level of the liquid in the pipe to fluctuate without drawing in foreign material. If this temperary installatio helps to any extent, a permanent istallation will be made.

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...June 1958.....

SHEET NO. 2

DATE	TOTAL SOLIDS PPM		SUSPENDED SOLIDS PPM				5 DAY B. O. D. 20 DEG. C. PPM		PH. DATA						
									RAW SEWAGE		PLANT EFFLUENT				
	RAW SEWAGE	PLANT EFFLUENT	RAW SEWAGE	PERCENT VOLATILE	PLANT EFFLUENT	PERCENT VOLATILE	RAW SEWAGE	PLANT EFFLUENT	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									Av.	*	Av.	*			
1	690	562	188	86.7	48	87.5	137	66					5.9	6.9	7.1
2															
3	750	572	99	80.8	54	79.6									
4															
5															
6															
7															
8															
9															
10															
11															
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29															
30															
31															
otal															
lax.															
lin.															
v.															

SUMMARY	RAW SEWAGE		PLANT EFFLUENT		REDUCTIONS ACHIEVED		
	PPM	POUNDS	PPM	POUNDS	PPM	POUNDS	PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS							
5 DAY B.O.D.							

PREPARED BY .....

DATE

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...October 1958..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X100	SEWAGE GAS WASTED (cu. ft.) X100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	53	32	42	59	59	102	94	1.25	*1.50	48	200	36	23	59	12
2	F	60	34	47				95	1.02	*1.50	112	160	52	4	56	10
3	F	63	43	53	59	59	95	100	.87	*1.50	77	160	55	13	68	9
4	F	72	38	55			104	97	1.02	*1.50	32	120	45	19	64	7
5	F	53	33	43				98	.92	*1.50	59	120	51	12	63	3
6	F	63	39	51	60	60	96	102	1.07	*1.50	61	160	48	2	50	2
7	R	76	54	65			102		1.38	*1.50	75	160	45	38	83	3
8	HR	73	57	65	59	59	109	98	1.82		67	160	49	16	65	1
9	LR	74	48	61				100	1.66		167	160	11	34	45	2
10	F	54	44	49					1.57		72	160	51	50	101	5
11	LR	50	32	41			102	94	1.47		64	160	49	26	75	18
12	F	57	37	47				97	1.42		23	160	50	28	78	4
13	F	71	49	60	60	60	92	99	1.56		35	160	53	26	79	2
14	F	76	50	63	60	60	98	100	1.54		67	160	47	47	94	2
15	F	75	57	66	61	60	104	96	1.61		27	160	45	41	86	2
16	R	76	46	61	61	61	99	100	1.63		67	160	46	49	95	2
17	F	66	36	51	59	58	105		1.55		45	160	45	61	106	3
18	F	58	32	45			98	101	1.47		110	160	47	46	93	8
19	F	58	35	47			103		1.39		41	160	39	39	78	4
20	F	64	40	52	59	60	106	94	1.51		52	160	2	112	114	3
21	F	70	46	58	59	59		92	1.46		32	160	50	41	91	4
22	R	70	50	60	59	58		96	1.52		35	160	50	38	88	2
23	C	62	44	53	58	58	95	100	1.47		32	160	53	43	96	3
24	R	52	46	49	58	58	102		1.43		36	160	41	39	80	12
25	C	58	42	50			104	94	1.39		18	160	4	101	105	11
26	C	52	38	45				92	1.32		177	120	54	37	91	10
27	F	52	32	42				95	1.44		11	160	53	15	68	15
28	F	54	28	41	58	58	92	98	1.41		31	160	55	17	72	13
29	F	54	30	42	58	57	100		1.43		14	160	11	71	82	14
30	F	58	34	46	58	58	95		1.42		20	160	43	23	66	8
31	F	62	34	48	58	59	101		1.45		23	160	51	39	90	10
Total									*46.44		1730	4880	1331	1150	2481	204
Max.		76	57	66	61	61	109	102	1.82		177	200	55	112	114	18
Min.		52	28	41	58	57	92	92	1.32		11	120	2	2	45	1
Av.		62	41	52	59	59	100	97	1.50		56	157	43	37	80	7

REMARKS: * Estimated flows based on 3 days prior and 3 days after clarifiers were out of service. See comment on sheet 4.

PREPARED BY R. D. Craun, Chief Operator

DATE Nov. 6

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1956 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS: RAW SEWAGE	SUSPENDED SOLIDS: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE	PH. DATA: PLANT EFFLUENT	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
	DISCONTINUED								Average	Average			
1			122	81.1	90	100	104	87	7.7	7.5	5.8	7.0	
2			120	95.0	69	100	103	73	7.6	7.3	5.6		7.2
3			134	81.3	66	86.4	112	66	7.6	7.5	5.7	7.0	7.2
4			123	100	41	73.2	158	33	7.5	7.5			
5			153	90.2	39	92.3	123	76	7.6	7.5			
6			141	89.3	78	93.6	116	81	7.5	7.3	5.8	7.1	7.3
7			103		77		107	87	7.7	7.5	5.6	7.1	
8			239	48.5	55	78.2	89	50	7.5	7.5	5.5		
9			141	70.1	53	75.5	82	49	7.6	7.4	5.8	6.8	7.1
10			141	70.1	53	75.5	82	49	7.6	7.4	5.8	6.8	7.1
10			145	89.7	46	87.0	88	38	7.7	7.4	5.8	6.8	7.0
11			145	91.0	42	85.7	115	64	7.5	7.4			
12			147	86.4	52	71.2	115	48	7.4	7.4			
13			128	85.9	49	89.8	102	58	7.5	7.3	5.8	6.7	7.1
14			118	80.5	52	100	111	67	7.5	7.4	5.7	6.8	7.2
15			130	86.9	45	88.9	92	61	7.5	7.4	5.7	6.8	7.2
16			112	89.3	51	86.3	99	58	7.4	7.2	5.4	6.8	7.1
17			118	70.0	47	91.5	91	52	7.6	7.5	5.7	7.1	
18			149	85.9	57	61.4	115	73	7.7	7.3			
19			116	84.5	39	79.5	99	64	7.5	7.1			
20			129	92.2	41	92.7	99	55	7.5	7.1	5.6	7.1	7.3
21			154	89.6	64	61.0	103	58	7.6	7.5	5.6	7.1	7.2
22			166	88.6	48	100	92	55	7.6	7.4	5.6		7.3
23			127	85.0	50	76.0	109	61	7.5	7.3	5.5	7.1	7.2
24			175	97.7	60	88.3	107	71	7.7	7.5	5.5	7.1	
25			149	85.2	47	78.7	145	86	7.6	7.4			
26			132	84.1	83	72.3	109	103	7.3	7.1			
27			165	90.3	69	85.5	117	71	7.3	7.2	5.6		7.2
28			151	92.1	43	93.0	109	59	7.6	7.5	5.6	7.1	
29			148	93.2	57	86.0	92	69	7.7	7.6	5.7	7.1	7.3
30			141	99.3	51	84.3	99	63	7.5	7.3	5.4		
31			136	89.7	53	90.6	104	52	7.7	7.7	5.7	7.1	7.3
Total													
Max.			239	100	90	100	158	103	7.7	7.7	5.8	7.1	7.3
Min.			103	48.5	39	61.0	82	33	7.3	7.1	5.4	6.7	7.0
Av.			141	86.4	55	85.0	107	64	7.6	7.4	5.6	7.0	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	Discontinued						
SUSPENDED SOLIDS	141	75761	55	29552	86	46209	61.0
5 DAY B.O.D.	107	57492	64	34388	43	23104	40.2

PREPARED BY R. D. Craun, Chief Operator

DATE Nov. 7

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1958 . . . . . SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate #2 Dig.		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1989	5.7		67.8									
2	1547	5.9		75.5									
3	1547	7.2		75.5									
4	1989												
5	1547												
6	1768	4.5		81.0		15030	1.48		64.2		15030	.33	68.4
7	1547	4.7		81.6									
8	1768	4.4		79.7									
9	3094	5.7		71.7									
10	884	6.8		68.3		7500	1.64		63.4				
11	2210												
12	1989												
13	3315	4.8		74.1									
14	1547	5.0		74.3									
15	1547	5.2		73.7									
16	1768	5.1		76.2									
17	1989	4.5		78.0		13920	1.68		54.6		13920	.30	64.5
18	1989												
19	1989												
20	1326	4.3		80.5									
21	1326	4.5		80.2									
22	1768	5.5		81.2									
23	1989	4.9		84.1									
24	1326	4.8		82.4		12370	1.22		56.7		12370		
25	1989												
26	3536												
27	1547	4.1		82.3									
28	2431	4.5		82.9									
29	1989	4.9		82.2									
30	1547	4.2		69.2									
31	1989	4.5		81.9		13040	.95		52.6		13040	.29	68.3
Total	58786		24984		19388	61860		7223		4211	54360		
Max	3536	6.8		84.1		15030	1.68		64.2		15030	.33	68.4
Min	884	4.1		67.8		0	.95		52.6		0	.29	64.5
Av	1896	5.0	806	77.6	625	1995	1.39	233	58.3	136	1754	.31	67.1

REMARKS Approximatley 7500 gal.(10 in. in bed) to bed 3 on the 10th. 7.0% Sol.58.2 % Volatile. pH 7.0.
2 in. rain on 8th.
Scum equal to 5 in. in the digester on the 9th and 4 in. on the 18th.

PREPARED BY R. D. Craun, Chief Opreator

DATE Nov. 7

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF October 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1	52	9.4		1.5	same	9.6		1.6
2	52	9.9		1.7		10.3		2.0
3								
4								
5								
6								
7	53	10.1		2.0		10.3		2.6
8	57	9.4		2.2		9.4		1.9
9	60	8.0		3.3		8.0		3.5
10								
11								
12								
13	No samples due to vacation schedules.							
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	60	10.1		3.3		10.3		3.5
Min.	52	8.0		1.5		8.0		1.6
Av.	55	9.4	88.7	2.1		9.5	89.6	2.5

COMMENTARY

The north clarifier was completely dewatered for inspection and was out of service from the 1st until 4pm on the 3rd. The South clarifier was then partially dewatered for inspection of the central metalwork and was out of service until noon of the 7th. New squeeges were installed on the scum collectors of both units. All other conponants appeared to be in excellant condition.

During the 7 days that one or the other of the clarifiers were out of service the flow had to be estimated. The angle at which the effluent channel meet, and the velocity of the flow at that point coupled with a very short approach to the critical area of the Parshal Flume, causes conditions which produce false metering when only one tank is in service.

Treatment did not deteriorate to any extent during this period and an effluent of satisfactory quality was produced at all times.

The stilling well tubing for the protection of the electrodes controlin the operation of the sewage pumps which was installed last month on a trial basis, appears to be the solutio to a vexing condition. The electrodes have not had to be cleaned during the whole month. We are also getting a much greater degree of uniformity in the operation of the pumps.

The operator was on vacation the last two weeks and all duties were very capably handled by the assistant.

REMARKS:

PREPARED BY R.D.Craun, Chief Operator

DATE Nov. 7

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F.							METERED QUANTITIES							
		ATMOSPHERE			AVERAGE											
		HIGH	LOW	AVERAGE	RAW SEWAGE	PLANT EFFLUENT	NUMBER 1 DIGESTER	NUMBER 2 DIGESTER	SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	54	34	44				94	1.35		21	160	56	15	71	13
2	F	51	29	40			94	97	1.30		32	160	61	16	77	15
3	F	56	36	46	58	59	103		1.40		127	160	34	27	61	10
4	F	62	42	52	59	59	104	91	1.41		150	160	47	38	85	7
5	C	58	34	46				96	1.40		115	160	56	10	66	13
6	F	48	28	38	58	57		98	1.37		22	160	57	6	63	15
7	F	48	32	40	56	56		100	1.35		123	160	57	15	72	12
8	LR	48	34	41			101		1.33		148	160	54	24	78	20
9	F	49	37	43			106	92	1.25		121	160	61	2	63	15
10	F	50	28	39	58	56		95	1.40		47	160	13	44	57	17
11	F	58	28	43			97		1.36		31	160	54	18	72	7
12	R	54	42	48			104		1.39		40	160	46	9	55	2
13	R	60	46	53	58	58	107	89	1.43		64	160	51	25	76	8
14	R	64	54	59				94	1.45		55	160	45	13	58	8
15	R	58	44	51				96	1.48		38	160	46	0	46	8
16	R	60	48	54			97	98	1.40		28	120	50	0	50	7
17	R	68	52	60	57	56	105		1.54		53	160	45	13	58	2
18	F	54	32	43	57	56	109	92	1.48		54	160	52	2	54	5
19	F	48	34	41	57	56		94	1.40		63	160	56	0	56	14
20	LR	52	28	40			99	97	1.42		50	160	42	0	42	11
21	S	42	26	34	56	56	104		1.41		105	160	48	11	59	18
22	F	42	26	34				96	1.36		78	160	48	0	48	11
23	LS	54	32	43			95	98	1.30		94	160	55	2	57	8
24	C	38	26	32	56	56	104		1.44		93	160	42	0	42	11
25	LR	38	26	32					1.48		370	160	40	7	47	18
26	S	28	20	24	56	54		91	1.42		376	160	42	0	42	17
27	S	30	20	25			96	90	1.26		362	160	46	0	46	22
28	S	28	18	23	57	54	100	86	1.38		116	160	46	0	46	20
29	S	24	0	12				87	1.41		9	160	43	0	43	24
30	F	24	16	20			92	87	1.31		22	160	47	0	47	22
31																
Total									41.68		3007	4760	1440	297	1737	380
Max.		68	54	60	59	59	109	100	1.54		376	160	61	44	85	24
Min.		24	0	12	56	54	92	86	1.25		9	120	13	0	42	2
Av.		48	32	40	57	56	101	94	1.39		100	159	48	10	58	13

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Nov. 4

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF...November 1958... SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS: PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE [redacted]	PH. DATA: RAW SEWAGE [redacted]	PH. DATA: PLANT EFFLUENT [redacted]	PH. DATA: PLANT EFFLUENT [redacted]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									Average		Average				
1			189	87.8	47	78.7	145	68							
2			235	83.8	60	80.0	168	79	7.5		7.3				
3			212	84.4	67	85.1	143	73	7.8		7.5		5.5	7.2	7.2
4			123	81.3	59	72.9	105	56	7.7		7.7		5.7	7.1	
5			112	90.2	30	73.3	94	30	7.9		7.7		5.7		7.2
6			141	79.4	53	94.4	97	55	7.7		7.6		5.7	7.1	7.2
7			126	82.5	55	87.3	100	61	7.7		7.5		5.7		
8			272	48.6	45	68.9	114	33							
9			261	79.7	52	90.4	160	83	7.6		7.4				
10			152	79.6	55	94.5	126	72	7.8		7.7		6.0	7.1	7.1
11			134	86.6	50	90.0	113	59	7.8		7.6		5.9	7.1	
12			120	79.2	59	81.4	103	70	7.6		7.4		5.8		7.1
13			218	85.3	65	75.4	120	63	7.5		7.4		5.5	7.1	7.2
14			142	88.7	49	93.9	83	52					5.5		
15			162	79.0	52	94.2	109	43	7.6		7.7				
16			134	84.3	60	83.4	104	65	7.4		7.4				
17			142	85.3	50	90.0	90	60	7.8		7.5		5.8	7.1	7.2
18			147	89.0	48	85.5	114	50	7.8		7.6		5.7		
19			130	86.9	41	97.5	94	43	7.8		7.6		5.8		7.2
20			106	85.8	67	85.1	97	58	7.8		7.7		5.8	7.1	7.3
21			159	88.1	51	80.4	84	46	7.8		7.7		5.7		
22			117	88.9	43	88.4	115	61	7.7		7.5				
23			139	84.9	52	96.2	116	52	7.6		7.5				
24			168	78.2	54	77.8	109	46	7.9		7.7		5.6		
25			129	84.5	41	100	116	55	7.8		7.6		5.8	7.2	7.2
26			96	92.7	52	86.5	116	58	7.8		7.7		5.9		
27			132	87.1	16	75.0	115	52	7.7		7.4				
28			222	89.6	59	83.1	97	58	7.8		7.6		5.7	7.0	7.2
29			106	92.4	50	100	109	55	7.7		7.7				
30			163	82.8	54	74.1	152	66	7.7		7.3				
31															
Total															
Max.			272	92.7	67	100	168	79	7.9		7.7		6.0	7.2	7.3
Min.			96	78.2	16	68.9	83	30	7.4		7.3		5.5	7.0	7.1
Av.			156	83.9	51	85.4	114	57	7.7		7.6		5.7	7.1	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS	156	54227	51	17728	105	36499	67.3
5 DAY B.O.D.	114	39628	57	19814	57	19814	50.0

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 8

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					[redacted] Supernate #2 Dig.		
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1989												
2	2431												
3	1768	3.8		82.4									
4	1768	4.3		85.2		13260	1.08		64.4		13260	.30	60.9
5	1768	4.2		85.5									
6	2431	4.6		83.9									
7	2652	3.7		83.7									
8	1768												
9	1547												
10	1989	4.5		82.8									
11	1326	4.1		82.2									
12	2210	3.9		80.6									
13	1768	4.3		80.5		13700	1.39		61.9		13700	.29	67.1
14	1547	4.2		81.0									
15	1326												
16	1989												
17	1989	4.4		82.2									
18	1768	5.1		81.1									
19	1768	4.3		81.3									
20	1989	4.1		81.3									
21	1547	4.3		81.3		11490	1.45		63.1		11490	.29	62.3
22	1989												
23	2431												
24	663	3.5		81.6									
25	1989	5.0		81.5		6370	.82		65.7				
26	2210	4.2		81.3									
27	2210												
28	1547	4.5		69.7									
29	1989												
30	2652												
31													
Total	57018		20840		16985	44890		4487		2863	38450		
Max.	2652	5.1		85.5		13700	1.45		65.7		13700	.30	67.1
Min.	663	3.5		69.7		0	.82		61.9		0	.29	60.9
Av.	1901	4.3	695	81.5	566	1496	1.19	150	63.8	95	1282	.29	63.4

REMARKS:

Approximately 8½" (6370 gal.) fill in #4 drying bed on the 25th. 5.4% solids and 54.0% Vol. pH 7.2 Temp 92 F.

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 4

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF November 1958 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4								
5	48	10.6		3.1	same	10.6		2.8
6	46	10.0		2.0		10.2		2.6
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18	54	8.2		2.0		8.2		2.0
19	48	9.8		2.0		9.6		2.0
20	43	10.4		2.0		10.4		2.2
21								
22								
23								
24								
25	40	11.0		2.0		11.6		2.4
26	38	11.0		1.8		11.4		2.5
27								
28								
29								
30								
31								
Total								
Max.	54	11.0		3.1		11.4		2.8
Min.	38	8.2		1.8		8.2		2.0
Av.	45	10.1	84.1	2.1		10.2	85.0	2.4

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of good quality was produced at all times.

The grease seal on the sludge circulator pump was replaced with a water seal on the 11th. The impeller shaft has developed considerable wear at the packing gland and arrangements are being made to replace it.

Mr. Angley, who was superintendant of the Public Services Department under which this plant is included, died on the 21st. Mr. Lewis Williamson has been appointed by the Board of Public Services to fill the vacancy.

Repainting of all interior walls and ceiling areas of the main building has been started.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Dec. 4

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1958 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	C	31	21	26	56	54	98		1.59		19	160	40	2	42	17
2	F	40	26	33			100		meter		30	160	37	21	58	15
3	LR	38	30	34	56	55		87	Out		41	160	40	1	41	11
4	C	40	26	33			90	88	of		28	160	37	0	37	15
5	S	28	8	18	55	53	96		service		21	160	38	0	38	23
6	S	20	10	15			100	82			11	160	35	0	35	24
7	S	20	12	16				82			59	160	43	0	43	23
8	S	26	10	18	55	54	92	83			29	160	28	0	28	20
9	S	15	1	8			94				19	160	50	7	57	25
10	LS	16	2	9			101				10	160	42	0	42	17
11	F	20	0	10	54	52	105	74			28	160	37	0	37	20
12	F	22	-5	8			100	77			38	160	40	0	40	25
13	F	16	2	9			104	74			8	160	5	30	35	14
14	LS	17	-1	8				71			17	160	36	7	43	23
15	LS	16	2	9	54	52		74			32	160	31	0	31	21
16	LS	35	6	21			97				27	160	51	20	71	18
17	F	30	16	23			103	73			32	200	49	1	50	19
18	F	38	22	30	54	52	105	72			78	160	40	0	40	19
19	C	38	0	19			96	74			132	120	20	0	20	21
20	F	22	2	12			100	72			100	120	40	0	40	22
21	F	26	14	20			102	70			90	120	27	0	27	20
22	F	40	18	29	54	53	98	73			134	120	49	9	58	16
23	F	38	24	31			105	75			123	120	41	0	41	14
24	S	28	8	18	54	53	99	78			122	120	35	7	42	18
25	F	22	10	16			102				93	120	41	0	41	20
26	S	36	16	26			106	72			98	120	33	0	33	19
27	LS	40	18	29			100	74			96	80	42	0	42	20
28	F	43	19	31			105	73			102	120	46	1	47	13
29	C	42	16	29			99	76			30	120	34	0	34	17
30	F	24	12	18	54	52	101	75			194	160	53	9	62	19
31	R&S	35	17	26			96	82			196	120	55	2	57	18
Total									41.4 *		2037	4480	1195	117	1312	586
Max.		43	30	34	56	55	106	88			196	200	55	30	71	25
Min.		15	- 5	8	54	52	92	70			8	80	5	0	20	11
Av.		29	12	20	55	53	100	76	1.34*		66	145	39	4	42	19

REMARKS: * Flow estimated from previous Decembers and from previous month. Meter out of service all month due to worn bearings. Parts on order.

PREPARED BY R. D. Crain, Chief Operator

DATE Jan. 5

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1958 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS: PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE [redacted]	PH. DATA: RAW SEWAGE [redacted]	PH. DATA: PLANT EFFLUENT [redacted]	PH. DATA: PLANT EFFLUENT [redacted]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									Average		Average				
1			128	89.8	80	93.7	98	55	7.7		7.7		6.1	7.1	7.2
2			149	81.2	73	80.8	107	57	7.8		7.6		5.8		
3			124	84.7	65	84.6	101	60	7.6		7.5		5.8		
4			107	84.1	65	90.8	94	44	7.8		7.7		5.7	7.1	7.2
5			134	85.8	66	86.4	117	62	7.8		7.5		5.8		
6			139	83.5	49	100	108	58	7.7		7.4				
7			125	80.0	62	96.8	129	63	7.7		7.6				
8			118	83.1	54	96.3	113	65	7.8		7.7		5.9	7.1	7.2
9			104	96.2	59	100	97	58	7.8		7.5		5.7	7.1	
10			127	87.4	73	100	108	65	7.8		7.6		5.8		7.1
11			88	90.9	56	91.1	127	63	7.8		7.7		5.9		
12			117	82.1	58	74.1	104	58	7.8		7.7		5.7		
13			144	93.7	47	83.0	109	56	7.7		7.6				
14			135	93.3	54	94.4	115	58	7.8		7.6				
15			119	93.3	70	87.1	120	73	7.8		7.6		5.6	7.1	7.1
16			113	86.7	64	90.6	84	63	7.9		7.7		5.8	7.1	
17			131	87.8	62	90.3	103	67	7.9		7.7		5.7	7.1	
18			104	81.7	64	89.1	83	49	7.8		7.6		5.7		7.1
19			101	85.1	63	79.4	98	60	7.8		7.5		5.9	7.1	7.0
20			120	86.7	50	80.0	105	69							
21			92	89.1	52	76.9	101	65	7.8		7.5				
22			237	97.5	61	90.2	158	46	7.8		7.7		6.0	7.2	7.1
23			125	86.4	58	100	104	65	7.8		7.7		5.9		
24			147	87.8	47	76.6	107	66	8.0		7.6		5.9		
25			140	88.6	44	84.1	84	62	7.8		7.6		5.9		
26			127	89.0	59	66.1	101	61	7.8		7.7		5.7	7.1	7.1
27			117	93.1	57	78.9	109	69	7.7		7.5				
28			195	87.7	54	83.3	130	61	7.7		7.5				
29			146	89.0	47	95.7	134	67	7.9		7.7		5.9	7.1	7.0
30			130	86.2	58	87.9	116	68	7.8		7.6		5.7	7.1	
31			149	91.3	64	84.4	98	61	7.9		7.7		5.8	7.0	7.0
Total															
Max.			237	97.5	80	100	158	73	8.0		7.7		6.1	7.2	7.2
Min.			88	80.0	44	66.1	83	44	7.7		7.4		5.6	7.0	7.0
Av.			130	88.0	59	87.5	108	61	7.8		7.6		5.8	7.1	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	Discontinued						
SUSPENDED SOLIDS	130	44889	59	20373	71	24516	54.6
5 DAY B.O.D.	108	37292	61	21063	47	16229	43.5

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 6

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1958 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	[illegible] Supernate # 2 Dig. — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	2652	3.9	879	83.7	736	16800	1.79	2526	53.7	1356	16800	.27	57.4
2	1768	3.4	512	77.0	392								
3	1105	4.0	375	82.2	308								
4	1768	4.2	632	81.3	513								
5	1547	3.7	486	79.5	387								
6	1547	4.3	565	80.7	456								
7	1768	4.3	646	80.7	521								
8	1989	4.5	762	82.9	631								
9	1326	4.3	484	83.6	404	12380	1.49	1549	60.9	943	12380	.28	58.8
10	1326	4.2	473	80.9	383								
11	1326	3.6	406	81.5	331								
12	1768	5.2	782	82.5	645								
13	848	4.9	353	81.0	276								
14	1768	4.2	632	81.5	514								
15	2652	4.5	1001	83.3	846								
16	2652	3.9	879	82.8	728	11270	1.45	946	63.7	603	11270	.29	63.0
17	1768	4.5	677	82.9	562								
18	1768	4.3	647	82.4	533								
19	1326	4.2	473	78.3	371								
20	1547	4.0	526	72.7	382								
21	1547	5.0	657	74.6	491								
22	2652	4.1	923	76.1	703	14360	1.97	2375	64.8	1540	14360	.31	64.7
23	1768	4.4	662	80.1	537								
24	1768	4.6	692	78.9	546								
25	1547	4.6	604	79.8	482								
26	1547	4.7	618	80.5	497								
27	2210	4.8	901	81.3	733								
28	1326	4.3	484	82.6	399								
29	2652	3.6	812	81.5	662								
30	1989	5.1	863	82.6	713	12590	1.27	1343	65.3	877	12590	.31	63.3
31	2652	4.4	992	82.2	815								
Total	55877		20398		16497	67400		8739		5319	67400		
By overall avgs.			20423		16481			9002		5554			
Max.	2652	5.2	1001	83.7	846	16800	1.97	2526	65.3	1540	16800	.31	64.7
Min.	848	3.4	353	72.7	308	0	1.27	0	53.7	603	0	.27	57.4
Av.	1802	4.3	658	80.7	532	2174	1.59	282	61.7	172	2174	.29	61.4

REMARKS: lbs. Suspended Solids removed by treatment - 24516
lbs. Dry solids to digestion - 20423
Lbs. out of balance 4093 Or 16.7%

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 6

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF December 1958 .....

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2	34	12.0		4.0	same	12.0		4.0
3	35	11.2		2.4		11.4		2.8
4	34	11.2		2.9		11.4		3.0
5								
6								
7								
8								
9	no samples due to freezing weather							
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23	35	10.8		1.6		10.8		2.4
24	Freezing							
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	35	12.0		4.0		12.0		4.0
Min.	34	10.8		1.6		10.8		2.4
Av.	35	11.3	80.7	2.7		11.4	81.4	3.0

COMMENTARY

All treatment units were in continuous service throughout the month and an effluent of good quality was produced at all times.

The flow meter which has been giving a little trouble for some time, locked the gears of the cable drum and cam assemblies on the 2nd. The lock was released by moving the cable drum slightly by hand but reoccured on the 4th and 5th. The two assemblies were removed for examination and it was found that the pivot bearings and shaft spindles were so worn that the gears barely meshed and would sometimes meet dead center and cause the lock. It is believed that there had been some "slip-pasts" which upset the calibration and it is suspected that the flow recordings from the 2nd were high and were not used. New bearings and spindles were placed on RUSH order but had not been received by the end of the month.

On last months report it was noted that a new shaft for the sludge circulating pump was to be replaced. It was discovered that the shaft that we had on hand was not the correct size although ordered from company furnished parts lists. On the 3rd, Mr. Killeen of Wm DaLee Co. was here to examine the shafts and reorder for the right size. At that time we made arrangements for their serviceman to come and make the repair. There is apparently still some confusion as to what shaft is needed so we are now waiting for the serviceman to call and make some measurements of the old shaft. Since we have only the one pump we have to use the old shaft until replacement is made and cannot send it in for duplication. The #3 sewage pump has again developed a shaft vibration such as was described in the July report and the serviceman will also check this while here.

The repainting program is still in progress but moving slowly.

REMARKS:

PREPARED BY R. D. Craun, Chief Operator

DATE Jan. 7

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF....January....1959.... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.) X 100	SEWAGE GAS WASTED (cu. ft.) X 100	TOTAL GAS PRODUCED (cu. ft.) X 100	GAS PURCHASED (cu. ft.) X 100
1	F	40	26	33			102		*1.24		107	120	38	0	38	19
2	C	38	28	33	54	52	105	75	*1.24		141	120	40	1	41	16
3	S	36	12	24			100		1.23		105	120	35	5	40	22
4	S	18	-6	6			103		1.15		95	120	23	0	23	26
5	S	16	0	8	53	52	102		1.30		144	160	25	43	68	22
6	F	21	5	13			102		1.22		41	120	36	0	36	20
7	C	22	10	16	53	51	106	70	1.26		18	120	27	1	28	21
8	F	24	12	18				72	1.26		50	160	20	12	32	20
9	F	24	10	17			97	72	1.27		34	120	41	4	45	20
10	F	26	6	16			99		1.22		59	120	52	0	52	22
11	F	30	14	22			102		1.17		56	120	40	0	40	21
12	F	38	18	28	53	52	101		1.30		125	120	35	13	48	16
13	C	38	20	29			101		1.28		46	120	37	7	44	14
14	Fog	42	22	32	53	52	100		1.35		130	160	37	5	42	16
15	S1	24	4	14			101		1.32		39	120	37	6	43	20
16	S	20	8	14	52	51	99		1.31		39	160	63	1	64	24
17	S	18	0	9			105	62	1.26		24	120	61	0	61	26
18	S	32	0	16			97	65	1.20		74	120	44	1	45	23
19	F	30	2	16	52	51	98		1.28		50	120	53	0	53	21
20	S&S1	30	20	25			102		1.29		25	120	48	3	51	20
21	S&S1	32	5	18	52	50	102		1.24		39	160	67	0	67	20
22	F	10	-2	4			108	61	1.20		23	120	53	0	53	23
23	F	12	-2	5	52	50	99	66	1.20		51	120	50	0	50	22
24	F	34	12	23			101		1.18		41	120	39	1	40	20
25	S	24	2	13			101		1.12		51	120	60	0	60	25
26	F	19	-1	9	52	50	105		1.26		64	120	37	0	37	28
27	F	26	6	16			104		1.22		15	120	50	0	50	29
28	F	31	9	20			105		1.24		27	160	45	0	45	16
29	R&S1	38	26	32			105		1.26		36	120	56	0	56	15
30	F	31	12	21	51	49	107	65	1.29		17	120	57	1	58	17
31	F	28	2	15			99	69	1.25		14	160	58	0	58	27
Total									38.54		1780	4000	1364	104	1468	631
Max.		42	28	33	54	52	107	61	1.35		144	160	67	43	68	29
Min.		10	-6	4	51	49	97	80	1.12		14	120	20	0	23	14
Av.		27	9	18	52	51	102	69	1.24		57	129	44	3	47	20

REMARKS: * Meter out of service - flow estimated from balance of the month.

PREPARED BY R.D.Craun, Chief Operator

DATE... February 3

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1959 SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE [redacted]	PH. DATA RAW SEWAGE [redacted]	PH. DATA PLANT EFFLUENT [redacted]	PH. DATA PLANT EFFLUENT [redacted]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									Average		Average				
1 Th			81	92.6	47	93.6	84	58	7.7		7.5		5.9	7.2	7.1
2 F			109	85.3	61	86.9	102	55	7.7		7.5		5.9		
3 Sa			133	91.7	41	95.1	106	58	7.8		7.7				
4 Su			111	86.5	49	85.7	111	61	7.8		7.7				
5 M			156	84.6	49	100	109	60	7.9		7.7		5.8	7.2	7.1
6 Tu			148	85.1	48	87.5	108	46	8.0		7.7		5.8		
7 W			182	84.1	56	94.6	137	55	7.9		7.8		5.8		
8 Th			106	94.3	56	78.6	113	60	7.9		7.7		5.7		
9 F			160	85.0	66	80.3	116	64	7.8		7.7		5.9	7.1	7.1
10 Sa			122	95.9	57	75.4	123	66	7.8		7.7				
11 Su			158	86.7	74	96.0	116	75	7.8		7.5				
12 M			166	91.6	61	93.4	128	68	7.8		7.7		5.8	7.2	7.1
13 Tu			120	89.3	59	100	126	67	7.8		7.6		5.6		
14 W			153	86.3	70	98.6	108	77	7.9		7.6		5.7		
15 Th			136	87.5	43	95.3	90	47	7.9		7.7		5.7		
16 F			104	81.7	52	78.8	89	40	7.8		7.6		5.8	7.2	7.1
17 Sa			138	89.9	50	82.0	130	73	7.8		7.5				
18 Su			144	91.7	52	98.1	114	57	7.8		7.5				
19 M			156	85.3	66	89.1	109	58	7.9		7.7		5.9	7.2	7.0
20 Tu			100	93.0	52	100	95	56	7.9		7.7		5.6		
21 W			99	84.8	57	100	89	56	7.9		7.7		5.8	7.2	
22 Th			122	94.3	48	100	109	46	7.9		7.6		5.7		
23 F			127	84.3	68	70.6	113	59	7.8		7.6		5.9	7.1	7.0
24 Sa			151	96.0	41	100	126	46	7.9		7.6				
25 Su			130	84.6	63	73.0	114	69	7.9		7.7				
26 M			182	80.8	71	100	128	72	7.9		7.7		5.9	7.2	7.1
27 Tu			127	83.5	57	79.0	109	68	7.9		7.8		600		
28 W			120	81.7	48	83.3	94	56	7.9		7.7		5.9	7.3	
29 Th			97	90.7	49	95.9	92	52	7.9		7.7		5.8		7.2
30 F			115	84.3	65	76.9	116	65	7.9		7.8		6.0	7.2	
31 Sa			156	100	46	93.5	111	61	7.9		7.7				
Total															
Max.			182	100.0	74	100.0			8.0		7.8		6.0	7.3	7.2
Min.			81	80.8	41	70.6			7.7		7.5		5.6	7.1	7.0
Av.			135	88.2	56	89.7	112	60	7.9		7.7		5.8	7.2	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	* Discontinued						
SUSPENDED SOLIDS	182	42746	56	17998	77	24748	57.9
5 DAY B O D	110	35354	60	19284	50	16070	45.5

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 6

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1959 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	Supernate #2 — GALLONS DRAWN	PERCENT DRY SOLIDS	Dig. PERCENT VOLATILE SOLIDS
1	1768	3.4		83.7									
2	1105	4.1		78.5									
3	1547	5.9		79.2									
4	1326	5.0		79.5									
5	1326	4.9		82.0		13040	1.35		62.2		13040	.29	61.3
6	2210	4.8		78.6									
7	1768	4.7		81.6									
8	663	5.2		81.6									
9	1989	4.7		80.7									
10	1768	5.5		80.3									
11	1547	5.5		81.8									
12	2210	4.9		80.8		15470	1.40		59.4		15470	.40	61.4
13	2431	3.6		84.1									
14	1547	3.9		82.4									
15	1768	5.3		83.6									
16	1326	3.6		84.3									
17	1768	4.4		80.7									
18	1768	4.1		82.2									
19	2210	4.5		86.2									
20	1326	5.6		83.8		12820	1.27		66.5		12820	.32	64.5
21	1768	3.5		83.3									
22	1768	4.7		83.8									
23	2431	4.2		85.0									
24	1326	3.4		85.0									
25	663	3.9		84.0									
26	1768	3.8		82.5									
27	1105	3.2		82.5									
28	1989	4.5		83.7									
29	1768	4.5		85.1		13700	1.26		66.1		13700	.30	59.2
30	1547	3.9		85.1									
31	1989	4.1		84.0									
Total	51493		19258		15907	55030		4102		2613	55030		
Max.	2431	5.9		86.2		15470	1.40		66.5		15470	.40	64.5
Min.	663	3.2		78.5		0	1.26		59.4		0	.29	59.2
Av.	1725	4.4	621	82.6	513	1775	1.32	132	63.7	84	1775	.33	61.6

REMARKS: Pounds of dry solids removed by the clarifiers = 24748
Pounds of dry solids pumped to digestion ------- 19258
Less to digestion than removed ---------- 5490 lbs. or 22.2%

PREPARED BY R. D. Craun, Chief Operator

DATE Feb. 3

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF January 1959 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE			
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13	33	11.8		3.3	same	12.0		3.7
14	35	11.2		2.4		11.4		3.2
15	34	10.8		2.6		10.8		2.8
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								
Max.	35	11.81		3.3		12.0		3.7
Min.	33	10.8		2.4		10.8		2.8
Av.	34	11.3	79.6	2.8		11.4	80.3	3.2

COMMENTARY

Adequate treatment units were in continuous service throughout the month and an effluent of good quality was produced at all times.

The new pivot bearings and spindle for the flow meter were received and installed on the 2nd. The meter was recalibrated at the same time and it now appears to be functioning perfectly.

Mr. Roy Gaukel, serviceman for the Wm DaLee Corp., dismantled the sludge recirculator pump at the digester on the 8th. It was discovered that we have a type MS4 pump instead of the 4S4 type that our literature and drawings were for. This accounted for our in-ability to order parts that fit. New bearings, shaft, impellor and wearing rings were placed on order and delivery is expected about the 2nd week in February. The pump was reassembled with the worn parts and placed back in service the same day.

We also had Mr. Gaukle examine the #3 raw sewage pump which has been in continuous service since the plant was placed in operation. The impellor sleeve, shaft and bearings showed enough wear so that it was decided to replace them also. Mr. Gaukle decided to take the assembly to Detroit with him and make the repairs in their shop. This unit is also expected to be back in early February. The two remaining pumps have ample capacity to handle over twice the normal flow.

REMARKS: Weather conditions prohibited river sampling during the balance of the month.

PREPARED BY R.D.Craun, Chief Operator

DATE Feb. 4

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1959 MISCELLANEOUS DATA OPERATOR R. D. Craun

Date	Weather: Precip Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Plant Eff E Coli MPN/100ml	Cl_2 lbs.	Power KWH	AUX FUEL Gas Cu. Ft. X 100	Remarks
1		14	-10	F		1.15	7.8				120	20	
2		22	0	F	51	1.28	7.8				120	21	
3		34	20	R&Sl		1.29	7.9				120	20	
4		22	20	LS	52	1.28	7.9				120	21	
5		22	2	LS		1.27	7.9				160	21	
6		24	2	F	52	1.25	7.9				120	28	
7		40	10	F		1.29	7.8				120	23	
8		28	10	Sl		1.18	7.8				120	19	
9		41	25	R&Sl	52	1.48	7.8				120	17	
10		35	7	R&S		1.46	7.9				200	21	
11		28	10	F	52	1.39	7.8				200	20	
12		40	20	R		1.58	7.7				160	12	
13		39	32	Cl	51	1.55	7.8				160	13	
14		40	24	Cl		1.67	7.8				120	21	
15		36	22	Cl		1.48	7.8				120	17	
16		36	26	Cl	51	1.56	7.8				120	16	
17		38	14	S		1.53	7.8				160	20	
18		20	2	F	51	1.48	7.9				120	18	
19		14	-1	F		1.46	7.8				120	19	
20		24	2	F	51	1.50	7.8				160	27	
21		31	13	F		1.45	7.8				160	19	
22		43	18	R&S		1.52	7.7				160	20	
23		38	20	R	50	1.68	7.8				120	12	
24		29	11	F	50	1.58	7.8				160	14	
25		38	18	F	50	1.60	7.8				160	19	
26		38	26	R&S	50	1.61	7.8				160	16	
27		42	26	R	50	1.67	7.7				120	20	
28		38	28	F		1.65	7.8				160	10	
29													
30													
31													
ARITH. MEAN		32	14		51	1.46	7.8				141	19	
STAT. MEAN													
Totals						48.20					3960	561	

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 19 59 OPERATOR R. D. Craun

PRIMARY TREATMENT DATA

Date	5-Day B O D Inf. Mg/l	5-Day B O D Inf. lbs.	5-Day B O D Eff. Mg/l	5-Day B O D Eff. lbs.	5-Day B O D Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs.	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs.	Suspended Solids Rem %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs.	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs.	River Data Temp F	River Data Above Outfall D.O. Mg/L	River Data Above Outfall BOD Mg/L	River Data Below Outfall D.O. Mg/L	River Data Below Outfall BOD Mg/L
1	113	1185	65	623	42.5	108	1035	66	633	38.9	103	988	45	432					
2	109	1164	58	619	46.8	134	1431	66	706	50.7	118	1259	62	662					
3	108	1163	66	711	38.9	122	1314	57	613	53.3	104	1109	47	507					
4	101	1077	60	641	40.6	126	1346	63	673	50.0	119	1271	55	587					
5	98	1037	50	528	49.0	92	974	47	497	59.7	87	921	44	467					
6	106	1107	46	479	56.6	108	1127	47	490	56.5	94	981	39	407					
7	122	1313	56	603	54.1	178	1916	36	387	79.7	165	1775	33	355					
8	144	1418	40	393	72.2	143	1408	30	295	79.0	118	1163	25	246					
9	97	1198	55	679	43.3	143	1767	63	778	55.9	116	1434	51	630					
10	73	889	43	524	41.1	94	1145	56	683	40.4	82	999	51	622					
11	78	905	39	453	50.0	96	1113	49	568	48.9	85	987	46	533					
12	97	1279	58	765	40.2	113	1491	50	658	61.2	60	792	30	396					
13	77	996	43	557	44.2	97	1252	47	608	51.6	80	1034	38	492					
14	131	1825	65	753	58.0	152	2118	66	837	60.5	122	1702	51	712					
15	96	1185	64	790	33.3	91	1113	50	618	45.1	77	952	47	582					
16	102	1327	68	884	33.3	101	1316	53	690	47.5	86	1119	52	677					
17	96	1225	63	804	34.4	93	1188	56	716	39.8	76	971	44	562	33	11.4	5.2	11.5	5.5
18	94	1162	55	679	41.5	109	1359	52	643	52.3	91	1113	44	544					
19	90	1096	55	669	38.9	77	938	45	548	51.6	70	853	40	487					
20	90	1127	52	652	42.2	101	1264	50	626	50.4	85	1062	41	513					
21	83	1004	33	399	60.2	102	1232	42	507	58.8	85	1025	37	447					
22	93	1178	58	736	37.6	124	1574	60	762	51.6	102	1295	48	608					
23	90	1262	59	827	34.5	122	1709	64	897	47.6	97	1358	53	743					
24	98	1319	62	818	36.7	94	1224	51	665	46.8	78	1016	41	534					
25	78	1041	63	841	19.4	91	1215	54	722	40.7	76	1013	50	668	33	11.9	3.7	11.8	3.8
26	81	1088	47	632	42.0	104	1398	58	778	43.2	86	1153	44	592	34	11.4	3.6	11.6	3.8
27	78	1087	52	726	33.3	88	1225	53	738	39.8	66	919	41	572					
28	80	1102	63	868	21.3	93	1282	63	868	32.2	74	1018	49	675					
29																			
30																			
31																			
ARITH. MEAN	97	1170	55	665	42.4	111	1337	54	650	50.8	93	1117	45	545	33	11.6	4.2	11.6	4.3
STAT. MEAN	97	38759	55	18633		111	37447	54	18204			31280		15258					

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OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, Michigan, MICHIGAN

MONTH February 1959 DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Date	Raw Sludge Gals.	Raw Sludge Vol Sol Lbs. Per 1000 c.f.	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	#2 Digester Supernatant Gals. X 1000	#2 Digester Supernatant pH	#2 Digester Supernatant Total Solids %	#2 Digester Supernatant Vol. Solids %	#2 Digester Supernatant Susp. Solids Mg/l	#2 Digester Supernatant 5-Day B O D Mg/l	Transfer #1 to #2 near Bottom Total Solids %	Transfer #1 to #2 near Bottom Vol. Solids %	Temp. Transfer #1 to #2 Temp. °F	Temp. #1 pH	Temp. #1 Temp. °F	Gas Used cu. ft. x 100	Gas Wasted cu. ft.	Gas Total Prod.	Remarks
		#1-15 #1				#2														
1	1768	33.8		4.1	85.3									103			44	0	44	Note — include gallons
2	2431	47.0	5.9	4.1	86.4									104			56	0	56	of sludge to beds
3	1547	30.8	6.0	4.3	85.1									106		61	66	0	66	
4	2210	46.4	5.9	4.5	85.4									99	7.2	65	48	0	48	
5	1768	31.2	5.9	4.2	76.8		7.2							100			52	0	52	
6	2431	43.3	6.0	3.8	86.0	12.4		.34	60.9			1.58	60.8	102			55	10	65	
7	1989	43.8	****	4.8	84.2									103			66	0	66	
8	1547	32.6	****	4.7	82.3									108		63	53	0	53	
9	2873	60.1	5.9	4.6	83.5		7.2							100	7.0	65	59	0	59	
10	1989	35.4	5.9	4.0	81.6									102			57	0	57	
11	1547	33.8	5.9	5.0	80.6		7.1							102	7.3		44	0	44	
12	2652	46.4	6.1	3.8	84.6	13.3		.38	63.4			1.28	66.7	102			65	0	65	
13	2431	51.6	6.1	4.7	82.9		7.2							106	7.1		46	0	46	
14	1989	38.0		Av.	Av.									104			59	0	59	
15	2210	42.2		Av.	Av.									106			46	0	46	
16	2431	46.5	6.1	4.4	79.8		7.1							104	7.0		52	0	52	
17	1989	31.7	6.0	3.6	81.4									105			45	0	45	
18	2210	40.2	6.1	4.2	78.7	13.3	7.2	.34	60.0			1.33	63.5	104			57	0	57	
19	1989	37.4	6.2	4.4	78.7									106			56	0	56	
20	1768	25.7	6.2	3.3	81.2									108	7.1	62	25	0	25	
21	1547	25.6		3.8	80.6											61	66	1	67	
22	1989	45.7		5.3	79.5									104			28	0	28	
23	884	12.2	6.1	3.1	81.6		7.1							99	7.2		55	0	55	
24	1105	14.5	6.1	4.4	79.2									103	7.3		41	5	46	
25	1105	27.8	6.1	5.9	78.3									102	7.4		38	10	48	
26	1989	35.1	6.2	4.1	79.0	12.8		.35	65.3	2310	750	0.89	63.8	102			42	25	67	
27	1768	19.0	6.4	2.5	79.2									100			54	0	54	
28	1547	41.3		5.4	79.8												10	35	45	
29																				
30																				
31																				
ARITH. MEAN	1918	36.4	6.1	4.3	81.6	1.85	7.1	.35	64.4	2310	750	1.27	63.6	103	7.2	63	46	3	52	
STAT. MEAN	53203					51720														

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MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1957 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1	F	14	-10	2			103		1.15		12	120	[illegible]	0	[illegible]	20
2	F	22	0	11	51	50	104		1.28		26	120	56	0	56	21
3	S&SL	34	26	27			106	61	1.29		79	120	[illegible]	0	[illegible]	20
4	LS	32	20	26	52	51	99	65	1.28		133	120	[illegible]	0	[illegible]	21
5	LS	22	2	12			100		1.27		100	160	[illegible]	0	[illegible]	21
6	F	24	2	13	52	51	102		1.25		81	120	55	10	65	28
7	F	40	10	25			103		1.29		85	120	66	0	66	23
8	SL	28	10	19			108	63	1.18		70	120	53	0	53	12
9	R+SL	41	25	33	52	51	100	65	1.48		84	120	[illegible]		[illegible]	1
10	R+SL+S	35	7	21			102		1.46		106	200	57	6	57	21
11	F	28	10	19	52	52	102		1.39		87	[illegible]	[illegible]	[illegible]	[illegible]	20
12	R	40	20	30			102		1.58		95	160	65	0	65	12
13	C	39	32	35	51	50	106		1.55		102	160	46	0	[illegible]	15
14	C	40	24	32			104		1.67		72	120	59	0	59	21
15	C	36	22	29			106		1.48		86	120	46	0	46	17
16	C	36	26	31	51	51	104		1.56		87	120	52	0	52	26
17	S	38	14	26			105		[illegible]		101	160	[illegible]	[illegible]	[illegible]	22
18	F	20	2	11	51	50	104		1.48		53	120	57	0	57	18
19	F	14	-1	7			106		1.46		46	120	56	[illegible]	[illegible]	4
20	F	24	2	13	51	50	108	62	1.50		48	160	[illegible]	[illegible]	[illegible]	27
21	F	31	13	22				61	1.45		16	160	66	1	67	19
22	R+S	43	18	30			104		1.52		34	160	28	0	28	20
23	R	38	20	29	50		99		1.68		22	120	[illegible]	0	[illegible]	19
24	F	29	11	20	50		108		1.58		121	160	41	5	46	14
25	F	38	18	28	50		102		1.60		122	160	38	10	48	19
26	R&S	38	26	32	50		102		1.61		110	160	42	25	67	16
27	R	42	26	34	50		101		1.67		63	120	[illegible]	0	[illegible]	20
28	F	38	28	33			105		1.65		47	160	[illegible]	[illegible]	[illegible]	14
29																
30																
31																
Total		[illegible]	397	650			2875	327	110.89		2088	3710	[illegible]	86	[illegible]	524
Max.		43	32	35	52	52	108	65	1.68		133	200	66	35	67	28
Min.		14	-10	2	50	50	99	61	1.15		12	120	10	0	25	10
Av.		32	14	23	51	51	103	63	1.46		75	141	46	3	52	19

REMARKS:

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1959 SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PPM PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE [illegible] AV	PH. DATA RAW SEWAGE [illegible]	PH. DATA PLANT EFFLUENT [illegible]	PH. DATA PLANT EFFLUENT [illegible]	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1		S	108	94.4	66	68.2	113	65	7.8		7.5				
2		M	134	88.1	66	93.9	109	58	7.8		7.5		5.9		
3		Tu	122	85.2	57	82.5	108	66	7.9		7.7		6.0		
4		W	126	94.4	63	82.3	101	60	7.9		7.7		5.9		7.2
5		Th	92	94.6	42	93.6	98	50	7.9		7.6		5.9	7.2	
6		F	108	87.0	47	93.0	106	46	7.9		7.6		6.0		
7		Sa	178	92.7	36	91.7	122	56	7.8		7.5				
8		Su	143	82.5	30	83.3	144	40	7.8		7.7				
9		M	143	81.1	63	81.0	97	55	7.8		7.7		5.9	7.2	7.0
10		Tu	94	87.2	56	90.9	73	43	7.9		7.8		5.9		
11		W	96	88.9	49	93.9	78	39	7.8		7.6		5.8	7.1	7.5
12		Th	130	86.9	60	93.3	97	58	7.7		7.6		6.1		
13		F	92	82.5	47	80.9	77	43	7.8		7.6		6.1	7.2	7.1
14		Sa	152	80.3	60	85.0	131	54	7.8		7.7				
15		Su	91	84.6	50	94.0	96	64	7.8		7.6				
16		M	101	85.1	53	98.1	102	68	7.8		7.7		6.1	7.1	7.0
17		Tu	93	81.7	56	78.6	96	63	7.8		7.8		6.0		
18		W	109	83.5	52	84.6	94	55	7.9		7.7		6.1	7.2	
19		Th	72	90.9	45	91.1	90	55	7.8		7.7		6.2		
20		F	101	84.2	50	82.0	90	52	7.8		7.6		6.2		7.1
21		Sa	102	83.3	42	88.1	83	33	7.8		7.7				
22		Su	124	82.3	60	80.0	93	58	7.7		7.7				
23		M	122	79.5	64	81.2	90	59	7.8		7.7		6.1	7.2	7.0
24		Tu	94	83.0	51	80.4	98	62	7.8		7.6		6.1	7.3	7.1
25		W	91	83.5	54	92.6	78	63	7.8		7.6		6.1	7.4	
26		Th	104	82.7	58	75.9	81	47	7.8		[illegible]		[illegible]		
27		F	88	75.0	53	77.4	78	52	7.7		[illegible]		[illegible]	[illegible]	7.2
28		Sa	93	79.6	63	77.8	80	63	7.8		7.6				
29															
30															
31															
Total			3113	2384.3	1498	2380.3	2703	1538					121.1	42.2	140
Max.			178	94.6	66	98.1	144	68	7.9				6.4	7.4	7.3
Min.			77	75.0	30	68.2	73	33	7.7				5.9	7.1	7.0
Av.			111	85.2	54	85.0	97	55	7.8				6.1	7.2	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS	[illegible]						
SUSPENDED SOLIDS	111	37447	54	18204	57	19243	51.3
5 DAY B.O.D.	97	32759	55	18633	42	14126	43.3

Super B.O.D. 732+

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1959 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	~~DRAWN TO DRYING BEDS~~ Digestion #1 Dig 1 — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	✓1768	4.1	617	85.3	527								
2	✓2431	4.1	848	86.4	733								
3	✓1547	4.3	565	85.1	481								
4	✓2210	4.5	847	85.4	723								
5	✓1768	4.2	632	76.8	487								
6	✓2431	3.8	786	86.0	676	12380	1.58	1643	60.5	994	12380	.34	60.9
7	✓1989	4.8	812	84.2	693								
8	✓1547	4.7	618	82.3	508								
9	✓2873	4.6	1123	83.5	938								
10	✓1989	4.0	677	81.6	552								
11	✓1547	5.0	657	80.6	528								
12	✓2657	3.8	857	84.6	723	13760	1.28	1426	66.7	751	13260	.38	63.4
13	✓2431	4.7	972	82.9	804								
14	1989	Av.	728	Av.	593								
15	2210	Av.	808	Av.	658								
16	✓2431	4.4	909	79.8	726								
17	✓1989	3.6	608	81.4	495								
18	✓2210	4.2	798	78.7	627	13760	1.33	1481	63.5	941	15260	.34	60.0
19	✓1989	4.4	743	78.7	584								
20	✓1768	3.3	496	81.2	402								
21	✓1547	3.8	498	80.2	400								
22	✓1989	5.3	897	79.5	713								
23	✓884	3.1	233	81.6	190								
24	1105	4.4	413	79.2	327								
25	1105	5.9	554	78.3	434								
26	1989	4.1	693	79.0	548	12820	.89	958	63.8	611	12820	.35	65.3
27	1768	2.5	375	79.2	297								
28	1547	5.4	807	79.8	644								
29													
30													
31													
Total	53703	111.0	19570	2121.3	15900	51720	5.04	5508	204.5	3496	51720	1.11	279.6
Max.	2873	5.9	1123	86.4	938	13760	1.58		66.7		15260	.38	65.3
Min.	884	2.5	233	76.8	190	0	.89		60.5		0	.34	60.0
Av.	1918	4.3	699	81.6	568	1847	1.27		63.6		1847	.135	64.4

REMARKS:

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF February 1959 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17	33	11.4		5.2		10.5		5.5
18								
19								
20								
21								
22								
23								
24								
25	33	11.9		3.7		11.8		3.7
26	34	11.4		3.6		11.6		3.8
27								
28								
29								
30								
31								
Total		34.7		12.5		34.9		13.0
Max.	34	11.9		5.2		11.8		
Min.	33	11.4		3.6		11.5		
Av.	33	11.6		4.2		11.6		4.3

COMMENTARY

Shaft that rotate the scraper plate for right opening of the flame tube of the heat exchanger broke on 5th. Necessary removal of the head section and the refractory disk that it contains to make a repair. Was very difficult to remove disk without breaking it. Had to have one that could be made at plant. Machine work completed and exchanger back in service at noon of the 6th, while the head section and the broken tubes were removed. New tubes were very badly pitted.

The left [illegible] tube was not to be replaced 12th. Heating was started, heating causes a slowdown to collect below, unit using to remove concrete possible repair on 13th.

Serviceman from the Dolee Co. was here on 12th and the #3 sewage pump was reassembled and placed back in service. #2 pump was provided with new bearings on the 18th and the sludge circulator was rebuilt with new shafts on the same day.

Sewage pumps were being operated overload according to [illegible] 24th was had heaters checked. Installed 1 size heaters on #2 the next day being the most of they are all the [illegible] unit.

Went to a safety engineers meeting at Stevens on 25th. Fire section and Bell [illegible] were present to talk about new standard [illegible] Wants it to [illegible]

Delivered [illegible] Colon on 27th. Took the plant over. [illegible] stage for a sewerage system. [illegible] and breaking [illegible] through [illegible]

REMARKS:

PREPARED BY .....

DATE .....

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH March 19 59 MISCELLANEOUS DATA OPERATOR R.D.Craun

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~Bacteria~~ ~~Coliform~~ Water MPN/100ml. cu.ft.	Cl_2 lbs.	Power KWH	AUX. FUEL ~~Gas~~ 100 cu ft	Remarks
1	N	38	28	C		1.63	7.8		73		120	14	
2	O	46	30	R&S	50	1.80	7.9		40		160	12	
3		38	24	S	50	1.75	7.9		48		120	16	
4	G	36	26	C		1.75	7.8		64		160	15	
5	A	42	30	R		1.83	7.8		107		160	14	
6	U	34	18	S	50	1.84	7.8		130		160	15	
7	G	30	18	S		1.74	7.7		22		160	23	
8	E	42	26	S		1.72	7.8		72		120	16	
9		30	20	Cl	50	1.79	7.8		12		160	18	
10		34	20	Cl	50	1.75	7.8		38		160	11	
11		40	18	C	49	1.75	7.9		67		120	15	
12		38	20	S	50	1.74	7.8		73		160	14	
13		40	20	S		1.67	7.8		152		160	19	
14		50	30	R		1.71	7.6		19		120	18	
15		46	22	S&W		1.68	7.7		94		160	26	
16		34	18	S	50	1.75	7.8		50		160	17	
17		30	12	LS	50	1.71	7.9		31		120	19	
18		40	20	C	50	1.73	7.8		41		160	14	
19		61	33	C	50	1.76	7.8		182		160	32	
20		58	30	Cl	50	1.76	7.8		518		160	15	
21		34	10	C		1.72	7.8		13		120	14	
22		33	13	C	50	1.66	7.8		12		160	25	
23		60	32	C	50	1.75	7.7		27		160	7	
24		68	30	C		1.73	7.8		100		120	7	
25		52	34	Cl	50	1.72	7.8		72		120	17	
26		42	30	S	50	1.77	7.8		53		120	10	
27		39	19	Cl		1.79	7.8		33		120	23	
28		40	22	C		1.74	7.7		28		120	23	
29		48	20	Cl		1.70	7.7		12		120	16	
30		50	25	Cl	50	1.83	7.8		349		160	14	
31		60	34	LR	50	1.78	7.8		39		120	12	
ARITH. MEAN		42	24		50	1.74	7.8		83		142	17	
STAT. MEAN									2571		4400	521	

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH March 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Date	Raw Sludge					Transfer ***** #1 to #2						sludge near bottom				Temp.	Gas			Remarks
	Gals.	Lbs. Per 1000 c.f. Digester 30	pH	Total Solids %	Vol. Solids %	Gals.	pH **	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X	Wasted cu. ft. 100	Total 1	
1	1326	14.6		5.1	79.5	12160		1.44	51.5							106	58	1	59	Note — include gallons
2	2210	21.4	6.0	4.3	79.8										700	90	57	0	57	of sludge to beds
3	1326	15.1	6.2	5.0	80.5										7.2	96	36	23	59	
4	1105	10.5	6.3	4.1	82.0										7.2	92	44	4	48	
5	2873	30.8	6.2	4.6	82.5										7.1	97	62	18	80	
6	1768	16.6	6.2	4.1	80.8										7.2	100	26	20	46	
7	1326	14.4		3.9	88.0											94	55	20	75	
8	1326	13.7		4.5	81.4											97	41	14	55	
9	2210	16.9	6.4	3.3	81.9										7.2	97	45	12	57	
10	1326	13.6	6.1	4.5	80.7											96	41	16	57	
11	1768	18.9	6.1	4.5	81.7										7.1	96	64	6	70	
12	1768	20.6	6.0	5.0	82.0	13700		1.54	57.5						7.1	100	68	13	81	
13	1326	13.8	6.1	4.4	83.3										7.1	107	50	13	63	
14	1326	4.9		1.6	81.6											96	67	4	71	
15	1547	12.6		3.5	82.5											105	57	2	59	
16	1768	13.4	6.3	3.3	80.9										7.1	96	56	0	56	
17	1768	13.0	6.1	3.1	83.3											101	49	3	52	
18	1768	17.9	6.3	4.3	80.9											102	52	0	52	
19	2431	21.3	6.3	3.8	81.5										7.2	103	14	44	58	
20	1105	11.7	6.3	4.6	81.5	11930		1.30	67.9						6.7	98	68	21	89	
21	2431	20.2		3.6	81.8											105	46	28	74	
22	1105	13.7		5.3	82.9											103	50	7	57	
23	1326	16.8	6.2	5.4	82.6										7.2	105	64	0	64	
24	1105	12.2	6.2	4.8	81.3												7	43	50	
25	1105	10.4	6.2	4.3	77.4												1	43	44	
26	1768	17.0	6.2	4.5	75.4												0	45	45	
27	1326	18.6	6.2	4.5	76.8												0	43	43	
28	1105	11.5		5.1	72.0												0	40	40	
29	1547	23.5		7.1	75.6												0	41	41	
30	1989	21.1	6.0	4.8	78.1												0	38	38	
31	1768	19.2	6.1	4.7	81.7												0	38	38	
ARITH. MEAN	1611	15.9	6.2	4.4	80.7	1219		1.43	59.0						7.1	95	38	19	57	
STAT. MEAN	49946					37790											1178	600	1778	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH March 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant from #2: Gals.	Supernatant from #2: ~~Lbs~~	Supernatant from #2: Total Solids %	Supernatant from #2: Vol. Solids %	Supernatant from #2: Susp. Solids Mg/l X 10	Supernatant from #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1						12160		.35	66.0	220	671					60			Note – include gallons
2															7.1	60			of sludge to beds
3															7.1				
4															7.1				
5																			
6															7.1				
7																			
8																			
9															7.1				
10																			
11															7.0				
12						13700		.33	64.9	170	1150				7.1				
13															7.1	59			
14																66			
15																			
16															7.1	67			
17																			
18																			
19															7.0				
20						11930		.34	59.2	200	580				7.0				
21																			
22																			
23															7.0	63			
24																67			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
ARITH. MEAN						1219		.34	63.4	197	800				7.1	63			
STAT. MEAN						37790													

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH March 1959 PRIMARY TREATMENT DATA OPERATOR R. D. Craun

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		Temp F	Upstream		Downstream	
	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.		D.O.	B.O.D.	D.O.	B.O.D.
1	82	1114	58	788	29.3	111	1508	60	817	45.9	89	1210	50	680	~~55~~				
2	73	1097	57	857	21.9	100	1493	50	752	50.0	77	1157	40	602					
3	80	1168	56	818	30.0	112	1637	53	774	52.7	93	1358	44	643	33	12.2	4.6	12.2	4.6
4	57	833	49	716	14.0	73	1066	59	862	19.2	60	877	47	687	33	11.6	4.4	11.8	4.5
5	63	962	46	703	27.0	96	1467	62	948	35.4	77	1176	46	703	33	11.6	3.6	11.6	3.8
6	65	998	38	583	41.5	75	1152	40	614	46.7	52	798	30	461					
7	72	1046	52	757	27.8	122	1773	49	712	59.0	108	1568	41	596					
8	91	1306	52	747	42.9	100	1437	45	647	55.0	85	1219	39	561					
9	82	1225	49	733	40.2	108	1614	43	643	58.4	91	1359	38	568					
10	78	1138	53	774	32.1	90	1314	51	745	43.4	73	1065	40	584	33	11.6	3.4	11.6	3.4
11	90	1313	49	716	45.5	108	1578	53	774	50.9	88	1286	45	658	34	11.4	3.2	11.6	3.4
12	75	1088	50	722	33.3	87	1264	57	828	34.5	73	1061	46	668	35	11.4	2.6	11.4	3.0
13	69	1393	55	918	20.3	81	1352	53	886	34.6	67	1117	44	736					
14	89	1271	53	757	40.4	124	1771	65	928	47.6	97	1384	51	728					
15	61	857	29	407	52.5	63	883	40	562	36.5	55	772	32	448					
16	82	1197	47	687	42.7	91	1328	51	746	43.9	73	1066	43	628					
17	73	1042	44	628	39.7	74	1056	46	657	37.8	63	899	37	528					
18	72	1039	46	664	36.1	93	1343	53	767	43.0	77	1112	44	636	33	12.4	3.0	12.6	3.6
19	78	1144	51	748	34.6	98	1439	58	853	40.8	70	1028	36	528	36	12.0	2.8	12.0	2.4
20	73	1072	49	721	32.9	132	1937	47	692	56.8	120	1763	41	603					
21	74	1061	40	573	45.9	80	1148	42	603	47.5	72	1033	37	532					
22	61	846	51	707	16.4	65	901	52	722	20.0	51	707	42	582					
23	73	1064	46	672	37.0	88	1285	44	643	50.0	82	1198	39	569					
24	81	1169	61	882	24.7	96	1387	53	767	44.8	83	1198	44	637	41	9.8	1.6	8.6	3.0
25	80	1147	50	717	37.5	90	1293	52	747	42.2	75	1077	44	632					
26	71	1047	51	753	28.1	81	1194	55	813	32.1	60	887	41	606	43	10.6	2.2	10.5	2.5
~~27~~28	86	1247	56	814	23.3	85	1235	47	683	44.7	75	1089	40	582					
~~28~~29	71	1007	49	695	31.0	69	978	50	708	27.5	64	907	43	610					
~~29~~30	78	1192	62	947	20.5	108	1659	60	917	44.4	93	1419	54	824					
~~30~~31	74	1098	55	817	25.7	88	1486	54	802	38.6	72	1068	46	683					
~~31~~27	79	1193	52	786	34.2	98	1464	52	777	46.9	80	1193	44	657					
ARITH. MEAN	75	1109	50	736	32.5	93	1369	51	754	42.9	77	1131	42	618	35	11.4	3.1	11.3	3.4
STAT. MEAN	75		50			93		53											
	34374		22812			42442		23389			35051		19160						

MARSHALL CITY DISPOSAL PLANT

109 EAST MICHIGAN AVE.

PHONE 3967

MARSHALL, MICHIGAN

BOARD OF PUBLIC SERVICE
PAUL S. KELSER, CHAIRMAN
J. D. WRIGHT
A. W. SCHULER, SR.

E. A. ANGLEY
SUPERINTENDENT

REMARK SHEET

The sludge circulating pump at the digesters that was completely rebuilt with new volute, impellor, shaft, bearings and wearing rings and placed in service on February 18th became inoperative again on the 24th of this month.

A pressed fit bushing insert at the lower bearing dropped out of the motor support casting sometime during the night of the 23rd. This created a 3/16 inch clearance all around the bearing, which in turn allowed the shaft to vibrate. Soon all of the packing was hammered out o of the gland. Without any steadying support for it's full length, the impellor and shaft evidently whipped about, rubbing and striking the volute and stuffing box until everything was completely ruined.

A service man from the DaLee company arrived on the 25th and said that the only thing that could be done was to take everything back to Detroit machine work and rebuilding again. Since it took 33 days to obtain parts from the factory for the other rebuild, it is expected that we will be without a pump until the latter part of April. In the meantime, we can not use the heat exchanger.

Sludge temperatures are recorded from the material entering the exchanger so will not be available while the pump is out of service. The samples for pH etc. are taken from a cock just ahead of the pump and as a main valve ahead of the cock has to be closed to remove the pump, these items will not be available either.

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 59 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1	F	38	28	33			106	60	1.63		73		58	1	59	14
2	RAS	46	30	38	50		90	60	1.80		40	160	57	0	57	13
3	S	38	24	31	50		96		1.75		48	120	32		32	6
4	F	36	26	31			92		1.75		64					12
5	R	42	30	36			97		1.83		107	160	62	18	80	14
6	S	31	18	26	50		100		1.84		130					15
7	S	30	18	24			94		1.74		22				75	23
8	S	42	26	34			97		1.72		72	120	41	14	55	16
9	C	30	20	25	50		97		1.79		12	160	45	12	57	18
10	C	34	20	27	50		96		1.75		38	160	41	16	57	11
11	F	40	18	29	49		96		1.75		67	120	41	6	73	15
12	S	38	20	29	50		100		1.74		73	160	65		81	11
13	S	40	20	30			107	59	1.67		152	160				19
14	R	50	30	40			96	66	1.71		19	120	67	4	71	18
15	S+W	46	22	34			105		1.68		94	160	57	2	59	26
16	S	34	18	26	50		96	67	1.75		50	160	56	6	56	12
17	LS	30	12	21	50		101		1.71		31	120	49	3	52	19
18	F	50	20	30	50		102		1.73		41	160	53	1	53	14
19	F	61	33	47	50		103		1.76					44		
20	C	58	30	44	50		98		1.76		518	160	68	21	89	15
21	F	34	10	32			105		1.72		13	120	46	28	74	14
22	F	33	13	23	50		103		1.66		12	160	50	7	57	25
23	F	60	32	46	50		105	63	1.75		27	160	64		64	2
24	F	68	30	49				67	1.73		100	120	7			7
25	C	52	34	43	50				1.72		72	120	1	13	14	17
26	S	42	30	36	50				1.77		53	120	0	43	43	10
27	C	39	19	29					1.79		33	120	0	43	43	23
28	F	40	22	31					1.74		28	120	0	45	45	25
29	C	48	20	34					1.70		12	120	0	41	41	16
30	C	50	25	38	50				1.83		349	160				17
31	LR	60	34	47	50				1.78		39	120	0	38	38	12
Total		1303	732	1043							2571	4400	1178	600	1778	521
Max.		68	34	49	50		107	67	1.84		518	160	68	45	89	32
Min.		30	10	21	49		90	59	1.63		12	120	0	0	38	7
Av.		42	24	34	50		95	63	1.74		83	142	28	19	57	17

REMARKS:

C - Clear
Cl - C

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 59 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1	Su		111	80.2	60	83.3	82	58	7.8		7.7				
2	M		100	77.0	50	80.0	73	57	7.9		7.7		6.0	7.0	7.1
3	Tu		112	83.0	53	83.0	80	56	7.9		7.6		6.2	7.2	7.1
4	W		73	82.2	59	77.7	57	49	7.8		7.7		6.3	7.2	7.0
5	Th		96	80.2	62	74.2	63	46	7.8		7.6		6.2	7.1	
6	F		75	69.3	40	75.0	65	38	7.8		7.6		6.2	7.2	7.1
7	Sa		172	88.5	49	83.7	72	52	7.7		7.6				
8	Su		100	85.0	45	86.7	91	52	7.8		7.7				
9	M		108	84.2	43	88.4	82	49	7.8		7.7		6.4	7.2	7.1
10	Tu		90	81.1	51	78.4	78	53	7.8		7.7		6.1		
11	W		108	81.5	53	84.9	90	49	7.9		7.6		6.1	7.1	7.0
12	Th		87	83.9	57	80.7	75	50	7.8		7.7		6.0	7.1	7.1
13	F		81	82.7	53	83.0	69	53	7.8		7.7		6.1	7.1	7.1
14	Sa		124	76.7	65	78.5	89	53	7.6		7.7				
15	Su		63	87.3	40	80.0	61	39	7.7		7.8				
16	M		91	80.2	51	84.3	82	42	7.8		7.7		6.3	7.1	7.1
17	Tu		74	85.1	46	80.4	73	44	7.9		7.8		6.1		
18	W		93	82.8	53	83.0	72	46	7.8		7.7		6.3		
19	Th		98	71.4	38	62.1	78	31	7.8		7.7		6.3	7.2	7.0
20	F		132	90.9	42	87.3	73	49	7.8		7.6		6.3	6.7	7.0
21	Sa		80	90.0	42	88.1	74	40	7.8		7.8				
22	Su		65	78.5	52	80.8	61	51	7.8		7.7				
23	M		88	93.2	44	88.7	80	50	7.7		7.6		6.2	7.2	7.0
24	Tu		96	86.4	53	83.0	71	51	7.8		7.6		6.2		
25	W		90	83.3	52	84.6	79	52	7.8		7.6		6.2		
26	Th		81	75.3	55	74.5	86	56	7.8		7.6		6.2		
27	F		98	83.7	52	84.6	79	52	7.8		7.7		6.2		
28	Sa		85	88.2	47	85.1	86	56	7.7		7.7				
29	Su		69	92.7	50	86.0	71	49	7.7		7.5				
30	M		108	82.6	60	90.0	78	62	7.8		7.7		6.0		
31	Tu		88	81.8	54	85.2	74	55	7.8		7.6		6.1		
Total			2886	2568.9	1596	2547.7	2	1556							
Max.			132	93.2	65	90.0	91	62	7.9		7.8		6.4	7.2	7.1
Min.			63	69.3	40	62.1	57	29	7.6		7.5		6.0	6.7	7.0
Av.			93	82.9	51	82.2	75	50	7.8		7.7		6.2	7.1	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS	93	41924	51	22041			
5 DAY B.O.D.							

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 59 SHEET NO. 3

DATE	SLUDGE HANDLING DATA: RAW SLUDGE FROM CLARIFIERS — GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2 — GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	~~DRAWN TO DRYING BEDS~~ Supernate — GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1326	5.1	553	79.5	439								
2	2210	4.3	808	79.8	644								
3	1326	5.0	563	80.5	453								
4	1105	4.1	385	82.0	316								
5	2873	4.6	1123	82.5	927	12160	1.44		51.5		12160	.35	66.0
6	1768	4.1	617	80.8	498								
7	1326	3.9	439	88.0	433								
8	1326	4.5	507	81.4	412								
9	2210	3.3	621	81.9	508								
10	1326	4.5	507	80.7	408								
11	1768	4.6	692	81.7	566								
12	1768	5.0	752	82.0	617	13700	1.54		57.5		13700	.33	64.9
13	1326	4.4	496	83.3	413								
14	1326	1.6	180	81.6	163								
15	1547	3.5	459	82.5	379								
16	1768	3.3	497	80.9	402								
17	1768	3.1	467	83.3	389								
18	1768	4.3	662	80.9	536								
19	2431	3.8	785	81.5	637	11730	1.30		67.9		11730	.34	59.2
20	1105	4.6	432	81.5	352								
21	2431	3.6	743	81.8	608								
22	1105	5.3	497	82.9	412								
23	1326	5.4	608	82.6	502								
24	1105	4.8	451	81.3	367								
25	1105	4.3	403	77.4	312								
26	1768	4.5	677	75.4	511								
27	1326	4.5	507	76.8	389								
28	1105	5.1	478	72.0	345								
29	1547	7.1	932	75.6	704								
30	1989	4.8	812	78.1	633								
31	1768	4.7	706	81.7	577								
Total	49946	135.7	18359	2501.9	14854	37790	1629		176.9		37790		190.1
Max.	2873	7.1	1123	88.0	927	13700	1.54		67.9		13700	.35	66.0
Min.	1105	1.6	180	72.0	163	0	1.30		51.5		0	.33	59.2
Av.	1611	4.4	592	80.7	479	1219	1.43		59.0		1219	.34	63.4

Supernate

B.O.D. 671 ppm
Susp. Sol. 2200 ppm

B.O.D. 1150
Sus. Solids 1700

B.O.D. 580
Sus. Solids 2000

Supernate

	B.O.D.	Sus. Sol.
24	671	2200
25	1150	1700
26	580	2000

3) 7401 (800 Av.) 3) 5900 (1767 Av.)
24 — 3 — 9
01 — 3 — 2
— 9 — 6
— 15

REMARKS: Scum on 20th
Cleaned No. 1 & No. 2 drying beds on 25, 26 with 3½" coke, 57.8% Vol. - 47.8% Vol.

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF March 59 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	BELOW EFFLUENT DISCHARGE: TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B.O.D. PPM	COMMENTARY
1									The chlorine circulating pump that was completely rebuilt with new volute, impeller, shaft, bearings & wearing rings, became inoperative again on the 24th of this month. A pr. of tit bushings inserted at the lower bearing carrier dropped out of the carrier. Sometime during the night of the 23rd. This created a 3/16 clearance around the bearing which in turn, allowed the shaft to vibrate and whip. Seem all of the pa Kinney Construct. Co. impeller to wear ring clearance. Replacing everything. A service man was called in [illegible] only the
2									
3	33	11.2		4.6		11.2		4.6	
4	33	11.6		4.4		11.8		4.5	
5	33	11.6		3.6		11.6		3.8	
6									
7									
8									
9									
10	33	11.6		3.4		11.6		3.4	
11	34	11.4		3.2		11.6		3.4	
12	35	11.4		2.6		11.4		3.0	To take over to Kinney to take with him for another complete rebuild. Since it took 33 days to obtain the parts for the previous rebuild, it is expected that we will be without circulating [illegible] of the [illegible] part of April. In the [illegible] cannot use the [illegible] tower are recorded. Sludge [illegible] ceased [illegible] available [illegible] in service. Samples for pH, suspended solids, B.O.D. etc. are [illegible] Sampling cocks just [illegible] To remove it, it is necessary to close a valve which should at the sampling cock [illegible] will not be [illegible]
13									
14									
15									
16									
17									
18	33	12.4		3.0		12.6		3.6	
19	36	12.0		2.8		12.0		2.4	
20									
21									
22									
23									
24	41	9.8		1.6		8.6		3.0	
25									
26	43	10.6		2.2		10.5		2.5	
27									
28									
29									
30									
31	42	11.6		3.2		11.0		2.6	
Total	[illegible]54	113.6		31.4		112.9		41.2	
Max.	43	12.4		4.6		12.6		4.6	
Min.	33	9.8		1.6		8.6		2.4	
Av.	35	11.4	81.4	3.1		11.3	80.7	3.4	

REMARKS:

PREPARED BY .....

DATE.....

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH April 19 59 MISCELLANEOUS DATA OPERATOR R.D.Craun

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Plant Eff. E. Coli. Water Cu.ft.	Cl_2 lbs.	Power KWH	AUX. FUEL cu.ft. Gas x 100	Remarks
1	.73	59	32	R	50	1.96	7.8		23		120	17	
2	.48	51	35	R	49	2.01	7.8		14		120	15	
3	.03	50	32	R	49	2.05	7.8		37		160	16	
4		52	38	C	50	2.04	7.7		12		120	15	
5		60	32	C&Cl	50	1.92	7.7		13		160	14	
6		54	36	C	50	2.07	7.8		26		120	7	
7	.49	70	40	R	50	2.09	7.7		45		160	22	
8	.09	52	36	R	49	2.04	7.7		20		160	10	
9		44	38	Cl	50	2.05	7.7		44		200	10	
10	.06	41	29	R&S	50	2.05	7.6		17		200	11	
11		46	32	Cl	50	1.99	7.6		13		160	7	
12		49	27	Cl	50	1.89	7.7		7		160	11	
13		52	30	Cl	50	1.98	7.8		24		160	6	
14		62	38	Cl	49	1.95	7.7		36		200	5	
15		68	46	Cl	50	1.92	7.7		23		160	2	
16		70	48	Cl	51	1.90	7.8		82		160	2	
17	.10	78	58	R	50	1.95	7.6		73		200	4	
18		62	38	Cl	49	1.93	7.6		12		160	10	
19	.18	48	32	R&S	49	1.81	7.7		10		160	14	
20		48	27	Cl	49	1.93	7.7		34		160	13	
21		52	28	C	50	1.88	7.8		20		200	7	
22		66	34	C	50	1.84	7.8		12		160	4	
23		64	44	C	50	1.86	7.8		27		160	2	
24	.02	68	46	R	50	1.85	7.7		46		200	5	
25		76	40	Cl	50	1.86	7.7		6		160	1	
26	.06	56	38	R	50	1.76	7.5		14		120	10	
27	.91	56	42	R	50	1.94	7.8		26		160	5	
28	.45	60	40	R	51	2.05	7.7		41		200	12	
29	.15	68	38	R	50	1.99	7.8		60		160	6	
30	.05	64	36	R	51	1.98	7.8		39		160	8	
31													
ARITH. MEAN	.13				50	1.95	7.7		29		149	12	
STAT. MEAN						1.95							
	7.00					58.54			866		4880	371	

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH April 1959 — PRIMARY TREATMENT DATA — OPERATOR R. D. Claun

Date	5-Day B O D Inf. Mg/l	5-Day B O D Inf. X lbs. 10	5-Day B O D Eff. Mg/l	5-Day B O D Eff. X lbs. 10	5-Day B O D Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. X lbs. 10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. X lbs. 10	Suspended Volatile Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. X lbs. 10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. X lbs. 10	Receiving Stream Data Temp F	Remarks			
1	69	113	48	79	30.4	126	206	61	100	51.6	96	157	49	80	43	11.0	2.6	11.2	2.8
2	52	87	38	64	26.9	79	132	41	69	48.1	71	119	38	64	43	10.8	2.8	10.8	2.9
3	67	115	42	72	37.3	81	139	48	82	40.7	70	120	41	70					
4	67	114	51	87	23.9	100	170	46	78	54.0	85	145	38	65					
5	84	134	37	59	56.0	72	115	33	53	54.2	69	110	37	59					
6	81	140	65	112	19.8	93	160	57	98	39.8	75	129	47	81					
7	71	124	57	99	19.7	88	154	69	120	30.3	67	117	48	84	46	10.4	2.4	10.6	2.6
8	80	136	50	85	37.5	70	119	39	66	44.3	56	102	36	61	48	10.0	2.5	10.0	2.4
9	59	101	30	51	49.2	77	132	41	70	33.8	67	114	38	65	46	10.2	2.2	10.2	2.0
10	58	99	39	66	32.8	124	211	44	75	64.5	108	184	37	63					
11	66	110	35	58	47.3	58	96	30	50	48.3	50	83	24	40					
12	87	137	61	96	29.8	103	162	61	96	40.8	95	150	53	39					
13	91	150	43	71	52.7	115	190	43	71	62.6	95	157	34	56					
14	73	119	52	85	28.8	93	151	45	73	51.6	81	132	35	57	46	10.8	3.2	10.8	2.8
15	72	115	54	87	25.0	88	141	47	75	57.8	78	125	44	71	50	9.8	2.1	9.8	2.2
16	79	125	41	65	48.1	72	114	47	75	34.7	65	103	40	63	52	9.4	2.5	9.6	2.4
17	67	109	48	78	28.4	88	143	42	68	52.3	72	117	37	60					
18	69	111	52	84	24.6	78	125	36	58	53.8	62	100	26	42					
19	134	213	77	116	42.5	167	253	55	83	61.1	142	215	53	80					
20	81	130	58	93	28.4	104	168	53	85	49.0	89	143	49	78					
21	80	126	55	86	31.2	84	132	48	75	42.9	72	113	38	60	44	10.8	2.4	10.8	2.8
22	67	103	47	72	29.9	71	109	44	68	38.0	61	94	39	60	49	10.6	2.8	11.0	2.7
23	85	132	61	95	28.2	78	121	54	84	30.8	68	105	43	67	52	10.0	2.1	10.4	2.3
24	61	94	50	77	18.0	70	108	33	51	52.9	65	80	25	39					
25	85	132	65	101	23.5	101	157	50	78	50.5	88	136	48	74					
26	104	153	73	107	29.8	116	171	59	87	49.1	105	154	51	75					
27	85	138	52	84	38.8	130	211	68	110	47.7	94	152	48	78					
28	68	116	45	77	33.8	93	159	52	89	44.1	78	133	37	63	48	9.4	3.8	9.4	3.2
29	73	121	56	93	23.3	97	161	51	85	47.4	86	143	47	78					
30	64	106	46	79	25.0	80	132	57	94	28.7	72	119	50	83					
31																			
ARITH. MEAN	76	123	51	83	32.4	93	151	48	79	46.9	80	128	41	65	47	10.3	2.6	10.8	2.6
STAT. MEAN	75		52			92		48											
		37018		24801			45431		23668			38528		19543					

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH April 19 59 DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Transfer ~~Digester~~ #1 to #2

Date	Raw Sludge Gals. 8.5	Lbs. Per 1000 c.f. Digester 30 #1	pH	Total Solids %	Vol. Solids %	Gals. X 10 8.4	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	Temp. °F # 1	Gas Produced cu. ft. X 100	Wasted cu. ft.	Used	Remarks
1	1768	21.8	5.9	5.6	77.7												38	38	0	Note — include gallons
2	1326	16.1	6.0	5.4	79.4												45	45	0	of sludge to beds
3	1326	13.3	6.0	4.9	72.6												40	40	0	* Scum
4	1326	21.3	5.9	7.4	76.7												38	38	0	Pumped
5	884	10.2	6.1	5.2	78.6												36	36	0	with
6	884	14.8	6.0	5.8	79.5												31	31	0	sludge.
7	1547	15.6	6.0	4.5	79.3	2829	6.8	.70	66.4							72	54	15	39	
8	1989	27.2	6.1	6.2	77.9											88	64	0	64	
9	1768	21.5	6.0	5.5	78.0		7.0									93	75	0	75	
10	1326	17.5	5.9	6.2	75.3		6.9									102	73	13	60	
11	884	11.0	6.0	6.4	68.6											103	61	16	45	
12	884	8.2	5.9	4.4	75.0											104	51	10	41	
13	1547	18.6	5.9	5.7	74.7		7.2									107	60	8	52	
14	1326	16.3	6.1	5.7	76.0		7.0										67	11	56	
15	1989	24.5	5.9	5.6	77.6		6.9									94	74	18	56	
16	2873	32.6	6.3	5.1	78.4		7.0									98	85	28	57	
17	*3315	73.2	5.5	8.5	91.8	972	6.9	2.09	64.7							99	59	43	16	
18	1326	14.0		5.0	74.6												83	73	10	
19	1326	12.4		4.2	78.4												62	62	0	
20	1547	14.9	6.1	4.3	79.0		7.0									83	55	0	55	
21	1326	11.4	6.1	3.8	79.6	928	6.9	1.28	65.3							92	65	12	53	
22	2652	24.5	6.0	4.0	81.6		6.9									88	70	X 1	69	
23	2210	24.0	6.0	4.7	81.7		6.9									96	87	31	56	
24	1768	17.9	5.8	4.7	76.1	928	6.9	1.92	63.5							97	87	23	64	
25	1768	17.4	6.0	4.2	82.8												84	10	74	
26	1768	15.1	5.7	3.7	81.5											101	89	27	62	
27	1547	14.2	6.0	3.9	83.3		7.0									103	82	24	58	
28	1989	23.6	5.9	5.2	80.4		6.9										84	22	62	
29	1989	22.8	6.0	5.2	77.7		7.0									104	79	20	59	
30	1989	18.1	6.0	4.1	78.4		6.9									96	90	32	58	
31																				
ARITH. MEAN	1672	19.8	6.0	5.2	78.4	1886	6.9	1.50	65.0							96	66	24	42	
STAT. MEAN	50167					56578											1976	727	1249	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH April 1959 DIGESTER AND SLUDGE DATA OPERATOR R. D. Craun

Date	Digested Sludge to beds: Gals.	[illegible]	pH	Total Solids %	Vol. Solids %	Supernatant from #2: Gals. X 10	pH # 2	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x 10	5-Day B O D Mg/l x 10	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	Temp. °F # 2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — include gallons
2																			of sludge to beds
3																			
4																			
5																			
6							7.0												
7						2829	7.1	.33	66.5	204	99								
8																			
9							7.1												
10							6.9												
11																			
12																			
13							6.9									57			
14							6.9									62			
15							6.9									68			
16							6.9									70			
17	8250		6.9	9.1	57.9		6.9												
18																72			
19																			
20							6.9												
21	7780		6.9	7.9	61.8		6.9												
22							6.9									75			
23							6.9												
24	10160		6.9	4.3	67.9		6.8												
25																80			
26							6.9									76			
27							6.9									80			
28							6.9									77			
29							6.9												
30																			
31																			
ARITH. MEAN			6.9	7.1	62.5	94.3	6.9	.33	66.5	204	99					72			
STAT. MEAN	26190					2829													

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April 1959

SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
Rain																
1.73	R	59	32	40	50				1.96		23	120	0	38	38	1
2.48	R	51	35	43	49				2.01		14	120	0	45	45	15
3.03	R	50	32	41	49				2.05		37	160	0	40	40	16
4 0	C	52	38	45	50				2.04		12	120	0	38	38	15
5 0	C+Cl	60	32	46	50				1.92		13	160	0	36	36	14
6 0	C	54	36	45	50				2.07		26	120	0	31	31	7
7.49	R	70	40	55	50		98		2.09		45	160	39	15	54	22
8.09	R	52	36	44	49		88		2.04		20	160	64	0	64	10
9 0	C	44	38	41	50		93		2.05		44	200	75	0	75	10
10.06	S+R	41	27	35	50		102		2.05		17	200	60	13	73	11
11 0	C	46	32	39	50		103		1.99		13	160	45	16	61	7
12 0	C	47	29	38	50		104		1.89		7	160	41	10	51	11
13 0	C	52	30	41	50		107	57	1.98		24	160	52	8	60	6
14 0	F	62	38	50	49			62	1.95		36	200	56	11	67	5
15 0	F	68	46	57	50		94	68	1.92		23	160	56	18	74	2
16 0	F	70	48	59	51		98		1.90		82	160	57	28	85	2
17.1	R	78	58	68	50		99	70	1.95		33	200	16	43	59	4
18 0	C	62	38	50	49			72	1.93		12	160	10	73	83	10
19.18	R+S	48	32	40	49				1.81		10	160	0	62	62	14
20 0	C	48	27	38	49		83		1.93		34	160	55	0	55	13
21 0	F	52	28	40	50		92		1.88		20	200	53	12	65	7
22 0	F	66	34	50	50		88	75	1.84		12	160	69	1	70	4
23 0	F	64	44	54	50		96		1.86		27	160	56	31	87	2
24.02	R	68	46	57	50		97		1.85		46	200	64	23	87	5
25 0	C	76	40	58	50			80	1.86		6	160	74	10	84	1
26.06	R	56	38	47	50		101		1.76		14	120	62	27	89	10
27.91	R	56	42	49	50		103	76	1.94		26	160	58	24	82	5
28.45	R	60	40	50	51			80	2.05		41	200	62	22	84	12
29.15	R	68	38	53	50		104	77	1.99		60	160	59	20	79	6
30.05	R	64	36	50	51		96		1.98		39	160	58	32	90	8
31																
Total							1820		58.54		866	4980	1249	727	1976	371
Max.					51		104		2.09		82	200	75	73	90	17
Min.					49		72		1.76		6	120	0	0	31	1
Av.					50		96		1.95		29	149	42	24	66	12

REMARKS:

C - Clear
Cl - Cloudy
R - Rain
S - Snow
Ca - calm
F - Fog

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April 1959 — SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PPM PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE MAXIMUM	PH. DATA RAW SEWAGE MINIMUM	PH. DATA PLANT EFFLUENT MAXIMUM	PH. DATA PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									AV		AV				
1		W	(126)	76.2	(61)	80.3	(69)	(48)	7.8		7.7		5.9		
2		Th	(71)	84.9	(41)	92.7	(52)	(38)	7.8		7.6		6.0		
3		F	(81)	76.4	(48)	85.4	(67)	(42)	7.8		7.7		6.0		
4		Sa	(130)	75.0	(46)	82.6	(67)	(51)	7.7		7.6		5.9		
5		Su	(72)	95.8	(33)	100+	(84)	(37)	7.7		7.6		6.1		
6		M	(93)	80.6	(57)	82.5	(81)	(65)	7.8		7.6		6.0		7.1
7		Tu	(72)	[illegible]	(54)	70.0	(71)	(57)	7.7		7.6		6.0	6.8	7.1
8		W	(70)	85.7	(39)	92.3	(80)	(50)	7.7		7.6		6.1		
9		Th	(77)	87.1	(41)	92.7	(69)	(30)	7.7		7.7		6.0	7.0	7.1
10		F	(124)	87.1	(44)	84.1	(58)	(39)	7.6		7.7		5.9	6.9	6.9
11		Sa	(58)	86.2	(30)	80.0	(66)	(35)	7.6		7.6		6.0		
12		Su	(103)	92.2	(61)	86.9	(87)	(61)	7.7		7.6		5.9		
13		M	(115)	82.6	(43)	79.1	(91)	(43)	7.8		7.6		5.9	7.2	6.9
14		Tu	(93)	87.1	(45)	77.8	(73)	(52)	7.7		7.6		6.1	7.0	6.9
15		W	(88)	88.6	(47)	93.6	(72)	(54)	7.7		7.6		5.9	6.9	6.9
16		Th	(72)	90.3	(47)	85.1	(72)	(41)	7.8		7.6		6.3	7.0	6.9
17		F	(88)	81.8	(42)	88.1	(67)	(48)	7.6		7.7		*5.5	6.9	6.9
18		Sa	78	79.5	(36)	72.2	(69)	(52)	7.6		7.6				
19		Su	(167)	85.0	(55)	96.4	(134)	(77)	7.7		7.4				
20		M	(104)	85.5	(53)	92.5	(81)	(58)	7.7		7.6		6.1	7.0	6.9
21		Tu	(84)	85.7	(48)	79.2	(80)	(55)	7.8		7.6		6.1	6.9	6.9
22		W	(71)	85.9	(44)	88.6	(67)	(47)	7.8		7.6		6.0	6.9	6.9
23		Th	(78)	87.2	(54)	79.6	(85)	(61)	7.8		7.6		6.0	6.9	6.9
24		F	70	72.8	(33)	75.8	(61)	(50)	7.7		7.5		5.8	6.9	6.8
25		Sa	(131)	87.1	(50)	96.0	(85)	(65)	7.7		7.6		6.0		
26		Su	(116)	90.5	(59)	85.4	(104)	(73)	7.5		7.4		5.7		
27		M	(130)	72.3	(68)	70.7	(85)	(52)	7.8		7.6		6.0	7.0	6.9
28		Tu	(93)	83.8	(52)	71.2	(68)	(45)	7.7		7.6		5.9	6.9	6.9
29		W	(117)	88.7	(51)	94.1	(73)	(56)	7.8		7.7		6.0	7.0	6.9
30		Th	(80)	70.0	(57)	87.7	(64)	(48)	7.8		7.6		6.0	6.9	6.9
31															
Total			2716	2571.7	1454	2540.6	2279	1530	231.6				167.1	118.1	124.6
Max.			167	95.8	69	100+	134	77	7.8		7.7		6.3	7.2	7.1
Min.			58	72.3	30	70.0	52	30	7.5		7.4		5.5	6.8	6.8
Av.			93	85.7	48	84.8	76	51	7.7		7.6		6.0	6.9	6.9

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS	93	45403	48	23434	45	21969	48.4
5 DAY B.O.D.	76	37103	51	24898	25	24801	32.9

* Scum

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April 1959 SHEET NO. 3

SLUDGE HANDLING DATA

DATE	RAW SLUDGE FROM CLARIFIERS: GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2: GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	~~DRAWN TO DRYING BEDS~~ Super [illegible]: GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1768	5.6	842	77.7	654								
2	1326	5.4	608	79.4	483								
3	1326	4.9	552	72.6	400								
4	1326	7.4	833	76.7	638								
5	884	5.2	390	78.6	306						[illegible]		
6	884	5.8	436	79.5	344						Bed [illegible] - 992		
7	1547	4.5	592	79.3	468	28290	.70	1659	66.4	1102	28290	.33	66.5
8	1989	6.2	1047	77.9	817								
9	1768	5.5	827	78.0	646								
10	1326	6.2	698	75.3	526								
11	884	6.4	481	68.6	330								
12	884	4.4	330	75.0	247								
13	1547	5.7	748	74.7	558								
14	1326	5.7	642	76.0	488								
15	1989	5.6	947	77.6	734								
16	2873	5.1	1243	78.4	977								
17 *	3315	8.5	2390	91.8	2195	9720	2.09	1706	64.7	1103			
18	1326	5.0	563	74.6	421								
19	1326	4.2	473	78.4	371								
20	1547	4.3	564	79.0	446								
21	1326	3.8	428	79.6	341	9280	1.28	998	65.3	652			
22	2652	4.0	902	81.6	734								
23	2210	4.7	883	81.7	721								
24	1768	4.7	707	76.1	537	9280	1.92	1494	63.5	948			
25	1768	4.2	632	82.8	521								
26	1768	3.7	556	81.5	453								
27	1547	3.9	512	83.3	426								
28	1989	5.2	879	80.4	707								
29	1989	5.2	879	77.7	683								
30	1989	4.1	693	78.4	543								
31													
Total	50167	155.1	22277	2352.2	17715	56570	5.99	5857	259.9	3805	28290		
Max.	3315	8.5	2390	91.8	2195	28290	2.09	1494	66.4	1103	28290		
Min.	884	3.7	330	68.6	247	0	.70	0	63.5	0	0		
Av.	1672	5.2	743	78.4	591	1886	1.50	195	65.0	127	743	.33	66.5

REMARKS: Cleaned #3 Bed [illegible] - 3 in. cake [illegible] cu. yd) 58.2% Moist - [illegible]
Filled bed #1 on 17th approx. 11 inches (9250 gal) PH. 6.9 Temp 61 - 9.1% sol., 57.9% Vol.
" " #2 on 21st " 10½ " (7780 gal) 7.9% Soll - 61.8% Vol
Cleaned Bed 4 on 21st - 3 in. cake (11 cu yd) 66.1% Moist - 60.7% Vol.
Filled Bed 3 on 24th, Approx 13½ inches (10,160 gal) PH 6.9 Temp. 72 - 4.3% [illegible] 67.9
* Pumped sludge - scum together

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF April 1959 SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE				COMMENTARY
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	
1	43	11.0		2.6		11.2		2.8	
2	43	10.8		2.8		10.8		2.9	
3									
4									
5									
6									
7	46	10.4		2.4		10.6		2.6	
8	48	10.0		2.5		10.0		2.4	
9	46	10.2		2.2		10.2		2.0	
10									
11									
12									
13									
14	46	10.8		3.2		10.8		2.8	
15	50	9.8		2.1		9.8		2.2	
16	52	9.4		2.5		9.6		2.4	
17									
18									
19									
20									
21	44	10.8		2.4		10.8		2.8	
22	49	10.6		2.8		11.0		2.7	
23	52	10.0		2.1		10.4		2.3	
24									
25									
26									
27									
28	48	9.4		3.8		9.4		3.2	
29									
30									
31									
Total	567	173.2		31.4		174.6		31.1	
Max.	52	11.0		3.8		11.2		3.2	
Min.	43	9.4		2.1		9.4		2.0	
Av.	47	10.3	88.2	2.6		10.8	92.2	2.6	

REMARKS:

PREPARED BY .....

DATE.....

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH May 1959 MISCELLANEOUS DATA OPERATOR R. D. Crain

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water Cu. Ft.	Cl₂ lbs.	Power KWH X 10	AUX. FUEL Gas cu. ft. X 100	Remarks
1	0	68	44	C	51	2.00	7.7		83		16	6	* Plant by-passed for 3½ hours
2	0	86	58	C	51	2.05	7.6		20		16	6	on the 15th to allow some for
3	0	87	57	C	51	2.00	7.6		15		16	6	some work to be done in the
4	0	86	54	C	51	2.12	7.7		9		16	2	comminuted sewage wet well.
5	0	89	61	C	52	2.10	7.7		39		16	1	
6	0	90	50	C	52	2.15	7.7		37		16	2	
7	0	64	40	C	52	1.97	7.7		232		16	2	
8	0	68	40	C	52	1.90	7.7		64		16	3	
9	0	72	52	Cl	51	1.88	7.7		10		16	3	
10	.76	80	60	R	51	1.94	7.6		7		16	4	
11	.29	70	56	R	51	2.02	7.7		23		16	6	
12	0	76	54	Cl	52	1.98	7.7		25		16	7	
13	0	66	38	Cl	52	1.89	7.6		65		12	7	
14	0	52	38	Cl	52	1.89	7.7		147		16	14	
15	0	52	32	Cl	52	*1.62	7.6		1420	48	16	12	
16	0	60	40	Cl	51	1.87	7.7		1764	62	16	8	
17	0	72	44	C	52	1.81	7.5		1733	63	16	2	
18	.22	76	58	R	52	1.99	7.5		1331	74	16	2	
19	.07	86	64	R	52	2.06	7.7		1846	77	20	1	
20	.41	86	64	R	53	2.18	7.6		1560	70	16	1	
21	.01	86	64	R	54	2.11	7.7		1749	64	20	1	
22	.43	64	46	R	54	2.08	7.8		1810	65	20	2	
23	.20	62	42	R	52	1.96	7.5		1580	56	16	5	
24	0	76	46	C	52	1.88	7.5		1650	59	16	1	
25	.02	78	62	R	53	2.04	7.7		1717	69	16	1	
26	.01	85	64	R	53	2.06	7.7		1641	44	16	2	
27	0	82	58	C	54	2.08	7.7		1691	66	20	1	
28	0	90	68	C	54	2.06	7.7		1630	70	16	1	
29	0	86	58	Cl	54	2.06	7.7		1581	65	16	2	
30	0	80	62	C	54	1.89	7.7		1579	60	16	1	
31	.10	87	65	C	54	1.93	7.4		1498	56	16	1	
ARITH. MEAN	.08	76	53		52	1.99	7.7		921	63	16	3.6	
STAT. MEAN						1.99							
					61	57			28556	1068	5080	112	

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH May 19 59 — PRIMARY TREATMENT DATA — OPERATOR R. D. Craun

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids					Receiving Stream Data				
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff			Temp F	Above Outfal		Below O.F.	
	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X 10	Mg/l	lbs. X 10			D.O	B.O.D	D.O.	B.O.D.
1	74	124	50	84	32	87	145	31	52	64	71	119	28	47						
2	79	135	31	55	61	86	147	37	63	57	80	137	28	48						
3	90	150	40	67	56	111	185	58	97	48	99	165	48	80						
4	96	170	61	108	37	128	227	57	101	56	100	177	47	83						
5	92	161	54	95	41	116	203	50	88	56	96	168	43	75	64	8.8	2.2	9.2	2.4	
6	55	99	44	79	20	73	131	44	79	40	69	124	42	75	66	8.4	2.8	9.0	3.0	
7	67	110	49	81	27	64	105	42	69	34	59	97	42	69	64	7.9	2.3	8.1	2.3	
8	77	122	54	86	30	84	133	40	63	52	81	128	38	60						
9	81	127	51	80	37	88	138	34	53	61	76	119	32	50						
10	84	136	43	71	49	85	138	24	39	72	72	117	24	39						
11	92	155	57	96	38	90	151	42	71	53	73	123	34	57						
12	70	116	44	73	37	64	106	23	58	64	52	86	18	30	63	8.4	2.0	8.6	2.0	
13	82	129	51	80	38	74	117	38	60	49	64	101	32	50	63	8.4	2.8	8.8	3.2	
14	75	118	49	77	35	74	117	34	54	54	65	102	30	47	56	9.0	1.6	9.4	2.0	
15	73	99	33	45	55	87	118	37	50	57	70	95	33	45						
16	88	137	59	92	33	105	164	46	72	56	93	145	41	64						
17	98	148	73	110	26	116	175	66	100	43	103	156	59	89						
18	120	198	57	95	52	174	239	76	126	56	131	218	55	91						
19	70	120	50	86	29	104	179	43	74	59	95	164	40	69	61	9.2	2.0	9.4	2.6	
20	69	126	48	87	30	114	207	51	93	55	86	156	41	75	64	9.0	2.0	9.2	2.1	
21	78	137	53	93	32	100	176	42	74	58	83	146	39	69	64	7.8	2.4	7.7	2.3	
22	64	111	49	85	23	122	212	56	97	54	108	187	47	82						
23	76	124	50	82	34	80	131	30	49	62	76	124	40	65						
24	88	138	59	93	33	85	133	52	82	39	71	111	43	67						
25	90	156	55	95	39	100	174	64	111	46	91	159	42	73						
26	67	115	47	83	30	96	165	45	77	53	72	124	37	64	62	7.8	1.8	7.7	1.9	
27	83	144	51	89	39	110	191	54	94	51	85	148	44	76	65	7.8	1.5	7.9	1.4	
28	85	146	54	93	37	147	253	48	83	67	122	210	44	76	66	9.0	1.8	9.2	1.8	
29	71	122	51	88	28	87	149	48	83	45	65	112	32	55						
30	68	107	39	61	43	76	120	30	47	60	63	99	26	41						
31	71	124	57	92	20	83	134	45	73	46	70	113	42	68						
ARITH. MEAN	80	132	50	84	36	97	160	45	75	54	82	136	38	64	63	8.5	2.1	8.7	2.2	
STAT MEAN	80	133	50	83	37	95	158	44	73	54										
		4098		2600			4967		2330											

MICHIGAN DEPARTMENT OF HEALTH

#2

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH May 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Date	Digested*** Sludge to beds					Supernatant from #2						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	8.35 Gals. X 10	pH #2	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X 10	5-Day B O D Mg/l X 10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #2	Produced cu. ft.	Wasted cu. ft.	
1						1260	7.0	.28	66	166	23								Note – include gallons
2																			of sludge to beds
3																			* 10.6
4							7.0												inch fill
5							7.0												to # 4
6							7.1												drying
7						1370	7.0	.27	53	143	24					82			bed
8							7.0									86			
9																			
10																			
11							7.1									84			
12							7.0									86			
13							7.1												
14							7.0									84			
15							7.1									80			
16																84			
17																			
18							7.2												
19						1326	7.2	.30	62	175									
20							7.0									90			
21	* 7950		6.9	8.3	61.4		7.0												
22							7.0									90			
23																92			
24																			
25							7.0									88			
26							7.0									91			
27							7.1									95			
28						1591	7.0	.52	78	210	21					94			
29							7.0									99			
30																			
31																			
ARITH. MEAN	256		6.9	8.3	61.4	179	7.0	.44	65	174	27					88			
STAT. MEAN	7650					5547													

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1959 SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1 0	C	68	44	56	51		99	F	(2.00)		83	160	34	57	77	6
2 0	C	86	58	72	51		97		(2.05)		20	160	8	77	85	6
3 0	C	87	57	72	51		97		(2.00)		15	160	0	54	54	6
4 0	C	86	54	70	51		88		(2.12)		9	160	81	25	106	2
5 0	C	89	61	75	52		103		(2.10)		39	160	52	55	107	1
6 0	C	90	50	70	52		104		(2.15)		37	160	61	12	73	2
7 0	C	64	40	52	52		106	82	(1.91)		232	160	49	60	107	2
8 0	C	68	40	54	52		91	86	(1.90)		64	160	51	39	90	2
9 0	CL	72	52	57	51		100		(1.88)		10	160	70	34	74	3
10,76	R	80	60	70	51		104		(1.94)		7	160	43	66	109	4
11 .29	R	70	56	63	51		106	84	(2.02)		23	160	43	19	62	6
12 .0	CL	76	54	65	52		99	86	(1.98)		25	160	52	23	75	7
13 .0	CL	66	38	52	52		106		(1.89)		65	120	52	14	66	7
14 .0	CL	52	38	45	52		107	84	(1.89)		147	160	10	71	81	14
15 .0	CL	52	32	41	52			80	(1.62)	118	1420	160	70	21	91	12
16 0	CL	60	40	50	51		96	84	(1.82)	62	1764	160	70	11	81	8
17 0	C	72	44	58	52		103		(1.81)	63	1733	160	20	43	63	2
18,22	R	76	58	67	52		102		(1.99)	74	1331	160	54	12	66	2
19 .07	R	86	64	75	52		104		2.06	77	1846	200	59	35	94	1
20 .41	R	86	64	75	53		96	90	(2.18)	70	1560	160	60	27	87	1
21 .01	R	86	64	75	54		104		(2.11)	64	1749	200	67	21	88	1
22 .43	R	64	46	55	54		112	90	(2.08)	65	1810	200	72	26	98	2
23 .20	R	62	42	52	52		102	92	1.96	56	1580	160	30	31	61	5
24 0	C	76	46	61	52		107		(1.88)	59	1650	160	43	24	67	1
25 ,02	R	78	62	70	53		110	88	2.04	69	1717	160	47	1	48	1
26 .01	R	85	64	74	53			91	2.06	44	1641	160	59	3	62	2
27 0	C	82	58	70	54		99	95	2.08	66	1691	200	41	0	41	1
28 0	C	90	68	76	54		100	94	2.06	70	1630	160	60	30	90	1
29 0	CL	86	58	72	54		94	99	2.06	65	1591	160	59	26	85	2
30 0	C	80	62	71	54		104		1.88	60	1579	160	47	21	68	1
31,10	C	87	65	76	54		101		(1.93)	56	1498	160	36	25	61	1
2.52																
Total		2362	1639	1991	1621		2947	1325	61.67	1068	28556	5080	1466	975	1441	112
Max.76		90	65	76	54		112	99	2.18	77	1846	200	81	77	109	14
Min. 0		52	32	41	51		88	82	1.62	44	7	160	0	0	41	1
Av.08		76	53	64	52		102	88	1.99	63	921	164	47	31	79	3.6

REMARKS:

C - clear S - Snow
CL - cloudy Ca. Calm
R - Rain F. Fog

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1959 SHEET NO. 2

DATE	TOTAL SOLIDS PPM RAW SEWAGE	TOTAL SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PPM RAW SEWAGE	SUSPENDED SOLIDS PERCENT VOLATILE	SUSPENDED SOLIDS PPM PLANT EFFLUENT	SUSPENDED SOLIDS PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM PLANT EFFLUENT	PH. DATA RAW SEWAGE	PH. DATA RAW SEWAGE	PH. DATA PLANT EFFLUENT	PH. DATA PLANT EFFLUENT	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
									AV		AV				
1		F	87	88.5	31	90.3	74	50	7.7		7.6		5.9	7.0	7.0
2		Sa	86	93.2	37	75.7	79	31	7.6		7.6		6.0		
3		Su	111	89.2	58	82.8	90	40	7.6		7.5		6.1		
4		M	128	78.1	57	82.5	96	61	7.7		7.6		6.0	7.1	7.0
5		Tu	116	82.8	50	86.0	92	54	7.7		7.6		6.1	7.0	7.0
6		W	73	94.5	44	95.5	55	44	7.7		7.6	*	5.4	7.1	7.1
7		Th	64	92.2	42	100	67	49	7.7		7.6		6.1	7.0	7.0
8		F	84	96.4	40	95.0	77	54	7.7		7.6		5.9	6.7	7.0
9		Sa	88	86.4	34	93.2	81	51	7.7		7.6				
10		Su	85	84.7	24	100	84	43	7.6		7.5				
11		M	90	81.1	42	80.9	92	57	7.7		7.6		5.9	7.1	7.1
12		Tu	64	81.2	23	78.2	70	44	7.7		7.7		5.9	7.1	7.0
13		W	74	86.5	38	84.2	82	51	7.6		7.5		5.7	7.1	7.1
14		Th	94	87.8	34	88.2	75	49	7.7		7.5		5.7	7.1	7.0
15		F	87	80.5	37	89.2	73	33	7.6		7.5		5.7	7.1	7.1
16		Sa	105	88.6	46	87.0	58	59	7.7		7.6				
17		Su	116	88.8	66	89.4	98	7.3	7.5		7.3				
18		M	174	75.3	76	72.4	124	57	7.6		7.5		5.9	7.1	7.2
19		Tu	104	91.3	43	92.8	70	50	7.7		7.7		5.8	7.1	7.2
20		W	114	75.4	51	91.4	69	48	7.6		7.5		5.9	7.0	7.0
21		Th	100	83.0	42	92.9	78	53	7.7		7.6		5.9	7.1	7.0
22		F	122	88.5	56	83.9	74	49	7.8		7.8		6.0	7.1	7.0
23		Sa	80	95.0	30	100	76	50	7.5		7.5		5.8		
24		Su	85	93.5	52	82.7	88	59	7.5		7.4				
25		M	180	91.0	64	65.6	90	55	7.7		7.6		5.9	7.3	7.0
26		Tu	96	75.0	45	82.2	67	47	7.7		7.5		6.0	7.2	7.0
27		W	110	77.3	54	81.5	83	51	7.7		7.6		5.9	7.3	7.1
28		Th	147	83.0	48	71.7	86	54	7.7		7.5		5.9	7.2	7.0
29		F	87	74.7	48	66.7	71	51	7.7		7.6		5.9	7.0	7.0
30		Sa	76	82.9	30	86.7	68	39	7.7		7.5		5.8		
31		Su	83	84.3	45	93.3	71	57	7.4		7.3		5.9		
Total			3010	3642.5	1387	2635.9	1414	1563	237.2		234.1		152.9	N/R3	1139
Max.			174	96.4	76	101	120	73	7.8		7.8		6.1	7.3	7.2
Min.			64	74.7	23	65.6	55	31	7.4		7.3		5.4	6.7	7.0
Av.			97	85.2	45	85.0	80	50	7.7		7.6		5.9	7.1	7.0

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS	97	49720	45	23108	52	26612	53.6
5 DAY B.O.D.	80	41080	50	25675	30	15405	37.5

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF May 1959 SHEET NO. 3

SLUDGE HANDLING DATA

DATE	RAW SLUDGE FROM CLARIFIERS: GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS 8.5	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	SLUDGE TRANSFERED FROM 1 to 2: GALLONS TRANSFERRED	PERCENT DRY SOLIDS 8.4	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	DRAWN TO DRYING BEDS: GALLONS DRAWN	supernate PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
												BOD-229 T.S.-1660	
1	2210	6.3	1183	73.5	869	12600	1.83	1937	65.0	1260	12600	.28	66.1
2	1105	5.0	468	76.0	357								
3	1105	5.5	517	70.9	367								
4	1989	4.3	727	78.6	571								
5	2210	4.4	827	79.0	653							B.O.D-	244
6 *	3315	7.3	2057	85.0	1747							T.S.-	1432
7	2210	4.9	921	78.1	718	13700	1.69	1944	63.2	1230	13700	.27	53.4
8	2210	4.0	752	78.4	588								
9	1326	4.1	462	78.5	362								
10	1326	4.5	507	79.1	401								
11	1326	[illegible]	574	77.2	443								
12	1326	[illegible]	563	76.4	422								
13	2210	3.8	714	74.3	531								
14	1547	6.3	828	76.2	631								
15	1768	5.4	812	77.9	632								
16	1547	4.3	564	78.3	442								
17	1105	4.5	423	76.8	324							BOD- sus. Sol-	384 1750
18	1547	4.5	592	77.9	461								
19	2431	4.5	919	78.2	718	13260	1.23	1368	62.9	862	13260	.30	61.5
20	2652	4.3	968	82.0	794								
21	2431	5.1	1049	77.6	814	8400	1.63	115	58.0	67	—		
22	1989	5.4	913	77.8	711								
23	1547	4.0	524	78.0	409								
24	1547	4.1	538	78.0	419								
25	1989	3.7	626	79.2	496								
26	1547	5.1	668	79.5	532							BOD- sus S-	2100
27	2210	6.2	1164	75.7	882								
28	2873	4.6	1122	74.5	837	15910	1.55	2070	62.1	1284	15910	.52	77.9
29	2210	5.8	1088	76.2	831								
30	1547	5.4	708	75.7	537								
31	1326	4.1	462	78.6	363								
Total	57681	152.0	24240	2403.1	18862	63870	6.30	6434	311.2	4703	55470	1.37	258.9
Max.	3315	7.3	2057	85.0	1747	15910	1.83	1944	65.0	1284	15910	.52	77.9
Min.	1105	3.7	423	70.9	324	0	1.23	0	58.0	0	0	.27	53.4
Av.	1861	4.9	782	77.5+	608	2060	1.26	304	62.2	152	1789	.44	64.7

REMARKS:

Fill [illegible] 10.6 inch (7950 gal) on 21st 8.3 % sol 61.4 % Vol pH 6.9

BOD Super. Sus Sol

229 1660
244 1432
384 1750
21 2100
4) 6442 (1735 Av.

4) 1068 (267

PREPARED BY

DATE

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF.....

SHEET NO. 4

DATE	RECEIVING STREAM DATA — ABOVE EFFLUENT DISCHARGE				RECEIVING STREAM DATA — BELOW EFFLUENT DISCHARGE				COMMENTARY
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	
1									
2									
3									
4									
5	64	8.8		2.2		9.2		2.4	
6	66	8.4		2.8		9.0		3.0	
7	64	7.7		2.3		8.1		2.3	
8									
9									
10									
11									
12	63	8.4		2.0		8.6		2.0	
13	63	8.4		2.8		8.8		3.2	
14	56	9.0		1.6		9.4		2.0	
15									
16									
17									
18									
19	61	9.2		2.0		9.4		2.6	
20	64	9.0		2.0		9.2		2.1	
21	64	7.8		2.4		7.7		2.3	
22									
23									
24									
25									
26	62	7.8		1.8		7.7		1.9	
27	65	7.8		1.5		7.9		1.4	
28	66	9.0		1.8		9.2		1.8	
29									
30									
31									
Total	758	101.5		35.2		141.2		37.0	
Max.	66	9.2		2.8		9.4		3.2	
Min.	56	7.8		1.5		7.7		1.4	
Av.	63	8.5		2.1		8.7		2.2	

REMARKS:

PREPARED BY .....

DATE.....

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH June 1959 MISCELLANEOUS DATA OPERATOR R. D. Craun

Date	Weather: Precip Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	~~Grit~~ pH	~~Grit~~	~~Plant Eff. Grease Water~~ cu. ft.	Cl_2 lbs.	Power KWH X 10	AUX FUEL ~~Gas~~ ** Cu. Ft. X 100	Remarks
1		76	50	Cl	54	2.01	7.7		1762	71	16	1	
2		76	46	C	54	1.95	7.7		1923	68	20	1	
3		88	52	C	54	1.96	7.6		1958	77	16	1	
4		88	54	C	54	1.93	7.6		1980	72	20	1	
5		88	55	C	54	1.92	7.7		1945	66	16	1	
6		86	60	C	54	1.88	7.7		1835	67	20	1	
7		92	62	C	54	1.80	7.5		1868	63	16	1	
8		92	66	C	56	1.97	7.6		1783	75	16	1	
9		94	66	C	55	1.93	7.6		1763	64	20	2	
10	.01	96	68	R	56	1.90	7.7		1882	64	16	1	
11	.66	84	64	R	56	1.97	7.6		1910	69	16	2	
12		84	58	C	56	2.01	7.7		1874	69	20	1	
13		70	44	Cl	55	1.81	7.7		1817	58	16	1	
14		74	48	C	55	1.71	7.5		1657	56	16	3	
15		80	54	C	55	1.80	7.6		1750	67	16	0	
16		82	50	C	54	1.77	7.7		1925	79	20	0	
17		78	50	C	55	1.74	7.7		1963	64	16	2	
18		78	48	C	55	1.72	7.7		1636	74	16	1	
19		80	56	C	55	1.75	7.8		1860	65	16	1	
20		84	52	C	56	1.81	7.6		1776	59	16	1	
21	.39	88	46	R	56	1.74	7.5		1787	60	16	2	
22		84	54	Cl	56	1.84	7.7		1733	73	16	1	
23		80	60	Cl	56	1.78	7.8		1772	70	20	1	
24		88	68	Cl	56	1.77	7.6		1811	66	16	1	
25		98	70	Cl	56	1.82	7.6		1695	67	16	2	
26		94	72	Cl	56	1.97	7.7		1870	66	16	23	
27		94	75	Cl	56	1.89	7.6		1688	58	16	0	
28		96	76	Cl	56	1.74	7.6		1723	56	16	0	
29	.11	92	58	R	56	1.89	7.8		1596	70	16	0	
30	.40	90	60	R	56	1.75	7.7		1767	68	16	0	
31													
ARITH. MEAN	.05	86	58		55	1.85	7.7		1844	67	17	1.8	
STAT. MEAN						1.86							
					55	53			55319	2001	508	53	

*C—Clear Cl—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH June 19 50 PRIMARY TREATMENT DATA OPERATOR R. D. Craun

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids					T E M P	Receiving Stream Data			
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.				Above		Below	
	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X 10	Mg/l	lbs. X 10			D.O.	BOD	D.O.	B.O.D.
1	90	151	53	89	41	105	176	46	77	56	89	149	41	69						
2	95	155	57	93	40	108	176	44	72	62	101	164	38	62	66		8.4	2.0	8.4	1.6
3	92	151	53	87	42	97	159	64	105	34	80	131	49	80	64		9.0	2.4	9.6	4.2
4	73	118	50	81	32	91	147	40	64	56	64	103	34	55	68		10.2	.8	10.2	2.2
5	66	106	54	87	18	72	115	42	67	42	68	109	41	66						
6	75	118	43	67	43	82	129	25	39	71	74	116	25	39						
7	98	147	69	104	30	99	149	49	74	51	87	131	47	71						
8	84	138	61	100	27	101	166	54	89	47	85	140	47	77						
9	77	124	51	82	34	88	142	37	60	58	76	122	34	55	68		10.0	1.6	10.2	1.6
10	76	121	52	83	32	77	122	54	86	30	64	101	42	67	68		10.2	2.4	10.6	2.8
11	91	150	55	90	51	111	182	49	81	56	88	145	42	69	70		9.2	2.2	9.4	2.6
12	68	114	48	81	29	85	142	47	79	45	74	124	42	70						
13	80	120	46	69	42	95	144	35	53	63	82	124	37	56						
14	116	166	65	93	44	120	171	53	76	56	102	146	49	70						
15	102	153	58	87	43	125	188	45	68	64	106	159	39	59						
16	98	145	69	102	30	116	171	48	71	59	104	154	45	66	64		11.0	2.2	11.2	2.1
17	116	168	73	106	37	108	157	62	90	43	93	145	51	74	64		11.4	2.4	11.6	3.2
18	90	129	67	96	26	109	156	46	66	58	92	132	38	55	64		10.6	2.0	10.8	2.1
19	116	169	69	101	59	140	205	60	88	57	114	167	52	76						
20	97	146	62	94	36	120	181	42	63	65	103	157	40	60						
21	86	125	55	80	36	98	142	40	58	59	80	116	31	45						
22	102	157	61	94	40	128	197	58	89	55	114	175	53	81						
23	98	145	67	99	32	115	171	60	89	52	96	142	51	76						
24	91	134	56	83	38	116	171	51	75	56	97	143	41	60						
25	96	146	65	99	32	91	138	47	71	48	73	111	37	56	66		10.2	2.0	10.2	2.0
26	78	128	57	94	27	82	135	47	77	43	74	122	46	76						
27	91	144	56	88	38	95	150	38	60	60	86	136	38	60						
28	92	133	61	89	34	78	113	46	67	41	70	101	43	62						
29	92	145	77	121	16	120	189	67	106	44	98	155	57	92						
30	94	137	72	105	23	126	184	61	89	52	103	150	50	73						
31																				
ARIT. MEAN	91	139	59	91	32	103	159	49	75	53	88	136	43	66	67		9.8	2.1	10.0	2.7
STAT. MEAN	90	139	59	91	35	103	159	49	74	53										
		4183		2744			4768		2249			2637		1977						

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Number 1

MARSHALL, MICHIGAN

MONTH JUNE 19 59

DIGESTER AND SLUDGE DATA — Transfer ~~from~~ from #1 to #2

OPERATOR R. D. Craun

Date	Raw Sludge					sludge near bottom									Temp.	Gas			Remarks
	Gals.	Lbs. Per 1000 c f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. (X	Wasted cu. ft. 100	Used)	
	8.5	30				8.4													
1	1326	13	5.9	4.3	78										7.1	109	63	10	53	Note — include gallons
2	*3315	58	5.4	7.2	85										7.0		88	60	28	of sludge to beds
3	2431	26	5.9	4.8	79										7.1	96	90	33	57	* Skimming
4	1989	23	5.8	5.1	78	12820		1.6	69						7.0	104	88	43	45	pumped
5	2210	25	5.7	5.1	79										7.0	109	72	1	71	with
6	1326	12	5.9	4.0	82												75	0	75	sludge
7	1326	11	5.8	4.0	80											112	86	67	19	
8	1768	14	5.8	3.5	78										7.0	106	57	1	56	Gas
9	2210	24	5.7	4.8	80										6.9	102	66	9	57	venting
10	2210	24	5.7	5.4	80										7.0	107	61	19	42	at cover
11	1768	16	5.7	4.2	80	12600		1.2	66						6.9	108	65	12	53	several
12	2873	29	5.7	5.1	70										6.9		91	40	51	times &
13	1989	21	5.8	4.8	79											106	56	16	40	not
14	1817	19	5.8	4.9	75											107	63	1	62	metered
15	1547	14	5.9	4.1	78										7.0	116	41	1	40	
16	2210	24	5.7	5.4	72										6.9	108	22	13	9	
17	1989	26	5.7	5.9	79	12150		.8	68						6.8	100	54	1	53	
18	3094	41	5.6	6.0	78										6.6	95	49	1	48	
19	1989	22	5.8	5.1	78										6.6	101	57	12	45	
20	1768	18	5.8	4.5	79										6.5	106	68	30	38	
21	1768	19	5.9	4.7	80										6.6	98	78	35	43	
22	3094	32	5.6	4.5	80										6.9	104	51	13	38	
23	2652	26	5.9	4.4	79	14140		2.9	58						6.9	103	97	41	56	
24	1768	17	5.9	4.3	79										6.7	93	100	33	67	
25	1547	17	5.9	4.9	79										7.1	110	96	36	60	
26	1870	22	5.9	5.4	79										7.1	105	87	26	61	
27	1326	14	5.9	4.7	80												85	20	65	
28	1989	22		4.8	80											100	96	26	70	
29	2652	26	5.5	4.1	83										7.3	111	70	25	45	
30	1326	16	5.6	5.2	82	13480		1.5	62						7.1	110	101	45	56	
31																				
ARITH. MEAN	2038	22	5.8	4.8	79	2173		1.6	65						6.9	105	72	22	50	
STAT MEAN		21																		
	61147					65190											2173	670	1503	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR MARSHALL, MICHIGAN

Sheet # 2

MONTH June 19 59 DIGESTER AND SLUDGE DATA — OPERATOR R. D. Craun

Date	Digested** Sludge to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant From #2: Gals. 8.35 ##	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x 10	5-Day B O D Mg/l x 10	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH # 2	Temp. °F # 2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1														7.0	94			Note — include gallons
2														7.1	96			of sludge to beds
3														7.0				43 cu. yds
4						12820	.27	64	146	32				7.0				dried slud
5														7.0	94			from 4 beds
6															99			64% moist.
7																		56% volatile
8														7.1	97			
9														7.1	102			
10														7.2				
11						12600	.29	71	162	43				7.1				
12														7.0	102			
13																		
14																		
15														7.1	95			
16														7.1	97			
17						12150	.35	66	162	17				7.1				
18														7.0	98			
19														7.0				
20														7.1	94			
21														7.1	97			
22														7.2				
23						14140	.30	65	186	31				7.2	94			
24														7.1	100			
25														7.3				
26														7.3	100			
27															102			
28															108			
29														7.3				
30						13480	.39	67	292	65				7.2				
31																		
ARITH. MEAN						2173	.32	67	190	38				7.1	98			
STAT. MEAN										33								

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1959 SHEET NO. 1

DATE	TYPE OF WEATHER (R-P-C)		TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1 M	0	CL	76	50	63	54		109	94	2.01	71	1762	160	53	10	63	1
2 Tu	0	C	76	46	61	54			96	1.95	68	1923	200	28	60	88	1
3 W	0	C	88	52	70	54		96		1.96	77	1958	160	57	3.3	90	1
4 Th	0	C	88	54	71	54		104		1.93	72	1780	200	45	43	88	1
5 F	0	C	88	55	71	54		109	94	1.92	66	1945	160	71	1	72	1
6 Sa	0	C	86	60	73	54			99	1.88	67	1835	200	75	6	75	1
7 Su	0	C	92	62	77	54		112		1.80	63	1868	160	19	67	86	1
8 M	0	C	92	66	79	56		106	97	1.92	75	1783	160	56	1	57	1
9 Tu	0	C	94	66	80	55		102	102	1.93	64	1763	200	57	9	66	2
10 W	.01	R	96	68	82	56		107		1.90	64	1882	160	42	19	61	1
11 Th	.66	R	84	64	74	56		108		1.97	69	1910	160	53	12	65	2
12 F	0	C	84	58	71	56			102	2.01	69	1874	200	51	40	91	1
13 Sa	0	CL	70	44	57	55		106		1.81	58	1817	160	40	16	56	1
14 Su	0	C	74	48	61	55		107		1.71	56	1657	160	62	1	63	3
15 M	0	C	80	54	67	55		116	95	1.80	67	1750	160	40	1	41	0
16 Tu	0	C	82	50	66	54		108	97	1.77	79	1925	200	9	13	22	0
17 W	0	C	78	50	64	55		100		1.74	64	1963	160	53	1	54	2
18 Th	0	C	78	48	63	55		95	98	1.72	74	1686	160	48	1	49	1
19 F	0	C	80	56	68	55		101		1.75	65	1860	160	45	12	57	1
20 Sa	0	C	84	52	68	56		106	94	1.81	59	1776	160	38	30	68	1
21 Su	.39	R	88	46	67	56		98	97	1.74	60	1787	160	43	32	75	2
22 M	0	CL	84	54	69	56		104		1.84	73	1733	160	40	11	51	1
23 Tu	0	CL	80	60	70	56		103	94	1.78	70	1777	200	56	21	77	1
24 W	0	CL	88	68	78	56		93	100	1.72	66	1811	160	67	39	106	1
25 Th	0	CL	98	70	84	56		116		1.82	67	1695	160	60	36	96	2
26 F	0	CL	94	72	83	56		105	100	1.82	66	1870	160	61	26	87	23
27 Sa	0	CL	94	75	84	56			102	1.82	58	1658	160	65	20	85	0
28 Su	0	CL	96	76	86	56		100	108	1.74	56	1723	160	70	6	76	0
29 M	.11	R	92	58	75	56		111		1.89	76	1596	160	45	23	68	0
30 Tu	.4	R	90	60	75	56		110		1.75	68	1767	160	56	45	101	0
31																	
Total	1.57				2157	1657		2726	1667	55.53	2001	55319	5080	1703	672	2173	53
Max.	.66		98			56		116	108	2.01	79	1963	200	75	67	101	23
Min.	0			44		54		93	94	1.71	56	1596	160	9	0	22	0
Av.	.05		86	58	72	55		105	98	1.85	67	1844	169	50	22	72	1.8

REMARKS:

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1957 SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: PERCENT VOLATILE	5 DAY B.O.D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B.O.D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1		M	105	84.8	46	89.1	90	53	7.7		7.5		5.9	7.1	7.0
2		Tu	108	93.5	44	86.4	95	57	7.7		7.5		* 5.4	7.0	7.1
3		W	97	82.5	64	76.6	92	53	7.6		7.3		5.7	7.1	7.0
4		Th	91	70.3	40	85.0	73	50	7.6		7.4		5.8	7.0	7.0
5		F	72	94.4	42	97.6	66	54	7.7		7.6		5.7	7.0	7.0
6		Sa	82	90.2	25	100	75	43	7.7		7.6		5.9		
7		Su	99	87.9	49	95.9	98	69	7.5		7.3		5.8		
8		M	101	84.2	54	87.0	84	61	7.6		7.4		5.8	7.0	7.1
9		Tu	88	86.4	37	91.9	77	51	7.6		7.5		5.7	6.9	7.1
10		W	77	83.1	54	80.7	76	52	7.7		7.6		5.7	7.0	7.2
11		Th	111	79.3	49	85.7	91	55	7.6		7.5		5.7	6.9	7.1
12		F	85	87.1	47	89.4	68	48	7.7		7.6		5.7	6.9	7.0
13		Sa	95	86.3	35	100+	80	46	7.7		7.5		5.8		
14		Su	120	85.0	53	92.5-	116	65	7.5		7.4		5.8		
15		M	125	84.8	45	86.7	102	58	7.6		7.5		5.9	7.0	7.1
16		Tu	116	89.7	48	93.8	98	69	7.7		7.6		5.7	6.9	7.1
17		W	108	86.1	62	92.3	116	73	7.7		7.5		5.7	6.8	7.1
18		Th	109	84.4	46	82.6	90	67	7.7		7.5		5.6	6.6	7.0
19		F	140	81.4	60	86.7	116	69	7.8		7.5		5.8	6.6	7.0
20		Sa	120	85.8	42	95.2	97	62	7.6		7.5		5.8	6.5	7.1
21		Su	98	81.6	40	77.5	86	55	7.5		7.4		5.9	6.6	7.1
22		M	128	89.1	58	91.4	102	61	7.7		7.6		5.6	6.9	7.2
23		Tu	115	83.5-	60	85.0	98	67	7.8		7.7		5.9	6.9	7.2
24		W	116	83.6	51	80.4	91	56	7.6		7.5		5.7	6.7	7.1
25		Th	91	80.2	47	78.7	96	65	7.6		7.4		5.9	7.1	7.3
26		F	82	90.2	47	97.9	78	57	7.7		7.6		5.9	7.1	7.3
27		Sa	95	90.5	38	100	91	56	7.6		7.5		5.9		
28		Su	78	89.7	46	93.5	92	61	7.6		7.5				
29		M	120	81.7	67	85.1	92	77	7.8		7.6		5.5	7.3	7.3
30		Tu	136	81.7	61	82.0	94	72	7.7		7.6		5.6	7.1	7.2
31															
Total			3098	2559.0	1457	[illegible]	2720	[illegible]	229.1						
Max.			140	94.4	67	100+	116	77	7.8		7.7		5.9	7.3	7.3
Min.			72	70.3	25	76.6	66	43	7.5		7.3		5.4	6.5	7.0
Av.			103	85.3	49	88.6	91	59	7.7		7.5		5.8	6.9	7.1

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS	103	47699	49	22692	54	25007	52.4
5 DAY B.O.D.	91	42142	59	27323	32	14819	35.2

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1954 SHEET NO. 3

DATE	SLUDGE HANDLING DATA												
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					~~DRAWING DRYING BEDS~~ Supernate		
	GALLONS TO NUMBER 1 DIGESTER 8.5	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED 8.4	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN 8.35	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1326	4.3	484	[illegible]	377							S.S.-	1460
2 *	3315	7.2	2029	85.4	1732							BOD-	325
3	2431	4.8	992	78.6	778								
4	1989	5.1	863	78.4	677	12820	1.57	1691	69.2	1171	12820	.27	63.7
5	2210	5.1	957	78.8	754								
6	1326	4.0	451	81.6	364								
7	1326	4.0	451	80.0	361								
8	1768	3.5	[illegible]	77.5	408								
9	2210	4.8	[illegible]	80.0	722							S.S-	1620
10	2210	5.4	1[illegible]3	80.3	814							B.O.D-	427
11	1768	4.2	632	79.6	494	12600	1.23	1302	65.8	857	12600	.29	71.2
12	2873	5.1	1244	70.5	877								
13	1989	4.8	813	79.2	643								
14	1817	4.9	756	74.6	563								
15	1547	4.1	538	77.8	418							S.S-	1620
16	2210	5.4	1018	71.5	725							B.O.D-	173
17	1989	5.9	918	78.8	786	12150	.79	806	68.3	550	12150	.35	66.4
18	3094	6.0	1576	78.3	1234								
19	1989	5.1	862	78.1	673								
20	1768	4.5	677	78.6	532								
21	1768	4.7	706	80.4	568							S.S	1860
22	3094	4.5	1181	80.0	946							BOD-	305
23	2652	4.4	991	78.9	782	14140	2.85	3385	58.4	1977	14140	.30	65.5-
24	1768	4.3	662	78.6	519						14140		
25	1547	4.9	644	78.7	507								
26	1870	5.4	858	78.6	674								
27	1326	4.7	530	79.6	422								
28	1989	4.8	812	80.4	652							S.S-	2920
29	2652	4.1	924	83.0	767							B.O.D-	650
30	1326	5.2	586	81.9	481	13480	1.47	1665	62.1	1034	13480	.39	67.4
31													
Total	61147	[illegible]	25671	[illegible]	[illegible]	65190	7.91	8849	323.8	5589	65190	1.60	334.2
Max.	3315	7.2	2029	85.4	1732	14140	2.85	3385	69.2	1977	14140	.39	71.2
Min.	1326	3.5	451	70.5	361	0	.79	0	58.4	0	0	.27	63.7
Av.	2038	4.8	856	78.8	675	2173	1.58	295	64.8	186	2173	.32	66.8

REMARKS: * [illegible]

Cleaned #1 [illegible] 4th - 4 inch cake (15 cu. yds) 68.1 % Moist + 51.0 % Vol.

Cleaned #2 [illegible] 4th 3½ " cake (13 cu. yds) 57.4 % " + 55.2 % "

Cleaned #3 [illegible] 22nd 1" cake

" #4 " " 24th 4" cake (15 cu. yds) 66.4 % Moist + 62.8 % Vol.

[illegible] (69%) 3)169.0 (56%

S.S. [illegible]

B.O.D. - 325, 427, 173, 305, 650 + [illegible] (376

PREPARED BY .....

DATE .....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF June 1959 SHEET NO. 4

DATE	RECEIVING STREAM DATA								COMMENTARY
	ABOVE EFFLUENT DISCHARGE				BELOW EFFLUENT DISCHARGE				
	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	TEMPERATURE F.	DISSOLVED OXYGEN PPM	PERCENT SATURATED	5 DAY B. O. D. PPM	
1									
2	66	8.4		2.0		8.4		1.6	
3	64	9.0		2.4		9.6		4.2	
4	68	10.2		.8		10.2		2.2	
5									
6									
7									
8									
9	68	10.0		1.6		10.2		1.6	
10	68	10.2		2.4		10.6		2.8	
11	70	9.2		2.2		9.4		2.6	
12									
13									
14									
15									
16	64	11.0		2.2		11.2		2.1	
17	64	11.4		2.4		11.6		3.2	
18	64	10.6		2.0		10.8		2.1	
19									
20									
21									
22									
23									
24									
25	66	10.2		2.0		10.2		2.0	
26									
27									
28									
29									
30	70	7.8		3.4		8.0		5.2	
31									
otal	[illegible]	[illegible]		[illegible]		110.2		29.6	
ax.	70	11.4		3.4		11.6		5.2	
in.	64	7.8		.8		8.0		1.6	
v.	67	9.8		2.1		10.0		2.7	

REMARKS:

PREPARED BY .....

DATE.....

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH July 19 59 MISCELLANEOUS DATA OPERATOR R. D. Craun

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	~~Water~~ MPN/100ml. cu.ft.	Cl₂ lbs.	Power KWH x10	AUX FUEL ~~Gas~~ cu.ft. x 100	Remarks
1		84	68	R	56	1.75	7.8	1725	75	20	0	
2		80	54	C	56	1.69	7.7	1745	65	16	0	
3		92	60	C	56	1.80	7.7	1756	69	16	0	
4		88	68	Cl	56	1.66	7.6	1626	62	16	0	
5		88	60	Cl	56	1.66	7.6	1670	58	16	0	
6		82	48	Cl	57	1.69	7.7	1600	66	16	0	
7		90	60	C	57	1.63	7.8	1589	65	16	0	
8		94	68	C	57	1.74	7.7	1750	70	20	0	
9		82	56	C	57	1.69	7.8	1792	67	16	0	
10	.03	88	58	R	57	1.75	7.7	2103	65	16	0	
11		82	50	C	57	1.62	7.8	1862	65	16	0	
12		81	51	C	57	1.46	7.6	1800	57	16	0	
13		88	58	C	57	1.66	7.6	1804	68	16	0	
14		90	56	C	57	1.70	7.7	1824	65	16	0	
15		90	60	C	57	1.68	7.8	1684	65	16	0	
16	.21	94	66	R	57	1.73	7.7	1870	64	16	0	
17	.08	92	68	R	58	1.78	7.7	2139	62	16	0	
18	.39	82	64	R	57	1.73	7.6	1915	57	16	0	
19	2.16	87	61	R	57	1.84	7.6	2176	57	16	0	
20		86	60	C	57	1.88	7.7	1583	76	16	0	
21		90	60	C	58	1.90	7.7	1909	83	16	0	
22	.61	92	68	R	58	1.83	7.8	1832	51	16	0	
23	.40	82	64	R	59	1.86	7.7	1828	68	12	0	
24		82	54	C	58	1.81	7.7	1892	70	16	0	
25		82	56	C	58	1.69	7.7	1910	62	12	0	
26		86	56	C	58	1.66	7.6	1852	60	12	0	
27		90	64	C	60	1.83	7.7	2120	85	12	0	
28	1.35	88	68	R	58	1.96	7.7	2067	75	20	0	
29	.18	92	68	R	64	2.06	7.7	1813	73	12	0	
30		92	62	C	60	1.92	7.8	1766	72	12	0	
31		86	60	C	59	1.89	7.8	1810	71	16	0	
ARITH. MEAN	.11	87	60		57	1.76	7.7	1817	67	16	0	
STAT. MEAN												

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

54 52 56312 2068 480

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH July 1959 — PRIMARY TREATMENT DATA — OPERATOR R.D. Craun
Prepared by R.J. Swalwell

Date	5-Day B O D Inf. Mg/l	5-Day B O D Inf. lbs. X 10	5-Day B O D Eff. Mg/l	5-Day B O D Eff. lbs. X 10	5-Day B O D Rem. %	Suspended Solids Inf Mg/l	Suspended Solids Inf lbs. X 10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs. X 10	Suspended Solids Rem. %	Suspended Volatile Solids Inf Mg/l	Suspended Volatile Solids Inf lbs. X 10	Suspended Volatile Solids Eff Mg/l	Suspended Volatile Solids Eff lbs. X 10	TEMP	Receiving Stream Data Above Rem.	Above	Below Rem.	Below
1	89	129	60	87	33	90	131	56	81	38	73	106	36	52	70	7.8	7.7	7.7	7.8
2	92	129	60	85	35	109	154	39	55	64	90	126	33	46					
3	74	111	56	84	24	83	125	49	73	41	70	105	37	55					
4	68	94	58	80	15	78	108	40	55	49	73	101	42	59					
5	82	113	59	82	28	106	147	48	67	55	93	129	44	61					
6	108	152	59	83	45	137	193	54	76	61	113	159	47	66					
7	69	93	46	62	33	102	139	43	58	58	87	118	35	48	68	10.0	1.8	10.4	1.8
8	85	123	52	75	39	99	143	49	71	48	83	120	41	59	70	10.8	1.9	11.2	2.5
9	90	127	58	81	36	111	156	50	71	55	93	131	45	63	69	9.4	3.4	10.0	2.4
10	90	130	57	83	36	98	143	54	78	45	85	124	44	64					
11	99	134	58	78	41	86	116	42	56	51	80	108	38	51					
12	113	137	64	78	43	139	169	54	65	61	114	138	42	51					
13	107	148	61	84	43	128	177	58	80	55	110	152	51	70					
14	49	69	37	51	24	90	127	43	60	52	75	106	39	55	68	12.4	2.6	12.4	2.6
15	76	106	52	73	32	100	140	66	95	34	74	104	48	67	68	12.4	3.5	12.0	3.3
16	92	132	61	88	39	95	137	41	49	57	82	118	41	59	69	12.0	2.8	12.0	2.8
17	75	111	49	73	35	117	174	46	68	61	104	155	38	56					
18	84	121	50	72	47	101	145	32	46	68	87	123	30	43					
19	83	127	73	112	12	143	219	74	114	48	107	164	55	84					
20	105	165	77	121	27	145	227	65	102	55	109	171	54	84					
21	71	112	61	96	14	91	143	59	93	35	73	116	49	77	68	8.2	1.6	8.4	1.8
22	76	116	49	74	36	103	158	45	68	56	83	126	39	59	68	8.4	2.6	8.4	3.0
23	79	123	56	86	29	100	154	36	55	64	86	133	35	54					
24	71	107	53	79	25	87	131	54	81	38	76	114	47	71					
25	76	106	55	76	28	104	146	45	62	57	94	132	38	53					
26	109	151	62	86	53	147	230	55	76	63	113	156	44	60					
27	85	130	65	99	24	105	160	73	111	32	90	136	63	96					
28	67	109	56	91	16	130	212	54	88	42	89	144	46	74	68	9.6	2.4	10.0	3.0
29	71	122	53	90	25	117	201	67	115	43	84	144	46	78	70	7.4	5.7	7.0	6.7
30	77	123	56	89	27	91	145	46	73	49	70	111	39	62	69	7.5	1.2	8.4	2.0
31	74	116	47	73	36	80	126	30	47	63	73	115	29	46					
ARITH. MEAN	83	121	57	83	31	107	157	51	74	52	88	129	42	62	69	9.7	3.1	9.8	3.3
STAT. MEAN	82	121	56	83	31	107	157	50	74	53									
		3766		2571			4876		2299			3985		1923					

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R.D. Craun

Prepared by R.J. Swalwell

Transfer ~~Xxxxx~~ #1 To #2

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	sludge near bottom Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH	Temp. °F	Gas Produced cu. ft.	Gas Wasted cu. ft.	Used	Remarks
	8.5	30				8.4									#1	#1	(X 100)			
1	*3757	63	5.4	6.7	89										6.9	100	93	36	57	Note — include gallons
2	1547	18	5.7	4.7	78										6.9	108	90	40	50	of sludge to beds
3	2873	26	5.8	4.0	80	7770		1.8	62						6.9	105	87	80	7	* Skimming
4	1768	21	5.8	5.3	79											97	80	80	0	pumped
5	1768	15	5.7	3.8	81											95	90	16	74	with
6	2210	20	5.7	3.9	81										7.2	112	47	45	2	sludge
7	1547	18	5.5	4.8	84										7.1	100	82	38	44	
8	1768	16	5.5	4.6	81										6.9	96	94	28	66	Gas
9	1547	18	5.7	5.5	82										7.0	108	70	64	6	venting
10	1768	19	5.8	4.5	83	12380		1.8	65						7.1	100	69	63	6	at cover
11	1768	17	5.7	4.2	82											94	110	37	73	several
12	1547	11	5.8	3.1	81											110	77	31	46	times &
13	1768	18	5.6	4.6	71										7.0	104	28	24	24	metered
14	1547	19	5.6	5.6	81										7.1	100	89	83	6	
15	1989	23	5.4	5.1	80										7.0		85	10	75	
16	1547	16	5.4	4.4	82										7.0	92	114	34	80	
17	1547	15	5.8	4.4	81										7.1	108	87	80	7	
18	1105	10	5.6	4.7	78											98	104	98	6	
19	1326	14	5.7	4.6	82											96	104	42	62	
20	2210	22	5.7	4.4	81										7.2	101	58	35	23	
21	1768	18	5.7	4.5	79	17900		7.1	65						7.3	98	77	71	6	
22	1989	23	5.8	5.1	79												73	67	6	
23	2652	32	5.7	5.7	75												60	53	7	
24	1989	23	5.7	5.2	80												85	80	5	
25	1989	22	5.8	4.9	79												62	56	6	
26	1989	23	5.7	5.3	77												59	54	5	
27	1768	20	5.9	4.4	89												41	41	0	
28	2210	13	5.8	5.2	78												51	51	0	
29	1989	26	5.9	6.5	72												50	50	0	
30	1547	21	5.9	6.7	72												46	46	0	
31	1768	17	5.7	4.8	73												55	55	0	
ARITH. MEAN	1886	21	5.7	4.9	80	12683		3.6	64						7.0	101	75	51	30	
STAT. MEAN	58465					38050											2332	1588	749	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

Number 2

MONTH July 19 59

DIGESTER AND SLUDGE DATA

OPERATOR R.D. Craun
Prepared by R.J. Swalwell

Date	Digested Sludge to beds					Supernatant From #2						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals. 8.4	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X 10	5-Day B O D Mg/l X10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1															7.1	108			Note — include gallons
2															7.2				of sludge to beds
3	7730		7.1	8.8	62										7.1	106			Cleaned
4																102			#5 bed on
5																			27th 4"
6															7.1				cake 15
7															7.2	98			cu. yds.
8															7.1	102			65% moist.
9															7.2	100			57% vol.
10						12380	.38	64	283	64					7.3				
11																96			
12																94			
13															7.2	98			
14															7.1	96			
15															7.1	94			
16															7.2	102			
17															7.2				
18																			
19																			
20															7.2				
21						17900	.36	70	261	57					7.2				
22															7.2				
23																			
24																			
25																			
26																			
27																			
28						13260	.49	73	375	46									
29																			
30																			
31																			
ARITH. MEAN						14513	.41	69	306	56					7.2	100			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1959

MISCELLANEOUS DATA

OPERATOR R.D. Craun
Prepared by R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH	AUX. FUEL Gas cu. ft. X 100**	Remarks
1		80	52	C	59	1.79	7.7		1932	59	12	0	
2		84	58	C	58	1.60			1830	55	12	0	
3	.27	72	60	R	58	1.76	7.6		1760	65	16	0	
4		84	62	C	58	1.78	7.7		1777	72	12	0	
5		88	66	C	58	1.80	7.6		1760	75	16	0	
6		94	70	C	59	1.80	7.7		1773	100	12	0	
7	.16	76	60	R	58	1.78	7.7		1706	90	16	0	
8		80	60	CL	58	1.80	7.7		1874	71	12	0	
9		78	56	C	58	1.57	7.7		1780	55	12	0	
10	.05	80	59	R	58	1.78	7.7		1564	70	12	0	
11		84	62	C	58	1.71	8.3		1726	78	16	0	
12		90	68	C	58	1.75	7.8		1762	68	12	0	
13		94	66	C	60	1.79	7.8		1778	70	16	0	
14		92	72	C	60	1.79	7.7		1731	67	12	0	
15		90	70	C	60	1.70	7.8		1753	66	12	0	
16	.23	84	68	R	60	1.61	7.6		1790	64	16	0	
17	.01	82	68	R	59	1.82	7.8		1660	69	12	0	
18		86	60	C	60	1.77	7.8		1745	76	12	0	
19		90	68	C	60	1.76	7.7		1800	72	16	0	
20		94	72	C	60	1.76	7.7		1776	71	12	0	
21		92	72	C	60	1.80	7.8		1830	70	12	0	
22		93	72	C	60	1.76	7.7		1724	71	12	0	
23		93	71	C	60	1.64	7.7		1683	64	12	0	
24		92	66	C	60	1.83	7.8		1890	69	16	0	
25		94	72	C	60	1.79	7.7		1886	76	12	0	
26	1.05	94	66	R	60	1.91	7.6		2002	73	12	0	
27	.25	88	70	R	60	1.76	7.8		1920	71	12	0	
28		90	70	C	60	1.80	7.7		2011	71	12	0	
29	.01	92	68	R	60	1.71	7.7		2031	67	12	0	
30		86	62	C	60	1.58	7.7		1845	65	12	0	
31		87	69	C	60	1.73	7.7		1859	78	12	0	
ARITH. MEAN	.066	87	66		59	1.75	7.7		1797	70	13	0	
STAT. MEAN													

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1959 PRIMARY TREATMENT DATA OPERATOR R. D. Craun
prepared by R. J. Swalwe

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids					Receiving stream data				
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.			Temp	above		below	
	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10						
1	79	118	51	76	18	70	104	30	45	57	65	97	28	42						
2	107	143	79	105	26	100	133	60	80	40	84	112	49	65						
3	113	166	55	80	51	136	200	42	61	69	112	164	39	58						
4	91	135	62	92	32	100	148	52	77	48	77	114	42	62	66	7.3	1.5	7.4	2.0	
5	87	130	64	96	26	87	131	48	72	43	77	115	45	67	66	8.6	1.4	9.0	2.1	
6	81	121	75	112	7	105	157	92	138	12	94	141	80	120	69	9.9	2.5	10.1	2.7	
7	78	116	66	98	15	116	172	63	93	38	101	149	63	93						
8	60	90	38	57	37	76	114	30	45	61	70	105	26	39						
9	74	97	57	74	15	107	140	60	78	44	88	115	49	64						
10	93	137	57	84	39	150	222	53	78	65	119	176	45	66						
11	78	111	52	74	33	96	137	48	68	50	81	115	43	61	66	10.0	7.8	10.4	6.5	
12	82	120	63	92	23	102	149	40	58	61	91	132	39	57	68	10.6	2.8	10.8	3.0	
13	72	108	54	80	25	98	146	55	88	44	85	127	53	79	70	9.2	2.7	9.4	3.0	
14	110	164	53	79	50	91	135	50	74	45	76	113	42	62						
15	97	137	50	71	48	96	136	27	38	72	89	126	26	37						
16	114	153	56	75	51	152	204	60	80	61	122	164	55	73						
17	108	164	67	102	38	156	229	55	78	65	132	200	47	71						
18	92	135	64	94	30	121	188	56	82	54	98	145	43	63						
19	80	111	58	85	28	123	180	48	70	61	105	154	41	59	70	8.5	3.1	8.7	3.3	
20	87	127	58	85	33	111	163	50	73	55	96	141	54	65	72	9.6	3.0	9.6	3.2	
21	78	117	58	87	26	130	195	49	73	62	110	165	40	60						
22	113	166	60	88	46	134	197	48	70	64	118	173	42	61						
23	128	175	75	102	41	162	221	57	77	65	130	178	47	64						
24	98	149	66	101	33	111	169	48	73	57	86	131	38	58						
25	97	144	69	103	29	118	176	54	80	54	100	149	50	74	74	7.0	3.4	7.1	3.5	
26	78	124	56	89	28	134	213	53	84	60	91	145	36	57	74	6.6	2.4	6.6	2.6	
27	73	107	54	79	26	92	135	49	72	47	72	106	37	54						
28	66	99	48	72	28	107	161	58	87	46	94	141	50	75						
29	80	114	53	75	33	88	125	32	45	64	86	123	25	36						
30	74	97	51	67	31	108	142	47	62	57	86	113	37	49						
31	84	122	59	85	30	104	151	55	79	48	105	151	55	79						
ARITH. MEAN	89	129	59	86	32	112	164	51	74	54	95	138	44	64	70	8.7	3.1	8.9	3.1	
STAT. MEAN		129		86			164		75											

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1959 — DIGESTER AND SLUDGE DATA — OPERATOR R.D. Craun
Prepared by R.J. Swalwel

Date	Raw Sludge Gals. 8.5	Lbs. Per 1000 c.f. Digester 30	pH	Total Solids %	Vol. Solids %	Transfer #1 to #2 Gals. 8.4	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft. X 100	Remarks
1	1547	14	5.8	4.6	72												49	49	Note — include gallons
2	1989	21	5.7	5.2	73												54	54	of sludge to beds
3	1105	13	5.7	6.0	73												45	45	Gas venting
4	1768	21	5.8	5.5	76												51	51	at cover
5	2210	19	5.8	4.1	77												58	58	not
6	2431	25	5.8	4.8	77	4640											11	11	metered
7	1989	24	5.7	5.7	77	22100													
8	2210	27	5.8	5.8	75														
9	2431	25	5.8	5.0	74														No samples
10	1547	17	5.8	5.2	76														of transfer
11	1768	20	5.6	5.3	77														possible
12	2210	28	5.9	6.0	77														transferin
13	1768	17	5.8	4.4	76														by gravity
14	2210	22	5.8	4.7	7.6														through
15	1547	16	5.7	4.7	78														closed pipe
16	1989	26	5.8	5.0	80														circute.
17	1326	13	5.8	4.6	77														
18	3315	33	5.8	4.5	80	23650													
19	2210	24	5.7	4.8	81														No temp.or
20	2210	13	5.6	5.5	79														p.h. samples
21	2431	22	5.8	4.2	78														due to
22	1768	17	5.7	5.2	80														circulating
23	1547	19	5.8	5.3	80														pump being
24	2210	19	5.9	3.9	77														out of
25	2210	19	5.7	4.0	79														service.
26	2652	28	5.8	5.0	77														
27	2431	29	5.8	5.5	76														
28	1768	17	5.8	4.6	75														
29	1326	18	5.7	5.6	88														
30	1326	13	5.8	4.9	76														
31	1768	19	5.8	4.9	78	16580													
ARITH. MEAN	1976	21	5.8	5.0	77	16742											45	45	
STAT. MEAN		21																	
Tot	61227					66970											268	268	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 19 59 DIGESTER AND SLUDGE DATA OPERATOR R.D. Craun

Prepared by R.J. Swalwel

Digested ~~Raw~~ ~~XXXXX~~ to beds Supernatant from # 2 sludge near bottom Temp. Gas

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F	Produced cu. ft.	Wasted cu. ft.	Remarks
						8.4				X10	X10				# 2	# 2			
1																			Note — include gallons
2																			of sludge to beds
3																			No temp.
4																			or P.H.
5																			samples
6																			due to
7						41110	7.1	.48	68	367	107								circulatin
8																			pump being
9																			out of
10																			order
11																			
12																			
13	7500		7.1	7.8	59														
14	7900		7.1	8.4	59														
15																			
16																			
17	8300		7.0	4.9	56														
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31						9720	7.2	.64	56	338	104								
ARITH. MEAN	7900		7.1	7.0	58	25415	7.1	.56	62	352	105								
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 19 59

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~XXXX~~ water ~~XXXXXX~~ cu. ft.	Cl_2 lbs.	Power KWH	AUX FUEL Gas cu. ft. x100	Remarks
1	.62	82	60	R	60	1.69	7.8		1864	70	120	1	
2	.01	80	52	R	60	1.69	7.6		1846	70	160	0	
3		78	54	C	60	1.54	7.8		1861	72	120	0	
4		82	56	C	60	1.64	7.7		1747	71	120	0	
5		86	58	C	59	1.61	7.7		1695	70	120	0	
6		88	68	C	59	1.51	7.6		1687	72	80	0	
7	.07	90	68	C	60	1.61	7.7		1681	69	120	0	
8		91	69	C	60	1.57	7.8		1410	75	160	0	
9		88	58	R	60	1.92	7.8		1563	85	120	0	
10		68	46	C	60	1.49	7.8		1805	72	120	0	
11		64	40	C	60	1.46	7.8		1785	72	120	14	
12		72	44	C	58	1.42	7.7		1826	58	120	3	
13		72	46	C	58	1.40	7.7		1900	67	120	4	
14		76	50	C	59	1.53	7.7		146		80	3	
15		58	40	C	59	1.45	7.7		246		120	5	
16		56	32	C	58	1.41	7.8		576		120	37	
17		58	34	C	59	1.15	7.8		621		160	45	
18		66	42	C	59	1.42	7.8		35		160	7	
19		74	42	C	58	1.44	7.7		24		120	2	
20		84	62	C	59	1.46	7.7		7		160	3	
21	.61	86	64	R	59	1.72	7.7		146		120	4	
22		86	68	C	60	1.72	7.7		732		160	2	
23	.30	84	56	R	60	1.70	7.8		322		160	3	
24		72	56	C	60	1.61	7.8		204		160	2	
25	.04	80	60	R	60	1.65	7.7		10		160	2	
26	1.20	74	58	R	59	1.74	7.6		7		120	5	
27	.35	74	60	R	58	1.59	7.6		164		120	3	
28	.46	82	60	R	60	1.81	7.7		80		160	3	
29		68	44	C	60	1.68	7.7		105		160	3	
30		68	48	CL	60	1.73	7.7		40		160	4	
31													
ARITH. MEAN	.41	76	53		59	1.58	7.7		871	70	133	5	
STAT. MEAN						1.58							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 19 59

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids					Receiving Stream Data				
	Inf.		Eff		Rem	Inf.		Eff		Rem	Inf.		Eff.			Temp.	Above		Below	
	Mg/l	lbs. X 10	Mg/l	lbs. X 10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X 10	Mg/l	lbs. X 10			D.O.	B.O.D.	D.O.	B.O.D.
1	66	93	50	70	24	122	172	61	86	50	105	148	52	73	71		7.4	2.4	7.2	2.4
2	90	126	55	77	39	131	185	50	70	62	112	158	44	61	66		7.4	2.8	7.4	3.0
3	104	134	54	69	48	113	145	48	61	58	95	122	44	56	67		8.6	2.2	9.0	3.0
4	104	142	55	75	47	115	157	45	61	61	97	133	37	50						
5	99	133	69	92	30	113	152	44	59	61	97	130	38	51						
6	97	122	65	82	33	179	225	41	51	77	165	207	34	43						
7	86	116	52	70	40	160	214	43	57	73	141	189	37	49						
8	88	115	74	97	16	121	158	65	85	46	106	138	58	76	71		9.8	3.2	9.8	3.0
9	70	112	65	104	7	115	185	40	64	65	96	154	33	53	73		10.4	3.0	10.4	2.8
10	127	158	61	76	52	117	145	70	87	42	100	124	65	81						
11	91	111	66	80	31	146	177	67	82	54	115	140	60	73						
12	104	123	85	110	18	115	136	56	66	51	98	116	52	61						
13	109	127	56	64	49	171	200	50	58	71	139	162	46	53						
14	93	119	79	101	15	135	173	78	99	42	104	133	67	85						
15	116	140	69	83	41	113	136	64	77	43	92	111	52	63						
16	90	106	61	71	32	130	153	61	71	53	110	129	47	55	58		9.2	1.6	9.4	2.0
17	89	85	58	56	35	113	108	58	56	49	93	89	42	40	53		9.2	1.4	9.4	2.4
18	91	108	55	65	40	101	120	52	61	49	95	112	47	55						
19	111	132	70	84	63	125	150	47	56	62	105	126	39	47						
20	91	111	55	67	40	149	181	45	54	70	120	146	40	48						
21	120	172	62	89	48	180	258	60	86	67	132	189	47	67						
22	75	108	58	83	23	94	135	64	92	32	88	126	62	89						
23	78	110	50	71	36	106	150	50	71	53	88	125	44	62	67		8.6	2.0	8.6	2.4
24	76	102	58	78	24	123	165	52	70	58	96	129	40	53						
25	85	117	61	84	28	95	131	51	70	46	77	106	43	59						
26	96	139	86	125	10	123	178	60	87	51	91	132	51	74						
27	83	110	49	65	41	124	164	45	59	64	107	142	42	55						
28	74	112	46	69	38	110	166	59	89	46	89	134	44	66						
29	78	109	51	71	27	102	143	76	106	25	80	112	57	79	65		7.2	1.0	7.2	2.0
30	81	117	64	92	21	225	324	66	95	71	182	262	53	76	62		7.6	1.6	7.6	1.6
31																				
ARITH. MEAN	92	120	61	81	33	129	168	55	73	55	107	141	47	62	65		8.5	2.1	8.6	2.4
STAT. MEAN		120		82			162		72											

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge: Gals	Lbs Per 1000 c f. Digester	pH	Total Solids %	Vol Solids %	transfer #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5 Day B O D Mg/l	sludge near bottom: Total Solids %	Vol Solids %	Vol. Acids Mg/l	Temp: pH #1	°F #1	Gas: Produced cu ft X 100	Wasted cu ft. X 100	Remarks
	8.5	30				8.4									#1	#1			
1	2652	31	5.7	5.5	77												99	99	Note — include gallons
2	1768	23	5.6	6.0	79												82	82	of sludge to beds
3	1326	10	6.2	4.2	66												83	83	Skimming
4	1326	17	5.9	6.1	75												43	43	from clari-
5	1768	18	5.8	4.7	76												38	38	fiers
6	1326	16	5.7	5.4	78												40	40	pumped on
7	2652	34	5.6	5.3	80												36	36	28th & 29
8	3536	41	5.8	5.2	79												12	12	
9	1768	23	6.2	5.8	80	15910											8	8	Gas vent-
10	1768	25	5.9	6.1	78												0	0	ing at
11	1326	15	5.8	5.3	77												2	2	cover not
12	1989	20	5.8	4.8	75												0	0	metered.
13	1326	14	5.8	4.7	82												1	1	
14	1326	16	5.8	5.4	78												2	2	circulat-
15	1326	16	5.9	5.3	79												1	1	ing pump
16	3094	37	5.9	5.3	80	19010	6.6	2.6	62						6.6	68	54	54	back in
17	3536	31	6.0	3.7	84										6.6	74	54	53	service
18	1989	21	6.3	4.6	80										6.6	82	80	10	on 16th
19	1326	11	5.5	3.7	81											90	86	10	
20	1105	15	5.9	4.6	81												88	10	
21	1768	13	5.8	3.4	80										6.7	86	98	17	
22	1326	16	5.5	5.3	81	21660	6.8	2.4	62						6.8	93	112	26	
23	2210	25	5.6	5.1	79										6.8	88	121	29	
24	1989	27	5.7	5.8	80										6.8	104	72	0	
25	1989	27	5.5	6.1	78										6.9		79	0	
26	2210	21	5.8	4.4	79											105	77	0	
27	1105	10	5.9	4.3	79												70	0	
28	1989	61	5.4	12.5	86										7.0	94	76	0	
29	3978	81	5.5	8.8	82											104	79	0	
30	1326	17	5.7	6.2	76											107	101	50	
31																			
ARITH. MEAN	1937	24	5.8	5.5	79	18860	6.7	2.5	62						6.8	91	56	24	
STAT. MEAN		22																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 19 59 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Digested ~~XXXXXX~~ to beds — Supernatant From #2 — sludge near bottom — Temp. — Gas

Date	Gals.	Lbs. Per 1000 c f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F	Produced cu. ft.	Wasted cu. ft.	Remarks
						8.4				X10	X10				#2	#2			
1																			Note — include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9						17680	7.0	.34	59	205	77								
10																			
11																			
12																			
13																			
14																			
15																			
16															6.9				
17															6.9				
18															6.9				
19																68			
20																74			
21															6.9	82			
22						21660	6.9	.34	58	350	98				6.9				
23															7.0	92			
24															7.0	90			
25															7.0	97			
26																96			
27																102			
28															7.0	105			
29																			
30																103			
31																			
ARITH. MEAN						19670	7.0	.34	58	278	87				6.9	91			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1959 MISCELLANEOUS DATA OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water Meter cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX FUEL Gas cu. ft. x 100	Remarks
1		68	56	C	59	1.71	7.7		132		16	3	Digester no. 1 lowered 15 ft. to
2		74	52	C	59	1.65	7.7		84		12	5	permit installation of new valve.
3	.01	80	56	R	59	1.68	7.7		25		16	3	11½ ft. of sludge pumped to beds.
4	.84	70	56	R	58	1.62	7.3		42		12	2	Sludge too thick to be pumped
5	1.34	72	62	R	59	1.95	7.7		20		16	3	without thinning with plant Eff.
6	1.00	66	56	R	59	1.88	7.6		144		16	9	60996 gals. pumped at an average
7		68	52	C	59	1.72	7.7		78		12	4	of 13.9 % dry and 60% volatile.
8	.26	64	42	R	60	1.67	7.8		12		12	5	
9		56	38	C	59	1.45	7.7		22		12	7	
10	.46	66	42	R	58	1.50	7.6		12		12	8	
11		50	40	C	58	1.35	7.7		17		12	5	
12		46	40	C	58	1.36	7.8		17		12	6	
13	.02	46	32	R	58	1.37	7.7		18		12	7	
14		51	37	C	58	1.41	7.7		39		12	77	
15		58	42	C	58	1.41	7.7		122		16	48	
16	.01	68	42	R	58	1.41	7.6		45		16	15	
17	.01	50	32	R		1.64			41		12	7	
18		54	28	C		1.60			31		16	10	
19		58	34	C	57	1.70	7.8		20		12	6	
20		58	30	C	56	1.66	7.7		11		12	10	
21		54	32	C	57	1.70	7.8		31		12	8	
22		66	42	C	56	1.71	7.8		15		12	6	
23	.43	64	46	R	56	1.77	7.7		20		16	6	
24	.06	52	42	R	56	1.66	7.6		42		12	6	
25		44	34	C	57	1.57	7.6		13		12	6	
26	.19	48	34	R	56	1.67	7.7		42		12	6	
27	.02	40	30	R	57	1.61	7.8		24		12	17	
28		46	28	CL	57	1.41	7.7		20		12	20	
29	.01	54	32	R	56	1.61	7.7		22		12	9	
30	.27	54	42	R	56	1.66	7.6		29		12	8	
31	.01	50	42	R	56	1.60	7.7		16		12	7	
ARITH. MEAN	.16	58	41		58	1.60	7.7		39		13	11	
STAT MEAN						1.60							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1959 — PRIMARY TREATMENT DATA — OPERATOR R.J. Swalwell

Date	5-Day B O D Inf. Mg/l	5-Day B O D Inf. lbs. X 10	5-Day B O D Eff. Mg/l	5-Day B O D Eff. lbs. X 10	5-Day B O D Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs. X 10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs. X 10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs. X 10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs. X 10	Receiving stream data t emp	Above D.O.	Above B.O.D	Below D.O.	Below B.O.D	Remarks
1	82	117	69	98	16	118	168	80	114	32	100	143	77	110	59	6.6	3.8	6.6	2.6	
2	80	110	76	104	5	152	209	66	91	57	131	180	53	73						
3	100	140	92	129	8	105	147	61	85	42	91	127	53	74						
4	92	124	65	88	29	101	136	60	81	41	79	107	48	65						
5	84	136	61	99	27	200	325	98	159	51	120	195	57	92						
6	65	102	57	89	13	114	179	92	144	19	67	105	56	87						
7	97	139	63	90	35	100	149	63	90	37	70	100	45	64	60	6.6	1.6	7.4	2.6	
8	88	122	74	103	16	98	136	54	75	45	70	97	42	58	59	6.6	1.6	7.0	2.0	
9	80	97	58	70	28	93	113	55	66	41	88	106	43	52						
10	93	117	57	71	39	139	174	61	76	56	122	152	55	68						
11	61	68	30	34	51	110	124	38	43	66	92	104	32	36						
12	80	91	58	66	28	132	150	72	82	46	115	130	50	57						
13	76	86	56	64	15	90	103	60	68	33	75	85	40	45						
14	92	108	56	65	39	127	149	85	100	33	107	126	64	75						
15	97	114	50	59	48	86	110	50	59	42	69	81	45	53						
16	92	108	64	75	30	130	153	61	72	53	110	129	47	55						
17																				
18					No samples taken															
19	90	127	85	121	5	120	170	70	99	42	104	147	64	91						
20	97	134	81	112	17	117	162	70	97	34	100	138	50	69	48	9.4	1.8	9.4	2.0	
21	128	182	72	102	44	105	149	68	96	35	94	133	58	82	48	9.8	2.2	9.6	1.8	
22	104	148	57	81	45	143	203	66	94	46	124	177	59	84						
23	87	128	35	51	60	169	249	43	63	75	153	226	40	59						
24	152	210	72	100	53	172	238	72	100	58	143	198	53	73						
25	92	120	65	85	29	107	140	45	59	58	96	126	43	56						
26	168	234	106	147	37	194	270	70	97	64	176	245	60	84						
27	128	172	65	87	49	107	144	62	83	42	93	125	56	75	44	10.0	2.0	9.8	2.0	
28	104	123	41	48	61	121	142	51	60	58	93	110	40	47	43	10.0	2.0	10.0	2.0	
29	86	116	75	110	13	95	127	88	118	7	83	112	70	94						
30	98	136	70	97	29	132	183	68	94	48	116	161	57	48						
31	88	117	58	77	34	83	110	50	67	40	72	96	35	46						
ARITH. MEAN	96	128	64	87	31	123	166	64	87	45	102	137	51	69	52	8.4	2.1	8.5	2.1	
STAT. MEAN		123		86			155		85											

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1959 DIGESTER AND SLUDGE DATA OPERATOR R.J.Swalwell

Date	Raw Sludge					Transfer Sludge #1 to #2						sludge near bottom				Temp.	Gas		Remarks
	Gals. 8.5	Lbs. Per 1000 c.f. Digester 30	pH	Total Solids %	Vol. Solids %	Gals. 8.4	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X	Wasted cu. ft. 100	
1	1326	23	5.8	8.3	74	18560	7.0	2.0	75						7.2	102	84	64	Note – include gallons
2	1768	36	5.8	7.2	74										7.1	90	66	66	of sludge to beds
3	1547	29	5.8	6.7	73											88	51	51	Gas vent-
4	1105	23	5.7	7.3	75												103	36	ing at
5	2210	42	5.6	6.7	77											104	85	33	cover not
6	884	21	5.8	8.2	70	15470	7.1	2.1	60						7.1	108	34	26	metered.
7	1326	28	5.8	7.6	60										7.1		6	6	
8	1326	28	5.8	7.6	60										7.0				No samples
9	1326	28	5.6	7.6	60										7.1				taken on
10	884	27	5.6	9.9	61														17th & 18th
11	884	27	5.8	9.9	61														
12	1105	38	5.8	12.2	73														
13	1105	26	5.8	8.4	65														
14	1326	31	5.7	8.4	65														
15	884	20	5.9	8.0	65														
16	884	20	5.7	8.1	73														
17	1326																		
18	1105																		
19	1326	30	5.7	8.0	70														
20	1768	40	5.7	8.0	65														
21	1326	33	5.8	8.7	71														
22	884	22	5.8	8.7	72														
23	884	22	5.8	8.7	71														
24	884	20	5.7	8.1	73														
25	884	22	5.8	8.7	73														
26	884	23	5.6	9.3	68														
27	1105	29	5.6	9.3	68														
28	1326	35	5.6	9.3	67														
29	1989	47	5.8	8.4	66														
30	1768	42	5.7	8.4	66														
31	1768	49	5.6	9.9	67														
ARITH. MEAN	1262	30	5.7	7.9	68	17015	7.0	2.0	68						7.1	98	50	34	
STAT. MEAN		29																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1959 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Digested ~~xxxxxx~~ to beds					Supernatant from #2						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals. 8.4	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X10	5-Day B O D Mg/l X10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1						18560	7.1	.51	68	754	75				7.3	105			Note – include gallons
2															7.3				of sludge to beds
3	All beds filled																		
4	during month.																		
5	Digester #1 pumped																		
6	down 15 ft. 11½ ft.					15470	7.1	.22	56	344	110				7.2				
7	to beds. See page 1														7.2				
8	60996		6.9	13.9	60										7.2				
9															7.1				
10																			
11																			
12																			
13															6.9	86			
14																92			
15																96			
16															7.0				
17																			
18																			
19																87			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
ARITH. MEAN	60996		6.9	13.9	60	17015	7.1	.36	62	549	92				7.2	93			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1959

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water Cu. Ft.	Cl_2 lbs.	Power KWH X10	AUX FUEL Gas cu. ft. x 100	Remarks
1		54	34	CL	56	1.52	7.8		10		12	10	
2		42	26	C	56	1.60	7.7		77		12	13	
3	.25	48	34	R	56	1.60	7.6		19		16	43	
4	.62	60	46	R	56	1.78	7.6		31		16	50	
5	.09	66	30	R&S	57	1.71	7.7		29		16	50	
6	.03	34	26	S	56	1.68	7.7		17		16	60	
7		38	38	CL	56	1.63	7.8		12		16	57	
8		42	24	CL	55	1.59	7.7		9		16	61	
9		50	32	C	56	1.67	7.6		21		16	59	
10		62	40	C	56	1.65	7.6		16		12	42	
11		42	22	CL	56	1.64	7.6		26		16	59	
12	.30	36	26	S	56	1.65	7.5		61		16	59	
13	1.13	34	28	R&S	56	1.77	7.5		31		16	57	
14		33	17	CL	55	1.69	7.7		43		16	54	
15		34	18	C	55	1.63	7.6		32		16	58	
16	.01	42	10	R&S	56	1.73	7.7		27		16	15	
17	.01	18	8	S	55	1.68	7.7		22		16	23	
18		32	14	CL	54	1.69	7.6		24		16	18	
19		36	20	CL	55	1.65	7.9		15		16	12	
20	.10	38	22	S	54	1.68	7.8		7		16	12	
21		36	26	CL	54	1.64	7.7		8		16	15	
22		54	32	C	54	1.62	7.6		22		16	11	
23	.03	54	36	R	55	1.70	7.6		16		16	9	
24	.08	42	26	S	54	1.66	7.7		56		12	12	
25	.07	32	24	S	54	1.66	7.8		52		16	20	
26	.02	32	26	S	54	1.56	7.7		101		16	18	
27		34	26	CL	54	1.64	7.8		85		16	15	
28	.11	38	22	S	54	1.63	7.7		66		16	15	
29		30	20	CL	54	1.55	7.7		64		16	21	
30	.14	34	24	S	54	1.68	7.7		333		12	13	
31													
ARITH. MEAN	.10	41	26		55	1.65	7.7		44		15	32	
STAT. MEAN						1.66							

C–Clear CL–Cloudy R–Rain **Indicate Unit

W–Windy CA–Calm S–Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 19 59

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5 Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf.		Eff		Rem	Inf		Eff.		Rem	Inf		Eff.		Temp	Above		Below	
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10		D.O.	B.O.D.	D.O.	B.O.D.
1	77	97	49	62	36	108	137	56	71	48	93	118	48	61					
2	96	127	77	102	20	123	163	73	97	41	104	138	63	83					
3	100	134	58	78	42	141	189	70	94	50	115	155	56	75	43	10.0	2.8	10.0	2.8
4	93	138	43	63	54	127	189	40	59	69	91	135	36	53					
5	85	121	57	81	33	124	177	58	82	53	88	125	42	59					
6	89	124	66	92	26	110	154	69	96	37	86	121	56	78					
7	86	117	67	91	22	106	144	52	71	49	88	120	45	61					
8	74	98	36	48	51	105	139	35	46	67	88	117	28	37					
9	95	132	56	78	41	119	166	82	114	31	100	139	64	89					
10	80	110	59	81	26	115	158	66	90	43	95	131	50	69					
11	91	124	52	71	43	106	145	46	62	57	84	115	37	51	44	10.2	2.0	10.0	1.8
12	95	131	62	86	35	164	227	69	95	58	138	191	50	69	40	10.6	2.0	10.6	2.0
13	88	130	53	78	40	163	241	60	88	63	92	136	48	71					
14	81	114	46	64	43	118	166	60	84	49	103	146	48	67					
15	90	122	49	66	46	125	170	44	59	65	100	136	36	49					
16	84	121	55	79	35	110	159	40	57	64	93	134	35	50					
17	92	129	52	73	44	127	178	68	95	47	110	154	50	70					
18	69	97	52	73	25	114	161	60	84	47	98	138	53	74					
19	69	95	55	75	20	100	138	69	95	31	74	102	47	65					
20	73	102	58	81	21	117	164	59	83	50	97	136	47	66					
21	79	108	55	75	30	122	167	50	68	59	108	148	46	63					
22	68	92	36	48	47	133	180	32	43	76	117	158	30	40					
23	73	104	55	78	25	142	201	50	71	65	121	172	44	62					
24	86	119	60	83	30	115	159	60	83	48	99	137	52	72					
25	81	112	52	72	36	91	126	62	86	32	73	101	46	63	39	10.2	2.2	10.4	2.4
26	70	91	62	81	11	211	274	52	67	75	195	153	50	65					
27	72	98	56	76	22	116	159	55	75	53	97	133	48	65					
28	76	103	62	84	18	78	106	45	61	42	66	90	39	53					
29	90	116	40	51	56	168	217	50	65	70	137	177	42	54					
30	104	146	58	81	44	162	227	50	70	69	131	184	43	60					
31																			
ARITH. MEAN	84	115	55	75	34	125	173	56	77	54	103	138	46	63	42	10.3	2.3	10.3	2.3
STAT MEAN		115		75			167		78										

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester 8.5	30	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Transfer ~~Supernatant~~ #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft.	Remarks
1	1326	28		5.7	10.1	69												2	2	Note — include gallons
2	884	17		5.8	10.1	69												4	3	of sludge to beds
3	1326	21		5.8	8.4	67												2	2	
4	1105	19		5.7	9.1	67												0	0	
5	1326	19		5.7	7.2	72												24	24	
6	1768	27		5.7	7.7	70												23	23	
7	1326	36		5.7	13.8	71												27	27	
8	1326	21		5.6	7.6	76												30	30	
9	1326	18		5.9	6.9	71												30	30	
10	884	12		5.8	6.8	73												30	30	
11	1326	19		5.7	6.8	76										6.6	68	33	33	
12	1326	19		5.8	6.9	74										6.7	74	40	40	
13	1768	29		5.9	7.7	75										6.8	80	43	43	
14																	85	38	38	
15	1326	18		5.5	6.2	76										6.9	90	44	44	
16	1105	15		5.6	6.3	79										6.8	94	82	12	
17	1105	15		5.8	6.1	80										7.0	86	63	0	
18	1989	27		5.7	6.1	79	15250	7.0	2.2	57							94	72	0	
19	884	10		5.7	5.3	76											98	57	0	
20	1105	15		5.8	6.2	79												62	1	
21	884	13		5.7	6.5	79												62	0	
22	1105	14		6.0	5.6	78												64	0	
23	633	9		5.4	6.6	80										6.9	88	64	0	
24	1326	16		5.6	5.5	79											92	51	0	
25	884	11		5.6	5.5	79												57	0	
26	1768	19		6.1	4.8	80											87	57	0	
27	884	11		6.0	5.9	80										6.9	90	57	0	
28	1326	17		6.0	6.3	73											94	53	0	
29	884	13		5.8	6.2	82											97	55	1	
30	1326	19		5.8	6.5	78										6.9		57	0	
31																				
ARITH. MEAN	1226	18		5.8	7.1	72	15250	7.0	2.2	57						6.8	83	43	23	
STAT MEAN		17																		

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Digested ~~Sewage~~ to Beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant From # 2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X10	5-Day B O D Mg/l X10	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note – include gallons
2																			of sludge to beds
3																70			
4																75			
5															7.0	69			
6															7.0	72			
7																75			
8																79			
9																84			
10																86			
11															7.1	90			
12															7.1				
13															7.1				
14																			
15															7.1				
16															6.8	82			
17															7.3	84			
18						15250	7.0	.36	55	310	24								
19																83			
20																85			
21																88			
22																90			
23															7.0	92			
24																			
25																92			
26																92			
27															6.9				
28																			
29																86			
30															7.0	90			
31																			
ARITH. MEAN						15250	7.0	.36	55	310	24				7.0	83			
STAT MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 19 59

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water Cu. Ft.	Cl_2 lbs.	Power KWH X10	AUX FUEL Gas** Cu. ft. x 100	Remarks
1		40	26	CL	54	1.65	7.6		26		16	12	
2		40	30	C	54	1.68	7.7		49		16	12	
3		46	30	C	54	1.62	7.7		112		16	10	
4	.25	50	34	R	54	1.67	7.7		23		16	6	
5	.11	40	32	R&S	53	1.65	7.6		51		12	15	
6		36	24	CL	53	1.61	7.7		60		16	17	
7	.08	34	24	S	53	1.70	7.7		57		16	16	
8		38	24	C	54	1.69	7.7		66		16	15	
9		40	22	C	54	1.72	7.8		46		16	16	
10		42	24	C	54	1.67	7.7		18		16	13	
11	.52	44	34	R	54	1.77	7.7		32		16	10	
12		38	22	CL	53	1.68	7.7		31		16	20	
13		40	22	C	52	1.66	7.6		40		16	13	
14		40	26	CL	53	1.71	7.7		53		16	14	
15		46	30	C	53	1.75	7.6		50		16	13	
16		46	30	C	53	1.74	7.6		47		16	12	
17		42	26	C	53	1.73	7.7		42		16	7	
18		38	16	CL	52	1.64	7.8		42		16	13	
19		34	18	CL	52	1.60	7.7		68		16	15	
20		32	18	CL	52	1.56	7.9		70		16	11	
21		30	16	C	52	1.66	7.7		48		16	22	
22		30	20	C	52	1.65	7.8		54		16	22	
23	.03	30	22	S	52	1.64	7.7		49		20	20	
24		36	26	CL	52	1.63	7.7		47		16	7	
25		44	30	CL	52	1.53	7.7		41		16	12	
26	.20	52	40	R	52	1.63	7.7		38		12	7	
27	.12	56	48	R	53	1.64	7.7		40		16	7	
28	.45	52	26	R&S	52	1.74	7.8		51		12	13	
29	.03	28	20	S	52	1.72	7.7		70		16	15	
30		28	10	CL	52	1.70	7.7		102		16	20	
31		30	12	C	52	1.72	7.7		197		16	16	
ARITH. MEAN	.06	39	25		53	1.67	7.7		55		157	14	
STAT. MEAN						1.67							

C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1959

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids					Receiving Stream Data				
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.			temp	above		below	
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10			D.O.	B.O.D.	D.O.	B.O.D.
1	79	109	59	81	25	121	166	66	91	46	102	141	50	69						
2	92	128	80	111	13	125	174	97	135	22	110	153	77	107		36	12.0	3.4	12.0	3.8
3	72	98	61	83	15	90	122	66	90	27	82	111	51	69						
4	72	100	60	83	17	100	139	53	74	47	90	125	44	61						
5	128	175	65	89	49	130	178	54	73	59	110	150	48	65						
6	74	100	56	75	24	116	156	40	53	66	101	136	35	47						
7	93	133	85	121	8	134	191	88	125	38	116	166	73	104						
8	69	96	65	91	6	100	140	65	91	35	90	126	55	77						
9	69	99	58	83	15	103	148	56	80	46	90	129	50	72		35	11.8	2.6	11.8	3.0
10	81	113	61	85	25	106	148	64	89	40	84	117	52	72						
11	83	122	63	93	24	144	212	76	112	47	99	146	52	76						
12	98	137	60	84	34	140	196	46	64	67	131	184	44	61						
13	85	118	55	76	36	150	207	34	47	77	131	182	31	43						
14	82	119	72	105	12	108	157	67	97	38	92	133	57	82						
15	81	118	58	85	28	108	159	50	73	54	90	132	40	59						
16	73	106	61	88	16	100	145	58	84	42	90	130	50	72		36	11.4	2.4	11.2	2.4
17	73	105	60	86	18	100	143	52	74	48	88	126	42	60						
18	79	109	66	91	17	99	136	64	88	36	81	112	50	69						
19	116	155	58	77	50	110	147	46	61	58	96	128	38	51						
20	79	103	61	79	23	102	133	40	52	59	97	126	38	49						
21	52	72	46	63	12	133	184	60	83	55	112	155	52	72						
22	80	110	58	80	28	127	175	60	83	53	108	149	50	69						
23	83	113	59	81	29	91	124	51	70	44	72	99	40	54						
24	90	122	69	94	23	108	147	55	74	49	93	127	46	62						
25	60	77	40	51	33	63	80	37	47	41	58	74	33	42						
26	84	114	66	90	21	118	161	54	73	54	104	142	48	65						
27	81	111	61	83	25	110	150	38	52	66	95	130	32	44						
28	104	152	81	117	22	145	210	84	122	42	113	164	67	97						
29	68	97	60	86	12	185	265	65	93	65	152	218	54	77						
30	75	106	64	91	15	82	116	55	78	33	60	85	50	71						
31	87	125	64	92	28	137	197	56	80	60	113	162	43	61						
ARITH. MEAN	82	114	62	87	23	116	167	58	81	49	98	137	48	67		35	11.7	2.8	11.7	3.1
STAT. MEAN		113		86			161		80											

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN # 1

MONTH December 19 59 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge: Gals	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	transfer #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft.	Remarks
	8.5	30																	
1	1326	15	5.8	5.4	77										6.9	92	58	0	Note – indicate gallons
2	884	12	5.7	6.0	78	15910	6.9	1.8	60						6.9	95	60	0	of sludge to beds
3	4420	61	5.5	7.4	67												63	0	
4	884	10	5.7	5.0	80											92	57	0	
5	1105	12	5.7	4.9	80											98	64	0	
6	1105	17	5.7	7.2	77												62	0	
7	1326	22	5.7	7.6	78										6.9	92	60	0	
8	884	9	5.6	5.1	72											96	62	0	
9	884	16	5.7	8.2	79											100	60	0	
10	1989	27	5.8	6.2	80												65	0	
11	1768	23	5.8	5.8	80										7.0	94	82	1	
12	884	8	5.7	4.8	67	15028	7.0	5.9	50							103	62	0	
13	884	11	5.7	5.7	77												60	0	
14	1326	20	5.5	6.7	80										6.9		55	0	
15	1989	27	5.6	6.1	80											94	69	0	
16	884	13	5.6	7.2	76										7.0	100	66	0	
17	1326	24	5.5	8.6	74											97	67	1	
18	1105	18	5.7	7.5	77											102	66	0	
19	1105	17	5.6	7.1	76											98	66	0	
20	884	13	5.6	6.5	79											104	62	0	
21	1326	22	5.5	7.5	79										7.1		61	0	
22	2210	37	5.7	7.5	80											102	67	0	
23	1768	20	5.6	5.0	80											97	66	0	
24	884	12	5.6	5.8	80											101	62	0	
25	884	14	5.9	7.5	77											98	54	1	
26	884	9	6.1	4.4	81											102	58	0	
27	1105	18	5.9	7.2	79											98	57	0	
28	1547	18	5.6	5.2	81										7.1	100	60	0	
29	884	15	5.9	7.4	80	16354	7.0	4.9	61							103	56	1	
30	1326	19	5.8	6.3	80												61	0	
31	884	14	5.6	7.8	77											98	65	0	
ARITH. MEAN	1312	18	5.7	6.5	78	15764	7.0	4.2	57						7.0	98	62		
STAT. MEAN		17																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 19 59 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

digested ~~sewage~~ sludge to beds

Date	Supernatant Gals	Supernatant Lbs Per 1000 c f Digester	Supernatant pH	Supernatant Total Solids %	Supernatant Vol Solids %	sludge near bottom Gals.	sludge near bottom pH	sludge near bottom Total Solids %	sludge near bottom Vol Solids %	sludge near bottom Susp Solids Mg/l X10	sludge near bottom 5-Day B O D Mg/l X10	sludge near bottom Total Solids %	sludge near bottom Vol Solids %	sludge near bottom Vol Acids Mg/l	Temp pH #2	Temp °F #2	Gas Produced cu ft	Gas Wasted cu ft.	Remarks
1															7.1	91			Note — include gallons
2						15910	7.1	.29	57	184	34				7.1				of sludge to beds
3																93			
4																			
5																90			
6																93			
7															7.0	96			
8																			
9																90			
10																92			
11						15028	7.1	.22	52	105	12				7.1	96			
12																92			
13																96			
14															7.0	98			
15																100			
16															7.0	98			
17																101			
18																98			
19																101			
20																98			
21															7.2	100			
22																99			
23																102			
24																98			
25																101			
26																98			
27																101			
28															7.1				
29						16354	7.1	.34	68	122	15					96			
30																97			
31																99			
ARITH. MEAN						15764	7.1	.28	59	137	20				7.0	97			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff E Coli Water cu. ft.	Cl- lbs	Power KWH x10	AUX FUEL Gas cu. ft. x100	Remarks
1		34	20	CL	52	1.58	7.6		93		12	12	
2	.01	38	30	R&S	52	1.63	7.7		44		16	19	
3	.03	32	14	S	52	1.62	7.7		44		12	18	
4		22	12	CL	52	1.70	7.7		105		16	21	
5		20	8	CL	52	1.67	7.7		93		16	20	
6		30	18	C	52	1.69	7.6		100		16	16	
7		38	28	CL	52	1.72	7.7		121		16	14	
8		34	20	C	52	1.72	7.7		35		12	20	
9		40	22	CL	52	1.60	7.7		81		16	13	
10		40	24	CL	52	1.60	7.6		90		12	14	
11	.70	36	24	R	52	1.75	7.6		10		16	12	
12	1.70	54	34	R	48	2.17	7.7		20		16	10	
13		38	34	CL	52	2.09	7.8		20		16	11	
14	.47	38	30	R	52	2.15	7.8		25		20	12	
15		32	22	CL	52	2.12	7.7		36		20	14	
16		30	20	C	52	2.04	7.6		26		16	20	
17	.10	34	20	S	52	2.04	7.8		55		16	17	
18	.10	34	24	S	51	2.07	7.7		58		16	20	
19	.01	32	16	S	52	2.05	7.7		100		20	13	
20	.02	26	10	S	51	2.03	7.8		63		16	17	
21	.01	26	8	S	51	2.00	7.7		64		20	18	
22	.02	28	16	S	51	1.99	7.7		62		16	17	
23	.01	28	16	S	51	1.94	7.7		55		20	23	
24	.02	20	6	S	51	1.86	7.7		62		16	26	
25		32	18	Cl	51	1.96	7.6		50		16	10	
26	.17	36	20	R	50	1.93	7.7		47		16	14	
27	.11	36	30	R&S	50	1.92	7.7		53		16	13	
28		38	30	CL	50	1.93	7.8		40		20	12	
29		38	30	CL	50	1.93	7.7		33		16	13	
30		38	28	CL	51	1.86	7.7		30		16	14	
31		40	28	CL	51	1.86	7.7		28		16	11	
ARITH. MEAN	.11	34	21		51	1.88	7.7		56		16	16	
STAT MEAN						1.90							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem	Inf		Eff.		Rem	Inf		Eff		
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	X10	Mg/l	lbs. X10	
1	61	80	49	65	20	134	177	58	76	57	118	155	47	62	
2	88	119	64	87	27	93	127	54	73	42	82	112	52	71	
3	87	118	55	74	37	130	176	40	54	69	113	153	39	53	
4	132	188	63	89	52	241	342	50	71	79	200	283	49	69	
5	76	106	60	84	21	125	174	64	89	49	104	145	57	79	
6	116	164	49	69	58	161	226	50	70	69	133	187	45	63	
7	75	108	58	83	23	135	194	80	115	41	110	158	67	96	
8	87	125	52	74	40	128	184	51	73	60	112	161	39	56	
9	81	108	62	83	24	99	132	52	69	47	86	115	53	57	
10	80	107	53	71	34	103	138	36	48	65	85	114	31	41	
11	68	98	60	86	12	170	245	68	98	60	144	207	58	83	
12	59	107	33	61	44	140	253	64	116	54	75	136	32	61	
13	55	95	30	52	46	92	160	46	80	50	69	120	31	54	
14	49	87	43	77	12	88	159	50	89	53	70	125	40	72	
15	60	106	40	71	33	80	141	49	86	39	59	104	35	62	
16	62	105	30	51	52	67	114	26	44	61	60	102	23	39	
17	43	73	6	10	86	76	130	38	65	50	58	99	28	43	
18	52	90	46	80	12	53	92	49	85	8	50	70	46	80	
19	87	151	55	93	37	100	171	60	103	40	90	154	50	85	
20	59	100	38	65	36	65	110	43	72	34	55	93	34	58	
21	55	91	40	67	27	75	125	37	62	51	70	116	32	55	
22	52	86	33	56	37	69	114	37	61	46	62	103	32	53	
23	66	107	52	84	21	65	105	46	74	29	52	84	37	60	
24															
25	77	126	40	62	48	110	180	38	59	66	90	146	33	54	
26	68	109	49	79	28	129	205	77	124	40	111	179	62	100	
27	65	104	46	73	30	94	150	48	76	49	75	120	34	55	
28	57	91	26	42	54	93	149	38	61	59	76	122	33	53	
29	67	108	33	53	51	82	132	24	38	71	64	103	20	32	
30	79	123	36	56	54	107	166	25	39	77	106	164	30	46	
31	91	141	43	66	53	165	256	43	66	74	147	228	40	62	
ARITH. MEAN	72	110	45	69	37	109	168	48	72	53	91	139	40	62	
STAT MEAN		108		69			162		74						

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1960 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge					Transfer Supernatant #1 to #2						sludge near bottom			pH	Temp	Gas		Remarks
	Gals.	Lbs Per 1000 c f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l		°F	Produced cu. ft.	Wasted cu. ft.	
	8.5	30													#1	#1	X 100		
1	1326	23	5.7	7.7	79											101	59	0	Note – include gallons
2	1326	17	5.6	6.2	76											103	52	0	of sludge to beds
3	1105	13	5.7	5.4	80												54	1	
4	1326	18	5.6	5.9	80												58	0	
5	1989	29	5.7	6.5	81										7.4		44	0	
6	2431	39	5.7	7.3	80											93	66	0	
7	1547	20	5.8	5.8	79	17021	7.2	3.1	62							97	74	0	
8	1547	20	5.6	5.8	79											102	67	0	
9	1326	13	5.7	4.4	79												53	0	
10	1768	19	5.6	4.9	78											97	66	0	
11	1326	16	5.6	5.5	78										7.1	101	59	1	
12	1768	21	5.5	5.4	78												61	0	
13	1105	15	5.7	6.6	76											94	58	0	
14	1547	20	5.8	6.0	75											97	64	0	
15	1326	20	5.7	7.7	73										7.1	101	60	0	
16	1326	14	5.8	4.9	75											98	64	0	
17	1326	20	5.6	7.2	75											100	58	1	
18	1105	15	5.9	6.4	75										7.1		56	0	
19	884	12	5.7	6.0	78	17460	7.2	6.6	65						7.2	96	65	0	
20	1768	24	5.8	6.3	77										7.3	101	56	0	
21	1326	18	5.8	6.0	78												55	0	
22	1105	14	5.9	6.0	75											95	59	0	
23	1105	11	5.8	4.4	81											99	50	0	
24	1326	17	5.7	5.8	79											102	19	1	
25	1326	18	5.8	6.0	79												51	46	
26	1105	15	5.8	6.4	76										7.1		41	41	
27	1326	18	5.7	6.4	76												35	7	
28	1326	17	5.9	6.0	76											90	50	0	
29	1547	13	5.7	3.8	77										7.1	94	60	0	
30	1105	13	5.8	5.7	75											96	58	0	
31	1326	17	5.8	6.1	74											100	53	19	
ARITH. MEAN	1390	18	5.7	6.0	77	17240	7.2	4.8	63						7.2	98	56	4	
STAT MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1960 — DIGESTER AND SLUDGE DATA — OPERATOR R. J. Swalwell

Digested Raw Sludge to beds

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	Temp. °F	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
															#2	#2			Note — include gallons of sludge to beds
1																			
2																95			
3																95			
4																95			
5															7.4	95			
6																97			
7						17021	7.2	.46	65	336	24								
8																92			
9																96			
10																98			
11															7.1	96			
12																98			
13																100			
14																			
15															7.1	96			
16																98			
17																96			
18															7.1	98			
19						17460	7.2	.53	65	362	26				7.2	100			
20															7.3	94			
21																97			
22																99			
23																			
24																94			
25																89			
26															7.1	85			
27																82			
28																86			
29															7.1				
30																			
31																			
ARITH. MEAN						17240	7.2	.50	65	349	25				7.2	95			
STAT. MEAN																			

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..... SHEET NO. 1

DATE	TYPE OF WEATHER	TEMPERATURES, DEGREES F. ATMOSPHERE HIGH	ATMOSPHERE LOW	ATMOSPHERE AVERAGE	AVERAGE RAW SEWAGE	AVERAGE PLANT EFFLUENT	AVERAGE NUMBER 1 DIGESTER	AVERAGE NUMBER 2 DIGESTER	METERED QUANTITIES SEWAGE (million gallons)	CHLORINE (pounds)	WATER (cu. ft.)	ELECTRICITY (Kilowatts)	SEWAGE GAS UTILIZED (cu. ft.)	SEWAGE GAS WASTED (cu. ft.)	TOTAL GAS PRODUCED (cu. ft.)	GAS PURCHASED (cu. ft.)
1	LR	34	20	27	52		101		1.58		93.	120	57	0	57	12
2	R45.04	38	30	34	52		103	96	1.63		44	160	53	0	53	14
3	S.03	32	14	23	52			95	1.62		44	120	53	1	54	18
4	CL	22	14	17	52			95	1.70		105	160	58	0	58	21
5	CL	20	8	14	52			95	1.67		93	160	44	0	44	20
6	C	30	18	24	52		93	97	1.64		100					
7	S	38	28	33	52		97		1.72		121	160	74	0	74	14
8	C	34	20	27	52		102	92	1.72		35	120	67	0	67	20
9	M	40	22	31	52			96	1.60		81	160	53	0	53	13
10	CL	40	24	32	52		97	98	1.66		90	120	66	0	66	14
11	R0.70	36	24	30	52		101	96	1.75		10	160	58	1	59	12
12	R1.70	54	34	44	48			98	2.17		20	160	61	0	61	10
13	M	38	34	36	52		94	100	2.09		20	160	58	0	58	11
14	R0.47	38	30	34	52		97		2.15		25	200	64	0	64	12
15	LS	32	22	27	52		101	96	2.12		36	200	60	0	60	14
16	C	30	20	25	52		98	98	2.04		26	160	64	0	64	20
17	S.10	34	20	27	52		100	96	2.05		55	160	57	1	58	17
18	S0.10	34	24	29	51			98	2.09		58	160	56	0	56	20
19	S0.01	32	16	24	52		96	100	2.05		100	200	65	0	65	13
20	S0.02	26	10	18	51		101	94	2.03		63	160	56	0	56	17
21	ST	26	8	17	51			99	2.00		64	200	55	0	55	18
22	S0.02	28	16	22	51		95	99	1.99		62	160	54	0	54	17
23	S0.01	28	16	22	51		99		1.94		55	200	50	0	50	23
24	S.02	26	6	13	51		102	94	1.86		62	160	18	1	19	26
25	C1	32	18	25	51			89	1.96		50	160	5	46	51	16
26	R.11	36	26	28	50			85	1.93		47	160	0	41	41	14
27	RS.11	36	30	33	50			82	1.92		53	160	28	7	35	13
28	C1	38	30	34	50		90	86	1.93		41	200	50	0	50	12
29	C1	38	30	34	50		94		1.93		33	160	60	0	60	13
30	C1	38	28	33	51		96		1.86		30	160	58	0	58	14
31	C1	40	28	34	51		100		1.86		28	160	34	19	53	11
Total	3.47						2057	2271	58.25		1743	5040	1608	117	1725	1184
Max.	1.70	54			52		102	100	2.17		121	200	74	46	74	26
Min.	0		6		48		90	82	1.58		10	120	0	0	19	10
Av.	.112	34	21	27	51		98	95	1.88		56	163	52	4	56	16

REMARKS:

PREPARED BY .....

DATE.....

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..... SHEET NO. 2

DATE	TOTAL SOLIDS PPM: RAW SEWAGE	TOTAL SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS PPM: RAW SEWAGE	SUSPENDED SOLIDS: PERCENT VOLATILE	SUSPENDED SOLIDS PPM: PLANT EFFLUENT	SUSPENDED SOLIDS: PERCENT VOLATILE	5 DAY B. O. D. 20 DEG. C. PPM: RAW SEWAGE	5 DAY B. O. D. 20 DEG. C. PPM: PLANT EFFLUENT	PH. DATA: RAW SEWAGE MAXIMUM	PH. DATA: RAW SEWAGE MINIMUM	PH. DATA: PLANT EFFLUENT MAXIMUM	PH. DATA: PLANT EFFLUENT MINIMUM	RAW SLUDGE	DIGESTER NUMBER 1	DIGESTER NUMBER 2
1			134	88.1	58	81.0	61	49	7.6		7.6		5.7		
2			93	81.2	54	96.3	88	64	7.7		7.6		5.6		
3			130	87.0	40	97.5	87	55	7.7		7.5		5.7		
4			241	83.0	50	98.0	132	63	7.7		7.6		5.6		
5			125	83.2	64	89.1	176	60	7.7		7.5		5.7	7.4	7.2
6			161	82.6	50	90.0	176	49	7.6		7.5		5.7		
7			135	81.5	80	83.8	75	58	7.7		7.6		5.8		
8			118	87.5	51	76.5	87	52	7.7		7.6		5.6		
9			99	86.0	52	82.7	81	62	7.7		7.7		5.7		
10			103	82.5	36	86.1	80	53	7.6		7.5		5.6		
11			176	84.7	68	85.3	68	60	7.6		7.5		5.6	7.1	7.1
12			140	53.6	44	50.0	59	33	7.7		7.7		5.5		
13			82	75.6	46	69.6	55	30	7.8		7.6		5.7		
14			88	80.0	50	80.0	49	43	7.8		7.5		5.8		
15			80	83.8	49	71.4	60	40	7.7		7.6		5.7	7.1	7.2
16			67	80.0	26	88.5	62	30	7.6		7.6		5.8		
17			76	76.3	38	73.7	43	6	7.8		7.5		5.6		
18			53	94.3	49	93.9	52	46	7.7		7.6		5.9	7.1	7.2
19			160	90.6	60	93.3	87	55	7.7		7.6		5.7	7.2	7.4
20			65	84.6	43	81.0	59	38	7.8		7.6		5.8	7.3	7.1
21			75	93.3	37	86.5	55	40	7.7		7.5		5.8		
22			69	89.9	37	86.5	52	33	7.7		7.6		5.9		
23			65	81.0	46	80.0	66	52	7.7		7.7		5.8		
24	—	—	116	SAMPLES			—	—	—	—	—	—	5.7		
25			110	81.8	38	86.8	72	40	7.6		7.5		5.8		
26			129	86.1	72	80.5	68	49	7.7		7.5		5.8	7.1	7.3
27			94	80.0	48	70.8	65	46	7.7		7.6		5.7		
28			93	81.7	38	86.8	57	24	7.8		7.6		5.9		
29			82	78.0	24	83.3	62	33	7.7		7.5		5.7	7.1	7.2
30			107	99.1	25	100.0	79	36	7.7		7.6		5.8		
31			165	89.1	43	93.6	91	43	7.7		7.5		5.8		
Total			3269	2549	1441	2510.9	2154	1344	230.9		227.1		177.5	57.4	57.7
Max.			241	93.3	80	100.00	132	64	7.8		7.7		5.9	7.4	7.4
Min.			53	75.0	24	50.00	49	6	7.6		7.5		5.5	7.1	7.1
Av.			109	84.7	48	81.0	72	45	7.7		7.6		5.7	7.2	7.2

SUMMARY	RAW SEWAGE PPM	RAW SEWAGE POUNDS	PLANT EFFLUENT PPM	PLANT EFFLUENT POUNDS	REDUCTIONS ACHIEVED PPM	REDUCTIONS ACHIEVED POUNDS	REDUCTIONS ACHIEVED PERCENT
TOTAL SOLIDS							
SUSPENDED SOLIDS							
5 DAY B O.D.							

PREPARED BY .....

DATE

MARSHALL CITY DISPOSAL PLANT — MARSHALL, MICHIGAN

OPERATIONAL DATA FOR THE MONTH OF..... SHEET NO. 3

DATE	SLUDGE HANDLING DATA													
	RAW SLUDGE FROM CLARIFIERS					SLUDGE TRANSFERED FROM 1 to 2					Supernate ~~DRAWN TO DRYING BEDS~~			
	GALLONS TO NUMBER 1 DIGESTER	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS TRANSFERRED	PERCENT DRY SOLIDS	POUNDS DRY SOLIDS	PERCENT VOLATILE SOLIDS	POUNDS VOLATILE SOLIDS	GALLONS DRAWN	PERCENT DRY SOLIDS	PERCENT VOLATILE SOLIDS
1	1326	7.7	860	79.0	680								
2	1326	6.2	690	76.3	520								
3	1105	5.4	510	80.0	400								
4	1326	5.9	660	80.2	530								
5	1989	6.5	1100	80.7	880							SS	3360
6	2431	2.3	1480	80.0	1180							BD	244
7	1547	5.8	760	78.9	600	17021	3.1	4430	61.6	2746	17021	.46	65.2
8	1547	5.8	760	78.9	600								
9	1326	4.4	500	79.2	390								
10	1768	4.9	740	77.8	570								
11	1326	5.5	620	78.3	480								
12	1765	5.4	810	78.3	630								
13	1105	6.6	610	76.0	460								
14	1547	6.0	790	74.2	570								
15	1326	7.7	860	72.6	618								
16	1326	4.9	550	75.4	410								
17	1326	7.2	810	75.3	610							BD	266
18	1105	6.4	600	75.3	450							SS	3620
19	8811	6.0	450	77.6	350	17460	6.6	9680	64.7	6292	17460	.53	64.7
20	1765	6.3	943	77.2	720								
21	1326	6.0	680	78.1	530								
22	1105	6.0	570	75.0	420								
23	1105	4.4	410	80.8	320								
24	1326	5.8	650	79.2	510								
25	1326	6.0	680	78.6	530								
26	1105	6.4	601	75.9	450								
27	1326	6.4	710	75.9	530								
28	1326	6.0	680	76.3	510								
29	1547	3.8	500	77.3	380								
30	1105	5.7	530	75.4	400								
31	1326	6.1	690	73.7	500								
Total	43095	184.5	21800	2397.8	16740	34481	9.7	14110	126.3	9038	34481	.99	129.9
Max.	2431	7.7	1480	80.8	1180	17460	6.6	9680	64.7	6292	17460	.53	65.2
Min.	884	3.8	410	72.6	320	17021	3.1	4430	61.6	2746	17021	.46	64.7
Av.	1390	6.0	703	77.3	540	17240	4.8	7055	63.1	4519	17240	.50	64.9

REMARKS:

PREPARED BY .....

DATE .....

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Plant Eff. E. Coli. water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		36	10	C	50	1.93	7.7		62		20	11	
2		26	12	C	50	1.85	7.7		50		16	15	
3		34	14	C.	51	1.82	7.9		48		16	15	
4		42	18	CL	51	1.87	7.7		63		16	10	
5	.64	46	32	R&S	51	2.01	7.6		18		20	12	
6	.06	34	26	S	50	1.88	7.7		36		16	22	
7	.01	30	24	S	51	1.86	7.6		54		16	13	
8		38	30	C	51	1.94	7.8		39		16	14	
9	.62	38	30	R&S	50	1.96	7.6		90		20	22	
10	.34	38	18	R&S	50	2.06	7.7		12		16	19	
11	.10	26	18	CL	50	2.05	7.7		88		20	21	
12		26	8	C	50	2.06	7.7		66		20	17	
13		24	10	C	50	2.05	7.6		66		20	21	
14		24	10	C	50	1.95	7.6		10		16	20	
15		32	20	C	51	2.05	7.8		22		16	15	
16	.11	42	30	S	51	2.08	7.7		64		20	15	
17		38	22	CL	50	2.06	7.7		105		16	15	
18		32	20	CL	50	2.03	7.8		34		16	17	
19		28	18	CL	50	1.97	7.7		156		16	21	
20		30	20	CL	50	1.94	7.7		161		20	13	
21	.25	36	20	S	50	1.89	7.7		181		16	18	
22		34	20	C	50	1.98	7.7		67		16	41	
23		30	12	C	50	1.95	7.8		64		20	43	
24		34	18	CL	50	1.97	7.6		29		16	44	
25	.42	26	18	S	50	1.96	7.8		110		20	50	
26		32	26	CL	50	1.95	7.7		138		16	33	
27		30	10	CL	50	1.93	7.8		181		16	24	
28	.11	34	10	S	49	1.87	7.7		211		16	19	
29		26	4	CL	50	1.96	7.7		30		20	41	
30													
31													
ARITH. MEAN	.092	33	18		50	1.97	7.7		78		17.5	22	
STAT. MEAN						1.96							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 19 60

PRIMARY TREATMENT DATA

OPERATOR R.J. SWalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Above		Below		Remarks
	Inf.		Eff		Rem	Inf		Eff.		Rem	Inf		Eff		Receiving Stream Data				
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	Temp.	D.O.	B.O.D.	D.O.	B.O.D.
1	63	101	55	88	13	74	119	57	91	23	60	96	47	75					
2	60	92	43	66	28	66	102	40	62	39	60	92	37	57					
3	52	74	36	54	31	96	145	42	63	56	82	124	38	58					
4	43	67	32	50	26	74	116	51	79	31	67	104	38	59	36	14.8	5.2	13.0	3.2
5	76	127	55	92	28	104	175	65	109	38	74	124	52	87					
6	52	81	21	33	60	102	160	54	84	47	88	138	34	53					
7	57	88	36	55	37	87	135	42	65	52	77	118	40	62					
8	61	98	49	79	20	113	183	47	76	58	100	162	47	76					
9	67	110	58	94	13	87	142	43	70	51	74	121	31	51					
10	62	106	49	84	21	114	196	51	87	55	88	152	38	65					
11	49	83	37	63	24	70	119	60	102	14	57	97	46	78					
12	55	94	46	79	16	73	125	46	79	37	56	96	32	55					
13	64	109	18	31	72	71	121	26	44	63	63	108	22	38					
14	63	102	33	54	48	83	135	30	49	64	72	117	28	46					
15	64	109	60	102	6	88	152	50	85	43	77	132	44	75					
16	63	109	36	62	43	74	129	41	71	45	68	118	39	68					
17	55	94	51	87	7	87	150	69	118	21	100	170	70	120					
18	56	94	36	61	36	41	69	27	46	34	37	63	28	48					
19	58	95	49	80	15	76	124	50	82	34	62	102	37	61					
20	66	107	40	65	39	84	136	43	69	49	71	114	31	50					
21	75	118	30	47	60	130	205	74	117	74	112	177	27	43					
22	63	104	58	95	8	103	170	60	99	42	88	145	57	93					
23	67	109	40	65	40	98	159	30	49	69	82	133	25	40					
24	66	108	43	70	35	91	149	47	77	48	85	140	39	64	35	12.2	2.0	.2.4	2.6
25	57	92	33	55	42	88	143	54	88	39	75	122	43	70					
26	65	106	55	89	15	77	125	55	89	29	63	102	45	73					
27	76	122	52	83	32	74	118	50	80	32	61	98	43	69					
28	63	98	36	56	43	100	156	38	59	62	91	142	30	47					
29	70	114	46	75	34	150	245	38	62	75	128	210	28	46					
30																			
31																			
ARITH. MEAN	62	100	43	70	31	89	145	46	78	46	76	125	38	63	35	13.5	3.6	12.7	2.9
STAT MEAN		101		69			141		76										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge					Transfer Sludge #1 to #2						sludge near bottom				Temp.	Gas		Remarks
	Gals. 8.5	Lbs. Per 1000 c.f. Digester 30	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X	Wasted cu. ft. 100	
1	884	11	5.7	5.5	78	16800	7.1	.4	50								47	12	Note -- include gallons
2	1326	16	5.8	6.5	79												41	0	of sludge to beds
3	1105	15	5.6	6.6	78											92	35	0	
4	884	11	5.7	6.0	78										7.1	95	46	0	
5	884	8	5.7	3.9	78											97	46	0	
6	1326	13	5.8	4.5	80											99	46	0	
7	1547	22	5.7	5.9	87											101	42	0	
8	1547	18	5.9	5.6	75										7.1	102	45	0	
9	1105	12	6.1	5.2	77												54	0	
10	1989	20	5.9	4.6	78										7.1	94	51	0	
11	884	10	6.0	5.2	78											98	53	0	
12	1326	15	5.9	4.9	80											99	49	0	
13	1105	12	5.9	4.9	78											101	50	0	
14	2652	26	5.8	4.5	78											101	39	0	
15	884	9	5.8	4.6	80											100	40	0	
16	884	8	5.6	4.2	80												43	0	
17	1768	18	5.8	4.5	81	20100	7.1	4.3	57						7.1	95	40	0	
18	1326	14	5.8	4.5	81										7.1	97	35	0	
19	1326	14	5.8	4.8	77												31	0	
20	1326	14	5.9	4.6	82												34	0	
21	1326	15	5.8	5.0	79											91	25	0	
22	1326	15	5.8	5.1	77											90	26	0	
23	1326	16	5.6	5.3	80												42	0	
24	1547	18	5.8	5.1	80										7.0	86	33	0	
25	1989	23	5.7	5.3	79										7.1	94	52	0	
26	1326	14	5.9	5.2	75											100	44	0	
27	884	9	5.7	4.5	79												30	0	
28	2210	15	5.7	3.1	79											93	53	2	
29	1326	17	6.0	5.8	79											94	31	0	
30																			
31																			
ARITH. MEAN	1355	15	5.8	5.1	80	18450	7.1	2.4	53						7.1	96	42	.5	
STAT MEAN		15																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1960 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Digested Raw Sludge to beds					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X10	5-Day B O D Mg/l X10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1						16800	7.1	.56	64	408	20								Note – include gallons
2																86			of sludge to beds
3																89			
4															7.1				
5																			
6																			
7															7.2				
8																81			
9															7.2	84			
10																			
11																			
12																			
13																			
14																			
15																76			
16															7.3	79			
17						20100	7.3	.50	63	371	23				7.0				
18																82			
19																82			
20																			
21																			
22																80			
23																84			
24															7.1	90			
25															7.1				
26																85			
27																87			
28																			
29																85			
30																			
31																			
ARITH. MEAN						18450	7.2	.53	63	390	22				7.1	78			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~XXXXXX~~ water ~~XXXXXX~~ cu. ft.	Cl₂ lbs	Power KWH X10	AUX FUEL Gas** cu. ft. X100	Remarks
1		26	5	C	50	1.93	7.7		25		20	40	
2	.20	26	14	S	50	1.95	7.7		83		16	41	
3	.01	24	0	S	50	1.91	7.8		40		16	39	
4		24	4	C	50	1.89	7.7		96		16	40	
5		24	0	C	50	1.87	7.8		20		20	41	
6		30	10	CL	49	1.83	7.6		30		16	37	
7		28	-6	C	49	1.93	7.8		24		16	14	
8		28	10	C	50	1.93	7.7		11		16	43	
9		28	12	C	50	1.90	7.7		20		16	41	
10		28	2	C	50	1.90	7.7		25		20	37	
11		30	8	C	50	1.90	7.7		17		16	35	
12		28	0	C	50	1.87	7.6		33		16	36	
13		34	12	C	50	1.82	7.6		45		20	26	
14		36	8	C	50	1.96	7.6		28		16	18	
15		34	10	C	50	1.93	7.7		25		16	14	
16	.20	34	22	S	50	1.93	7.7		87		20	17	
17	.05	36	24	S	50	1.91	7.8		28		16	15	
18		36	16	C	50	1.91	7.7		30		16	16	
19		37	17	C	50	1.89	7.8		20		16	10	
20		34	10	C	50	1.83	7.8		30		20	13	
21	.60	30	14	S	50	1.95	7.8		43		16	19	
22		34	8	C	49	1.90	7.8		68		16	17	
23		36	16	C	49	1.94	7.7		53		16	14	
24	.06	30	2	S	50	1.92	7.7		89		16	19	
25	.04	32	22	S	49	1.89	7.7		90		16	16	
26		38	24	CL	50	1.85	7.6		49		16	14	
27		52	38	CL	50	1.88	7.6		58		20	12	
28		54	38	C	50	2.05	7.8		138		16	4	
29	.09	68	52	R	50	2.15	7.7		160		16	5	
30	1.12	68	34	R	50	2.36	7.7		56		20	7	
31		40	34	C	50	2.36	7.9		82		20	18	
ARITH. MEAN	.076	35	15		50	1.94	7.7		52		17.2	23	
STAT. MEAN						1.91							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Wincy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B.O.D. Inf. Mg/l	5-Day B.O.D. Inf. lbs. X10	5-Day B.O.D. Eff. Mg/l	5-Day B.O.D. Eff. lbs. X10	5-Day B.O.D. Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs. X10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs. X10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs. X10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs. X10	Receiving stream data above Temp.	Receiving stream data above D.O.	Receiving stream data above B.O.D.	Receiving stream data below D.O.	Receiving stream data below B.O.D.
1	61	98	49	79	20	105	169	56	90	47	92	148	49	79					
2	104	169	61	99	41	144	234	92	149	36	115	187	74	121					
3	61	97	52	83	15	96	153	63	100	34	84	134	52	82					
4	61	96	52	82	15	71	112	58	91	18	58	91	45	70					
5	67	105	49	76	27	93	145	41	63	56	80	125	35	54					
6	57	86	36	55	37	144	227	42	63	72	133	203	38	58					
7	55	88	49	79	11	100	161	66	106	34	80	129	51	82					
8	46	74	40	64	13	111	179	47	75	58	96	154	40	64					
9	43	68	36	57	16	62	98	40	63	36	60	95	37	59					
10	61	96	33	52	46	110	174	36	57	67	94	149	30	47					
11	63	100	48	76	24	61	96	54	85	13	51	81	43	68					
12	89	138	64	100	28	124	193	58	90	53	103	161	50	78					
13	67	102	30	45	55	85	129	22	33	74	65	98	20	30					
14	61	99	33	54	46	93	152	60	65	43	77	126	37	60					
15	65	104	36	55	45	76	122	44	70	42	61	98	34	55					
16	66	106	52	83	21	76	123	70	112	8	58	93	52	83					
17	61	97	52	82	15	64	102	58	92	9	57	90	48	76					
18	76	121	58	92	24	98	156	60	95	39	70	111	40	64					
19	71	112	60	94	16	102	161	58	91	43	86	135	43	67					
20	78	119	58	88	26	100	152	32	49	68	84	128	31	47					
21	69	112	55	89	20	154	250	47	76	69	141	229	40	65					
22	71	112	58	92	18	88	139	68	108	23	78	123	48	76					
23	72	116	58	93	19	88	142	41	66	53	71	115	34	55	35	13.2	2.8	13.4	3.4
24	153	243	55	87	64	120	192	40	64	67	114	183	38	61	36	12.2	2.4	12.4	2.2
25	89	140	55	86	38	166	261	45	70	73	148	233	36	56					
26	110	170	46	71	58	188	290	57	87	70	150	232	48	74					
27	85	133	52	81	35	135	212	43	67	68	116	182	40	63					
28	65	111	55	93	15	156	267	62	106	60	134	229	48	82					
29	78	139	58	104	26	73	131	60	107	18	60	107	49	87					
30	43	85	37	73	14	126	248	50	98	60	81	160	44	86	43	10.4	3.4	10.6	3.6
31	69	136	24	47	65	90	177	30	49	68	77	152	30	49					
ARITH. MEAN	72	115	48	78	29	107	172	51	82	48	89	145	42	68	38	12.0	2.9	12.1	3.07
STAT. MEAN		111		80			165		81										

Remarks

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1960

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Transfer ~~Sludge~~ #1 to #2 Gals.	Transfer #1 to #2 pH	Transfer #1 to #2 Total Solids %	Transfer #1 to #2 Vol. Solids %	Transfer #1 to #2 Susp. Solids Mg/l	Transfer #1 to #2 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft.	Remarks
	8.5	30		%	%			%	%	Mg/l	Mg/l	%	%	Mg/l	#1	#1			
1	1105	14	5.9	5.6	79												37	0	Note — include gallons
2	1105	14	5.7	5.7	80	20185	7.1	4.1	63						7.1	95	42	0	of sludge to beds
3	1105	14	5.9	5.9	78											104	37	0	
4	1105	13	5.8	5.2	77										7.0		37	0	
5	1326	15	5.8	5.3	77											98	45	0	
6	1547	20	5.7	5.6	79											103	50	0	
7	1768	22	5.9	6.3	71												41	0	
8	1547	17	6.1	4.9	78										7.1	96	50	0	
9	1326	17	5.6	5.9	78											100	45	0	
10	1105	16	6.0	6.3	79										7.1		45	0	
11	2652	33	5.8	5.5	79										7.1	96	57	0	
12	1326	14	5.8	4.7	78											99	54	10	
13	1768	18	5.7	4.7	78											104	38	16	
14	2652	37	5.6	6.3	80												66	12	
15	1989	27	6.0	6.2	79											100	65	7	
16	884	11	5.8	5.8	79	21216	7.1	.5	67						7.1	101	67	0	
17	1768	24	5.8	6.1	80												68	0	
18	1326	17	5.7	5.7	78										7.2	96	72	0	
19	1547	23	5.7	7.2	75											101	61	0	
20	1768	22	5.8	5.8	78											104	54	0	
21	1768	20	5.7	5.4	75												53	0	
22	2210	27	6.0	5.4	78											96	66	0	
23	1768	27	5.8	7.0	89										7.0	100	65	0	
24	1768	23	5.8	6.1	78											103	71	53	
25	1105	13	5.9	5.6	77												63	26	
26	1768	20	5.8	4.9	81											97	70	10	
27	1105	18	5.8	7.0	83											99	52	0	
28	1105	19	5.4	7.3	83											102	54	10	
29	3095	53	5.7	7.3	84	20995	7.0	.8	50						7.0	101	57	3	
30	1547	22	5.7	6.6	78												57	0	
31	884	12	5.8	6.9	71											93	50	0	
ARITH. MEAN	1576	21	5.8	5.9	78	20998	7.1	1.8	60						7.1	99	54	5	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Digested Raw Sludge to beds					Supernatant								sludge near bottom			Temp		Gas		Remarks
	Gals.	Lbs. Per 1000 c f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l X10	5-Day B O D Mg/l X10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft	Wasted cu. ft.	
1																				Note — include gallons of sludge to beds
2						20185	7.2	.54	63	367	32				7.2					
3																87				
4															7.2	92				
5																95				
6																93				
7																100				
8															7.2	98				
9																94				
10															7.2	99				
11															7.1	103				
12																				
13																98				
14																92				
15																				
16						21216	7.2	.44	64	291	34				7.2					
17																95				
18															7.2	99				
19																				
20																94				
21																95				
22																98				
23															7.0					
24																95				
25																90				
26																90				
27																				
28																90				
29						20995	7.2	.45	65	253	29				7.1	91				
30																95				
31																99				
ARITH. MEAN						20798	7.2	.48	64	304	32				7.2	95				
STAT MEAN																				

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl_2 lbs.	Power KWH x10	AUX. FUEL ** Gas cu. ft. x 100	Remarks
1		52	36	C	50	2.42	7.8		88		20	12	
2	.04	64	34	R	50	2.39	7.7		49		16	8	
3		54	34	Cl	50	2.34	7.8		63		20	11	
4	.01	44	28	S	50	2.41	7.6		39		16	13	
5	.01	36	22	S	50	2.35	7.7		62		20	13	
6		44	30	Cl	50	2.35	7.7		65		20	21	
7		50	32	Cl	50	2.33	7.6		48		16	16	
8		42	24	Cl	50	2.29	7.8		42		20	14	
9		38	18	Cl	50	2.22	7.7		6		16	17	
10	.01	44	24	R	50	2.18	7.7		6		20	17	
11	.15	54	38	R	50	2.30	7.9		69		16	10	
12		64	44	C	50	2.29	7.6		43		16	2	
13		78	56	C	50	2.27	7.6		14		16	1	
14	.51	66	52	R	50	2.35	7.6		47		16	1	
15	.46	72	52	R	50	2.38	7.6		32		16	1	
16	.65	70	54	R	50	2.44	7.6		9		16	5	
17	.10	70	32	R	50	2.40	7.7		8		20	10	
18		44	28	C	50	2.45	7.3		24		12	8	
19		62	38	C	50	2.44	7.6		14		16	6	
20	.03	74	50	R	50	2.44	7.6		10		16	3	
21	.02	66	44	R	50	2.43	7.6		24		16	0	
22		82	56	C	51	2.49	7.7		20		16	1	
23		86	60	C	51	2.47	7.6		15		16	2	
24		86	58	Cl	51	2.41	7.7		11		16	1	
25		84	48	C	51	2.45	7.8		75		16	5	
26		58	36	C	51	2.34	7.7		73		16	3	
27		58	32	C	51	2.31	7.7		72		20	7	
28		66	44	C	51	2.29	7.6		78		16	4	
29	.08	64	50	R	51	2.27	7.6		60		20	10	
30	.42	62	32	R	51	2.32	7.7		90		16	15	
31													
ARITH. MEAN	.083	61	40		50	2.36	7.7		42		17	7.9	
STAT. MEAN						2.37							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marsnall, MICHIGAN

MONTH April 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5 Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff			above		below	
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	ppm	D.O.	B.O.D.	D.O.	E.O.D.
1	52	157	40	121	23	105	317	52	157	51	95	287	40	121					
2	64	127	54	107	16	77	153	35	70	55	69	137	22	44					
3	62	121	40	78	36	120	233	33	64	73	90	175	32	62					
4	70	140	46	92	34	97	195	40	80	59	77	155	38	76					
5	55	108	43	84	22	84	165	55	108	35	73	143	44	86					
6	70	137	52	102	26	107	210	47	92	56	92	180	44	86	37	11.2	2.6	11.4	3.0
7	60	116	46	89	23	64	124	45	81	30	48	93	36	70	38	11.6	1.0	11.8	3.6
8	49	94	31	59	37	54	103	40	76	26	45	86	30	57					
9	61	113	46	85	25	70	130	42	81	40	60	111	40	74					
10	60	109	33	60	45	84	153	34	62	60	74	135	32	58					
11	70	134	52	100	26	92	177	57	109	38	72	138	46	88					
12	61	117	51	97	16	84	160	60	115	24	80	153	50	96	44	11.2	3.0	11.0	2.6
13	58	110	40	76	31	80	151	53	100	34	66	125	40	76					
14	53	104	43	84	19	75	141	44	86	41	58	114	28	55					
15	49	97	37	73	25	65	129	49	97	25	51	101	35	69					
16	60	146	40	98	33	70	171	35	85	50	61	149	30	73					
17	87	175	40	80	54	125	250	25	50	80	113	226	32	64					
18	64	131	46	94	28	73	149	43	88	41	60	122	33	67	48	9.4	2.0	9.8	2.4
19	43	87	30	61	30	50	102	34	69	32	40	81	27	55	50	9.2	1.8	10.0	2.8
20	78	158	58	118	26	80	162	38	77	53	75	152	35	71					
21	82	166	43	87	48	114	230	48	97	58	88	178	40	81					
22	73	152	46	96	37	96	200	38	79	60	78	162	32	67					
23	79	163	61	126	23	110	227	45	93	59	85	175	36	74					
24	74	149	55	111	26	90	180	40	80	56	77	155	34	68					
25	73	149	58	118	21	90	184	62	126	30	76	155	50	102					
26	56	109	43	84	23	69	134	52	101	25	54	105	41	80					
27	64	124	55	106	15	110	212	56	100	53	90	174	45	87					
28	66	126	56	107	15	90	172	57	109	37	74	141	44	84					
29	58	110	48	91	17	104	197	53	100	59	85	161	32	60					
30	60	116	45	87	25	56	108	50	97	11	54	104	48	93					
31																			
ARITH. MEAN	64	128	46	92	28	86	174	45	91	45	72	146	37	75	43	10.5	2.0	10.8	2.9
STAT MEAN		129		93			171		90										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Transfer Sxxxxx #1 to #2

Date	Raw Sludge Gals.	Lbs. Per 1000 c f. Digester 8.5 30	pH	Total Solids %	Vol. Solids %	sludge near bottom Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp pH #1	Temp °F #1	Gas * Produced cu. ft X	Gas Wasted cu. ft. 100	Remarks
1	1326	18	5.8	6.9	71												63	3	Note — include gallons
2	1547	21	5.7	6.5	74											103	71	14	of sludge to beds
3	1326	23	5.5	8.7	71												69	4	Gas vent-
4	1105	12	5.9	5.5	69												55	0	ing under
5	1989	31	5.9	7.8	70											93	63	2	cover not
6	1105	10	6.0	4.5	72										6.9	99	67	10	metered.
7	1547	19	5.7	6.3	72											102	64	63	Apr. 13-
8	1768	17	5.8	5.0	71										6.9		72	30	18
9	1326	17	5.7	6.4	74											98	63	9	
10	1326	16	5.8	5.7	73											102	58	5	circulat-
11	2210	27	5.4	6.4	76												71	9	ing pump
12	1326	14	5.7	4.7	78	21216	7.0	3.6	60							101	27	22	out of
13	1326	14	5.8	5.0	73												19	14	service no
14	1768	17	5.8	4.3	78										7.0		0	0	P.H. or
15	1326	18	5.6	6.0	80												0	0	temps.
16	1326	13	5.7	5.0	71												0	0	taken.
17	1768	19	5.7	5.0	78												0	0	
18	1768	19	5.5	5.2	73	14586	7.0	.4	50								0	0	North dig-
19	1326	15	5.9	5.1	77												26	26	ester out
20	1768	26	5.4	7.0	75												4	4	of service
21	1326	19	5.6	7.2	71										6.9		26	26	for clean-
22	1326	20	5.8	7.5	74												19	19	ing on 12.
23	1326	21	5.8	7.2	78												20	20	
24	1326	14	5.7	4.9	78												24	24	
25	2210	25	5.7	5.6	78												26	16	
26	1326	15	5.7	5.4	77												28	27	
27	1326	14	5.6	4.9	78												28	28	
28	1768	20	5.8	5.3	77												29	18	
29	1326	15	5.9	5.0	78												28	18	
30	1326	17	5.6	5.8	78												29	29	
31																			
ARITH. MEAN	1493	18	5.7	5.86	75	17901	7.0	2.0	55						6.9	100	42	18	
STAT MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 19 60 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Digested sewage to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note – include gallons
2																92			of sludge to beds
3																97			
4																100			
5																102			
6															7.2				
7																97			
8															7.1				
9																			
10																90			
11																92			
12						21216	7.0	.48	65	333	32								
13	15470		7.0	10.4	54.6										7.1				
14	7500		7.1	7.9	55.8														
15																			
16																			
17																			
18																			
19																			
20	8384		6.9	7.9	56.8														
21																			
22	7500		6.9	9.2	60.8														
23																			
24																			
25																			
26																80			
27	9000		6.9	9.7	66.3											83			
28																			
29																			
30																			
31																			
ARITH. MEAN	9570		6.9	9.0	58.8	212167.0		.48	65	333	32				7.1	93			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1960 MISCELLANEOUS DATA OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Plant Eff. E. Coli. Water ~~MPN/100ml~~ ~~XXXXXX~~ cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL **ges cu. ft. x100	Remarks
1		54	40	C	51	2.18	7.6		67		12	7	
2		68	44	Cl	51	2.31	7.7		25		16	6	
3		74	46	C	51	2.31	7.6		238		16	5	
4		78	52	C	51	2.32	7.4		128		16	2	
5		82	58	C	52	2.33	7.6		120		20	0	
6	.98	78	46	R	52	2.40	7.5		103		16	5	
7		48	34	C	52	2.28	7.6		90		16	22	
8		54	36	Cl	52	2.21			90		16	19	
9	.51	44	32	R	52	2.31			65		16	20	
10	.01	50	38	R	51	2.29			107		16	21	
11	.05	44	38	R		2.29			145		16	18	
12	.01	58	40	R		2.31			100		16	12	
13		56	42	Cl		2.31			1568	24	20	20	
14		68	44	C		2.29			1910	26	20	15	
15		80	42	C	51	2.25	7.7		1900	55	20	13	
16	.27	82	58	R	52	2.27	7.6		1820	72	20	27	
17	.01	68	42	R	52	2.30	7.5		1810	72	20	6	
18		80	54	C	52	2.33	7.7		1860	71	20	2	
19	.63	78	56	R	52	2.39	7.6		1820	70	20	1	
20	.20	84	58	R	52	2.35	7.7		1870	70	20	0	
21	.50	72	52	R	52	2.30	7.6		1830	70	20	2	
22		60	48	Cl	52	2.23	7.5		1850	70	20	4	
23		68	48	Cl	52	2.33	7.7		1810	71	20	5	
24		78	48	C	52	2.26	7.6		1720	70	20	3	
25		78	54	C	52	2.27	7.7		1710	67	20	1	
26	.02	78	58	R	52	2.28	7.6		1700	72	20	1	
27	.40	66	56	R	53	2.34	7.7		1760	68	24	3	
28	.05	82	52	R	53	2.33	7.6		1740	70	20	1	
29	.09	82	58	R	53	2.25	7.7		1670	73	20	3	
30	.01	72	52	R	53	2.29	7.6		1740	69	20	2	
31		78	50	C	53	2.38	7.7		1800	80	20	2	
ARITH. MEAN	.012	69	48		52	2.30	7.6		1134	65	19	8	
STAT. MEAN						2.31							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

D-4.1
MICHIGAN DEPARTMENT OF HEALTH.

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5 Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff		Rem	Inf		Eff.		Rem	Inf		Eff		
	Mg/l	lbs. X 10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	
1	63	115	46	84	25	74	135	28	51	62	60	109	26	47	
2	67	129	33	64	51	100	193	40	77	60	79	152	75	145	
3	70	135	52	100	26	62	120	46	89	26	53	102	40	77	
4	60	116	46	89	23	120	232	60	116	50	103	199	50	97	
5	78	151	58	113	26	100	194	50	97	50	78	151	36	70	
6	64	128	55	110	15	120	240	73	146	39	70	140	46	92	
7	66	125	56	106	15	75	143	52	99	31	67	127	45	86	
8															
9															
10															
11	No samples taken. Cleaning primary digester.														
12															
13															
14															
15	79	149	55	103	30	172	323	103	194	40	150	282	78	147	
16	63	119	55	104	13	110	191	64	121	42	78	147	45	85	
17	65	125	55	106	15	121	232	60	115	50	100	192	48	92	
18	64	124	49	95	23	100	194	66	128	34	80	155	51	99	
19	52	103	43	86	17	92	183	60	119	36	66	131	53	105	
20	52	102	37	73	30	94	184	53	104	48	81	159	41	80	
21	68	131	55	106	19	78	150	49	94	37	69	132	41	79	
22	67	125	24	45	64	106	197	38	71	64	89	166	32	60	
23	64	124	55	107	15	70	136	47	91	33	59	114	40	78	
24	64	120	55	103	14	80	150	51	96	36	69	130	43	81	
25	70	132	55	104	21	71	134	40	76	44	62	117	38	72	
26	55	105	49	93	11	92	175	37	70	60	79	150	32	61	
27	58	113	48	94	17	71	137	52	101	27	56	109	42	82	
28	54	105	40	78	26	103	200	47	91	54	60	116	40	78	
29	60	113	40	75	33	86	161	31	58	64	75	130	30	56	
30	67	128	36	69	46	124	237	75	143	40	107	204	59	112	
31	49	97	40	79	18	104	206	65	129	38	77	152	44	87	
AR. MEAN	72	121	54	91	25	97	185	54	103	45	78	149	45	~~116~~	
S. MEAN		123		96			180		104					86	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge Gals	Raw Sludge Lbs Per 1000 c f Digester 15	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol Solids %	Supernatant Gals	Supernatant pH	Supernatant Total Solids %	Supernatant Vol Solids %	Supernatant Susp Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol Solids %	sludge near bottom Vol Acids Mg/l	sludge near bottom pH	Temp °F	Gas Produced cu ft x 100	Gas Wasted cu ft	Remarks
1	1326	43	5.6	7.7	76												25	25	Note — include gallons
2	1326	30	5.7	5.3	76												28	17	of sludge to beds
3	1326	33	5.5	5.8	78											74	34	24	
4	1326	35	5.7	6.0	78												36	29	
5	1326	38	5.6	6.6	77											76	39	21	
6	1326	47	5.8	10.3	62											74	22	16	
7	1105	27	5.6	5.6	79												28	28	
8	1326																14	14	
9	1326																23	16	
10	1547															71	10	3	
11	1105															70	9	4	
12	1326															72	11	10	
13	2652															64	29	2	
14	2210															70	37	0	
15	2652	69	5.6	6.1	76											76	50	13	
16	1326	36	5.7	6.6	74											82	50	26	
17	1768	52	5.8	7.3	72											86	12	12	
18	1326	46	5.8	8.6	71											89	16	16	
19	1326	44	5.6	8.4	71												59	10	
20	1105	25	5.7	5.6	71											90	45	0	
21	1768	52	5.7	7.6	70											93	47	0	
22	1326	39	5.7	6.8	77											95	44	6	
23	1326	31	5.8	5.4	76											97	56	16	
24	1326	32	5.6	7.1	61											98	55	9	
25	1768	59	5.6	8.3	71											98	66	12	
26	1326	27	5.6	4.9	75											100	60	15	
27	1105	25	5.4	5.4	75											101	61	14	
28	1768	43	5.3	6.6	75											102	13	13	
29	1326	44	5.6	8.3	71											100	100	100	
30	1326	31	5.8	5.7	74											98	48	48	
31	1326	35	5.6	6.7	72											95	89	37	
ARITH. MEAN	1519	40	5.6	6.7	73											86	39	18	
STAT MEAN		39																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 19 60 MISCELLANEOUS DATA OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff ~~EXCEX~~ Water ~~MMMMX~~ cu.ft.	Cl_2 lbs.	Power KWH x10	AUX FUEL Gas cu.ft. x 100	Remarks
1		84	74	C	53	2.37	7.6		1770	80	24	1	
2		82	68	C	53	2.33	7.5		1780	73	24	1	
3	.40	80	68	R	53	2.33	7.6		1780	74	20	4	
4	.33	84	72	R	53	2.35	75		1670	33	20	2	
5		76	61	C	53	2.33	7.6		1690	70	24	1	
6		70	61	C	53	2.32	7.6		1700	75	20	1	
7		74	60	C	53	2.25	7.7		1700	77	24	2	
8		76	61	C	53	2.39	76		1850	77	24	2	
9		80	64	C	53	2.04	7.5		2260	74	20	1	
10	.02	88	75	R	53	2.29	7.6		1890	77	24	2	
11	.24	86	71	R	53	2.33	7.6		1830	90	20	6	
12	1.00	74	63	R	53	2.23	7.7		1840	83	20	2	
13	1.26	62	59	R	53	2.69	7.6		1760	84	24	2	
14	.35	62	57	R	53	2.58	7.6		1780	43	20	46	
15		76	68	CL	53	2.54	7.7		1700	76	24	50	
16	.94	80	66	R	54	2.72	7.5		1700	99	24	66	
17	.02	72	59	R	54	2.61	7.6		1840	84	24	27	
18		72	64	C	54	2.60	7.7		1850	70	24	27	
19		78	63	C	54	2.59	7.6		1770	63	24	27	
20		79	60	C	54	2.59	7.5		1830	98	20	26	
21		80	71	C	54	2.57	7.6		1640	76	24	19	
22	.10	84	73	R	54	2.62	7.4		1690	74	20	16	
23	.03	84	73	R	54	2.62	7.5		1830	80	24	3	
24	.02	70	57	R	54	2.53	7.5		1670	30	20	2	
25		84	68	C	54	2.46	7.6		1680	72	20	1	
26		90	72	C	54	2.40	7.7		1740	78	20	2	
27	.21	90	79	R	54	2.58	7.6		1680	78	24	1	
28	.03	83	71	R	55	2.51	7.5		1700	80	20	1	
29		82	71	C	55	2.52	7.5		1850	79	24	1	
30	.43	84	64	R	55	2.55	7.8		1820	78	20	1	
31													
ARITH. MEAN	.18	79	66		54	2.46	7.6		1778	74	22	11	
STAT. MEAN						2.46							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff		Temp	Above		Below	
	Mg/l	lbs. x10	Mg/l	lbs x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10		D.O.	B.O.D.	D.O.	B.O.D
1	64	127	52	103	19	78	154	51	101	35	60	119	37	73					
2	70	136	36	70	49	66	128	23	45	65	53	103	26	50					
3	60	116	40	78	33	80	155	33	64	59	67	130	26	50					
4	89	174	55	108	38	89	174	52	102	42	80	157	51	100					
5	60	112	33	61	45	80	149	37	69	54	85	158	30	56					
6	103	199	40	77	61	150	290	44	85	71	116	224	37	71					
7	68	122	33	59	52	110	198	20	36	82	88	158	18	32					
8	49	98	36	72	27	76	151	46	92	40	60	119	30	60					
9	62	105	49	83	21	131	223	51	87	61	112	190	47	80					
10	69	132	49	94	29	96	183	51	97	47	79	151	44	84					
11	70	136	55	107	21	82	159	35	68	57	70	136	30	58					
12	60	112	46	86	23	91	169	40	74	56	72	134	33	61					
13	62	139	52	116	16	192	430	86	193	55	106	237	44	99					
14	77	166	36	78	53	166	359	40	86	76	125	270	34	73					
15	49	104	46	98	6	60	127	45	95	25	42	89	37	78	59	7.4	2.2	7.0	1.8
16	59	134	46	104	22	192	435	70	159	64	135	306	40	91					
17	49	107	49	107	0	48	105	45	98	6	41	89	36	78					
18	52	113	49	106	6	53	115	37	80	30	46	100	29	63					
19	62	130	27	56	10	86	180	34	71	61	72	150	32	67					
20	46	99	40	86	13	70	151	52	112	26	60	130	42	91					
21	46	98	37	79	20	67	143	40	86	40	55	118	28	60	64	6.4	1.2	6.4	1.0
22	52	114	37	81	29	97	212	51	112	47	83	182	36	79					
23	43	94	37	81	12	66	145	45	99	32	53	116	40	88					
24	65	137	54	114	17	80	169	51	108	36	69	146	42	89					
25	55	113	55	113	0	67	137	43	88	36	53	109	35	72					
26	54	108	36	72	33	65	130	25	50	62	52	104	21	42					
27	72	155	61	131	15	110	237	67	144	39	96	206	55	118					
28	68	142	57	119	16	127	265	56	117	56	100	209	38	79	69	7.2	1.6	7.2	1.8
29	58	122	46	97	21	107	225	56	60	48	82	88	43	46	68	7.0	2.2	6.8	1.8
30	55	117	46	98	16	88	187	33	70	63	65	138	30	64	68	7.2	2.2	7.4	2.0
31	xx	xxx	xx	xx	xx	xx	xxx	xx	xx	xx	xx	xxx	xx	xx	xx	xxx	xxx	xxx	xxx
ARITH MEAN	62	125	44	91	24	96	196	45	92	49	76	152	36	71	66	7.0	1.9	6.96	1.7
STAT MEAN		123		91			173		89										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 19 60 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

transfer ~~xxxxx~~ #1 to #2

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	sludge near bottom Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
	8.5	30															X	100	
1	1326	29	5.6	11.9	65												38	30	Note — include gallons of sludge to beds
2	1768	25	5.7	6.2	81												0	0	
3	1547	20	5.6	8.0	58												108	46	
4	1326	17	5.6	8.0	58												26	20	
5	1326	22	5.5	8.8	67												78	17	
6	2210	30	5.5	5.1	80												26	14	
7	1768	19	5.8	4.7	78												68	76	
8	1547	25	5.7	8.5	69												52	51	
9	1768	23	5.7	6.0	78												38	38	
10	1326	23	5.8	8.9	68												43	37	
11	1326	21	5.6	7.0	80												36	26	
12	1768	29	5.7	9.3	62												20	20	
13	1105	15	5.7	7.8	64												23	23	
14	1768	26	58	7.8	67												25	25	
15	1768	25	5.7	7.5	66												0	0	
16	2210	31	5.8	7.5	68										7.1	87	0	0	
17	1547	20	5.9	7.1	66										7.1	90	0	0	
18	2210	40	5.8	11.4	59												0	0	
19	1547	20	5.7	6.9	65											85	2	2	
20	1547	23	5.7	8.4	64										7.0	84	26	26	
21	1105	18	5.9	8.7	65											85	38	14	
22	1989	30	5.7	8.4	64										7.0	84	47	1	
23	2431	69	5.4	11.5	86										7.1	88	70	23	
24	1547	19	5.6	6.6	66											86	65	18	
25	1768	19	5.8	5.7	69											88	59	12	
26	1989	30	5.5	8.3	64											86	63	13	
27	1768	21	5.8	6.3	66										7.0	89	55	9	
28	1768	23	5.6	6.5	71										7.0	90	51	3	
29	1768	23	5.9	6.5	71	21437	7.0	.35	55						7.0	91	80	60	
30	1768	22	5.9	6.6	67											89	69	20	
31																			
ARITH. MEAN	1687	25	5.7	7.7	68	21437	7.0	.35	55						7.0	87	42	21	
STAT. MEAN		24																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 19 60 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Digested sludge to beds

Date	Supernatant Gals.	Supernatant Lbs. Per 1000 c.f. Digester	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	sludge near bottom Gals.	sludge near bottom pH	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Susp. Solids Mg/l x10	sludge near bottom 5-Day B O D Mg/l x10	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																98			Note – include gallons of sludge to beds
2																96			
3																98			
4																98			
5																95			
6																99			
7																98			
8																96			
9																94			
10																92			
11																91			
12																91			
13																92			
14																94			
15																97			
16															6.9				
17															7.0				
18																67			
19																72			
20															6.9	76			
21																			
22															7.0	80			
23															7.0				
24																82			
25																81			
26																84			
27															6.9				
28															7.0				
29						13481	7.1	.26	50	155	37				7.1				
30																84			
31																			
ARITH. MEAN						13481	7.1	.26	50	155	37				7.0	89			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 19 60

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX FUEL Gas cu. x 100 ft.**	Remarks
1		78	56	C	55	2.45	P		1900	75	20	1	
2	2.04	84	64	R	55	2.82	H		1830	82	20	1	
3	.07	76	48	R	55	2.55			1830	80	24	2	
4		72	50	C	55	2.50	M		1760	48	24	1	
5		65	51	C	55	2.60	E		1780	82	24	1	
6		78	52	C	55	2.55	T		1770	79	20	2	
7		80	52	C	55	2.54	E		1750	79	24	1	
8		84	56	C	55	2.57	R		1900	80	20	1	
9		84	66	C	55	2.52			1800	70	24	2	
10		84	56	C	54	2.39	O		1800	75	20	1	
11		92	62	C	55	2.57	U		1700	80	20	1	
12		88	68	CL	55	2.57	T		1730	80	24	3	
13	.36	78	56	R	56	2.53			1840	78	20	3	
14		76	48	C	55	2.47	O		1700	39	24	3	
15		78	52	C	55	2.48	F		1770	81	20	3	
16		83	59	C	55	2.42			1760	82	20	5	
17	1.0	86	60	R	56	2.54	S		1760	80	20	4	
18	.03	82	62	R	55	2.57	E		1670	79	20	3	
19		86	52	C	55	2.58	R		1750	79	24	1	
20		82	56	C	56	2.45	V		1710	80	20	1	
21		90	64	C	55	2.56	I		1710	81	24	0	
22	1.04	90	62	R	55	2.66	C		1700	79	20	1	
23		86	60	C	56	2.49	E		1870	72	24	0	
24		90	60	C	56	2.34			1540	37	20	0	
25	.03	91	71	R	57	2.54			1700	71	24	0	
26	1.09	80	62	R	57	2.64			1700	79	24	0	
27		88	56	C	57	2.57			1750	79	20	2	
28		88	64	C	57	2.53			1700	74	20	1	
29		94	68	C	57	2.57			1730	76	24	1	
30		81	51	C	57	2.52			1710	71	20	2	
31		82	54	C	56	2.24			1720	77	24	2	
ARITH. MEAN	.182	83	58		56	2.53			1751	74	22	1.5	
STAT. MEAN						2.53							

C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff		
	Mg/l	lbs x 10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs x10	
1	61	125	36	74	41	80	164	40	82	50	72	148	32	66	
2	61	143	46	108	25	94	221	52	122	45	84	197	43	101	
3	36	77	18	38	50	77	164	28	60	64	61	130	31	66	
4	40	84	30	63	25	74	155	34	71	54	58	121	26	54	
5	64	138	36	78	44	102	220	38	82	63	71	153	34	73	
6	52	111	36	77	31	72	153	37	79	49	53	113	30	64	
7	46	98	33	70	28	87	184	44	93	49	80	170	31	66	
8	52	111	30	64	42	68	146	37	79	46	60	128	34	73	
9	58	122	40	84	31	65	137	25	53	62	60	126	29	61	
10	63	125	30	60	52	88	175	40	80	55	70	139	27	53	
11	67	143	49	105	27	71	152	43	92	39	55	118	39	83	
12	43	92	27	58	37	91	195	25	54	73	76	163	26	56	
13	53	112	30	63	46	107	226	33	70	70	97	205	20	42	
14	64	132	24	49	63	143	295	33	68	77	121	249	27	56	
15	73	151	66	137	11	89	184	57	118	36	74	153	50	107	
16	64	129	55	111	14	97	196	28	57	71	88	178	30	61	
17	39	83	21	42	46	68	144	36	76	47	50	106	25	53	
18	66	141	36	77	45	70	150	60	128	14	60	128	45	96	
19	58	125	9	19	84	85	183	23	49	73	70	151	20	43	
20	67	137	36	73	41	70	143	40	82	43	67	137	32	65	
21	49	105	37	79	25	65	139	32	68	51	62	133	27	58	
22	49	109	36	80	27	152	337	50	111	67	90	200	18	40	
23	58	121	43	89	26	130	270	36	75	72	95	197	20	42	
24	64	125	36	70	44	80	156	24	47	70	84	164	23	45	
25	49	104	36	76	27	93	197	48	102	48	71	151	28	59	
26	49	107	36	79	27	166	365	51	112	69	111	244	27	59	
27	55	118	30	64	27	93	199	23	49	75	56	120	33	71	
28	36	76	30	63	17	47	99	36	76	23	38	80	31	65	
29	46	98	33	71	28	53	113	36	77	33	46	98	25	54	
30	52	104	40	80	23	102	204	44	88	57	87	174	31	62	
31	65	122	30	56	69	104	194	26	49	75	95	178	24	44	
ARITH MEAN	55	114	35	73	36	90	189	37	79	55	73	153	23	63	
STAT MEAN		117		73			180		78						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Transfer Supernatant #1 to #2 Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. x 100	Gas Wasted cu. ft.	Remarks
	8.5	30																	
1	1547	16	P	5.4	70										P		64	14	Note — include gallons
2	2210	28	H	6.6	68										H	90	71	30	of sludge to beds
3	1768	22		6.4	70											89	73	28	
4	1326	17	M	6.9	65										M	92	65	27	
5	1326	23	E	10.1	61										E	90	62	22	
6	1547	19	T	6.9	64										T	91	61	21	
7	1326	18	E	7.2	66	7956		7.8	58						E	90	55	15	
8	1326	18	R	7.2	66										R	91	65	19	
9	1768	18		5.2	70											92	68	18	
10	1547	21	O	7.3	67										O	90	68	16	
11	1547	23	U	7.5	70										U	92	65	14	
12	1989	22	T	5.7	68										T	93	75	61	
13	2431	31		6.7	67											92	77	77	
14	1768	21	O	6.3	68	20332		.35	53						O	90	52	52	
15	1768	25	F	6.5	79										F	88	75	42	
16	1547	15		4.9	72											89	73	30	
17	1989	27	S	6.9	70										S	91	73	28	
18	1326	16	E	6.1	68										E	90	62	21	
19	2210	42	R	9.8	69										R	92	77	27	
20	1326	14	V	5.5	66										V	93	74	23	
21	1768	22	I	6.7	66										I	94	68	20	
22	2210	31	C	7.3	69										C	92	68	17	
23	1326	9	E	4.0	61										E	94	65	16	
24	1326	21		9.0	61											92	60	13	
25	1326	17		8.0	57											95	52	6	
26	2210	33		7.9	61											94	61	11	
27	1989	24		5.7	77	22984		.39	53							96	78	76	
28	1547	23		9.2	59											94	61	61	
29	1326	17		8.4	59											92	83	83	
30	1768	25		8.6	61											91	58	58	
31	884	9		5.7	62											90	61	61	
ARITH. MEAN	1686	22		6.95	66	17090		2.9	55							92	67	33	
STAT. MEAN		22																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 19 60 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Digested ~~Raw Sludge~~ to beds

Date	Supernatant Gals.	Lbs Per 1000 c f. Digester	pH	Total Solids %	Vol Solids %	sludge near bottom Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp °F #2	Gas Produced cu ft	Gas Wasted cu ft.	Remarks
1																89			Note — include gallons of sludge to beds
2																			
3																89			
4																			
5																90			
6																			
7	7500			10.2	53											91			
8																			
9																			
10																93			
11																			
12																			
13																			
14						20332		.19	56	94	25								
15																			
16																			
17																91			
18																			
19																			
20																			
21																			
22																91			
23																			
24																94			
25																			
26																96			
27						22984		.18	55	61	20								
28																			
29																			
30																92			
31																			
ARITH. MEAN	7500			10.2	53	21658		.18	55	77	22					92			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff E. Coli Water Maximum cu. ft.	Cl2 lbs.	Power KWH x10	AUX FUEL gas cu. ft. x 100	Remarks
1		86	64	C	57	2.46	P		1640	74	20	1	
2	.42	88	66	R	57	2.56	H		1730	71	24	1	
3	.30	80	60	R	57	2.48			1710	77	24	1	
4		77	59	C	57	2.47	M		1640	71	20	0	
5		82	60	C	56	2.53	E		1760	76	24	0	
6		82	60	C	56	2.35	T		1640	70	24	0	
7	.27	84	62	R	56	2.30	E		1680	70	20	0	
8		84	62	CL	56	2.51	R		1650	74	20	0	
9	.10	82	62	R	56	2.40			1710	72	24	0	
10		72	50	CL	56	2.35	O		1710	72	20	0	
11		80	54	C	56	2.35	U		1690	75	24	0	
12		82	56	C	56	2.42	T		1700	80	20	0	
13		82	62	C	56	2.26			1710	65	24	0	
14	.28	82	58	R	56	2.24	O		1590	25	24	0	
15		76	50	C	56	2.35	F		1600	66	24	0	
16		80	56	C	56	2.29			1730	77	20	0	
17		86	60	C	56	2.31	S		1670	72	24	0	
18		88	62	C	56	2.35	E		1650	72	20	0	
19		90	64	C	56	2.37	R		1660	75	24	0	
20	.10	86	62	R	56	2.33	V		1670	76	20	0	
21	.34	80	60	R	56	2.21	I		1610	75	20	0	
22		84	60	C	56	2.39	C		1640	74	20	0	
23		84	56	C	56	2.34	E		1620	73	24	0	
24		80	58	C	56	2.30			1700	78	20	0	
25		82	60	C	56	2.26			1680	78	24	0	
26		88	56	C	56	2.36			1750	80	20	0	
27		86	66	C	56	2.25			1720	67	20	0	
28		88	70	C	56	2.19			1720	71	16	0	
29		82	60	CL	56	2.36			1730	76	20	0	
30		88	60	C	58	2.69			1690	78	24	0	
31		90	70	C	58	2.31			1690	70	20	0	
ARITH. MEAN	.06	83	60		56	2.35			1680	72	22	.1	
STAT MEAN						2.36							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data.				
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.			Above		Below	
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	temp.	D.O.	B.O.D.	D.O.	B.O.D
1	60	123	43	88	28	138	283	52	107	62	127	260	37	76					
2	49	105	33	71	33	90	193	40	86	56	75	161	30	64	69	9.2	1.2	9.4	1.6
3	37	77	27	56	27	60	124	40	83	33	52	108	32	66	69	8.2	1.6	8.4	1.8
4	43	89	21	43	51	90	184	30	62	67	75	155	26	54					
5	37	78	30	63	19	151	318	25	53	83	142	300	17	36					
6	67	131	49	96	27	100	196	37	73	63	82	160	34	67					
7	55	106	49	94	11	115	221	50	96	57	82	157	36	69					
8	63	132	40	84	37	86	180	40	84	54	85	178	37	77					
9	60	120	40	80	33	130	260	52	104	60	94	188	35	70					
10	60	118	36	71	40	100	196	34	67	66	95	186	27	53					
11	61	120	33	55	46	96	188	40	78	58	71	139	35	69					
12	55	111	45	90	18	96	193	53	107	45	78	157	43	86					
13	55	104	45	85	18	80	151	41	77	49	67	127	36	68					
14	62	116	36	67	42	87	163	34	64	61	78	146	33	62					
15	67	131	55	107	18	110	214	48	94	56	88	172	40	78					
16	52	100	46	88	12	98	188	34	65	65	79	152	31	60	65	7.8	1.2	8.0	1.4
17	49	95	43	83	12	70	135	38	73	46	64	124	34	65	65	8.4	.8	8.8	1.4
18	61	120	46	90	23	82	161	34	67	59	66	129	28	55					
19	70	139	60	119	14	90	178	48	95	53	76	150	40	79					
20	83	161	67	130	19	71	138	54	105	24	62	120	48	83					
21	79	145	64	118	19	90	166	32	59	64	77	142	35	64					
22	73	145	60	119	18	117	233	50	100	57	87	173	40	80					
23	63	123	55	107	13	80	156	66	129	18	64	125	51	99	67	8.2	1.6	8.2	1.2
24	58	111	46	88	21	98	188	43	83	56	83	159	33	63					
25	52	98	36	68	31	78	147	41	77	47	64	121	36	68					
26	75	148	53	104	29	122	240	51	100	58	99	195	53	104					
27	98	183	58	108	41	82	153	40	75	51	64	120	32	60					
28	60	110	36	66	40	84	154	25	46	70	76	139	24	44					
29	60	118	49	97	18	78	154	31	61	60	67	132	29	57					
30	55	105	40	76	27	108	207	55	105	49	92	176	56	107	70	8.2	1.8	8.4	1.8
31	60	116	49	95	18	92	118	34	66	63	72	139	28	54					
ARITH. MEAN	61	119	45	87	26	96	188	42	82	55	80	158	35	69	68	8.3	1.4	8.5	1.5
STAT. MEAN		119		88			184		82										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 19 60

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

Supernatant transfer ~~xxxx~~ #1 to #2

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	sludge near bottom Gals.	sludge near bottom pH	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Susp. Solids Mg/l	sludge near bottom 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH	Temp. °F	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
	8.5	30													#1	#1	X 100		
1	1989	24	P	6.9	63											88	79	49	Note – include gallons
2	1768	23	H	7.8	61											90	74	32	of sludge to beds
3	1768	21		6.7	63	10387		8.9	48							91	65	24	
4	1326	17	M	7.5	61											92	66	26	
5	1768	18	E	4.4	81											91	41	29	
6	884	12	T	7.7	64											88	27	27	
7	884	14	E	8.2	70											87	80	80	
8	1547	25	R	8.2	70											87	57	14	
9	1326	17		6.8	68											90	58	0	
10	1547	21	O	7.1	68											90	61	0	
11	1989	19	U	5.0	67											92	62	0	
12	1547	18	T	6.0	69	16575		.40	56							94	62	0	
13	1547	19		5.7	74											93	64	0	
14	1768	22	O	6.5	69											97	64	0	
15	1326	17	F	5.9	78												74	74	
16	1326	17		5.9	78											93	59	59	
17	1547	13	S	4.3	70											91	64	64	
18	1326	16	E	5.8	72											90	74	74	
19	1326	15	R	5.9	71											89	55	55	
20	1547	17	V	5.3	72											88	60	60	
21	1768	19	I	5.4	70											87	47	47	
22	1768	20	C	5.7	71											85	80	16	
23	1326	14	E	5.1	72											90	65	7	
24	1105	16		7.5	69	11050		.39	49							92	71	16	
25	884	7		3.7	73												53	3	
26	2210	32		7.8	67											90	63	3	
27	1326	19		6.5	79											93	61	4	
28	1326	18		7.3	68											96	76	15	
29	1547	17		5.5	71											95	64	63	
30	1547	16		5.2	72	11492		9.2	48							92	75	75	
31	1547	17		5.2	75											91	50	50	
AR. H. MEAN	1487	18		6.2	70	12376		4.7	50							91	63	31	
STA. MEAN		19																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 19 60 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Digested ~~Raw Sludge~~ to beds

Date	Gals	Lbs Per 1000 c f Digester	pH	Total Solids %	Vol Solids %	Supernatant Gals	pH	Total Solids %	Vol Solids %	Susp Solids Mg/l x 10	5 Day B O D Mg/l x10	sludge near bottom Total Solids %	Vol Solids %	Vol Acids Mg/l	pH #2	Temp °F #2	Gas Produced cu ft	Gas Wasted cu ft	Remarks
1																			Note — include gallons of sludge to beds
2																			
3						10387		.28	50	174	45					90			
4																			
5																92			
6																			
7																			
8																			
9																			
10																93			
11																			
12						16575		.29	60	152	36								
13																96			
14																			
15																100			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24	7500			13.6	44.5														
25																94			
26																97			
27																			
28																			
29																100			
30						11492		.27	53	142	37								
31																			
ARITH. MEAN	7500			13.6	44.5	12818		.28	54	156	39					95			
STAT MEAN																			

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MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~XXXXX~~ water ~~XXXXX~~ cu. ft.	Cl_2 lbs. x10	Power KWH	AUX. FUEL Gas** cu. ft. x 100	Remarks
1		92	64	C	58	2.34	P		1680	68	20	0	P.H. meter sent in for
2		87	59	C	58	2.26	H		1700	72	20	0	repairs and has not yet
3		86	66	C	58	2.24			1720	70	20	0	been returned.
4		88	66	C	58	2.14	M		1620	28	20	0	
5		82	58	C	58	2.11	E		1660	65	20	0	
6		86	62	C	58	2.24	T		1680	70	20	0	
7		92	64	C	59	2.28	E		1720	75	20	0	
8	1.78	94	66	R	59	2.43	R		1660	71	24	0	
9		76	50	Cl	60	2.29			1760	81	24	0	
10		72	44	Cl	57	2.11	O		1730	65	20	0	
11		74	52	C	56	2.07	U		1720	65	20	0	
12		70	46	Cl	57	2.13	T		1660	70	20	0	
13		64	38	Cl	57	2.06			1710	74	20	7	
14		72	44	C	57	2.05	O		1660	73	20	3	
15		75	46	Cl	57	2.04	F		1530	41	20	2	
16		76	50	C	57	2.08			80		24	2	
17		80	44	Cl	57	2.10	S		13		20	1	
18	.94	74	56	R	57	2.04	E		16		20	4	
19	.10	74	54	R	57	2.24	R		73		20	3	
20		70	50	Cl	57	2.17	V		12		20	2	
21		72	54	Cl	57	2.13	I		12		20	1	
22		78	58	Cl	57	2.23	C		16		20	1	
23		74	60	Cl	57	2.18	E		26		20	0	
24		84	62	Cl	57	2.21			10		20	3	
25	.01	74	58	R	57	2.06			16		20	1	
26		72	50	Cl	57	2.15			16		20	1	
27		72	48	C	56	2.15			20		20	3	
28		68	42	Cl	56	2.06			35		20	4	
29	.07	72	46	R	56	2.02			101		16	4	
30		56	32	Cl	56	1.96			56		20	10	
31													
ARITH. MEAN	.097	77	53		56	2.15			857	66	20	1.7	
STAT. MEAN						2.16							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf.		Eff		Rem	Inf		Eff		Rem	Inf		Eff.		Temp.	Above Remarks		Below	
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10		B.O.D.	D.O.	B.O.D	D.O.
1	61	119	46	90	25	83	162	36	70	57	67	131	33	64	70	1.4	8.2	1.6	8.2
2	55	104	40	76	27	72	136	39	74	46	54	102	26	49					
3	64	119	54	100	16	65	121	40	74	39	68	126	35	65					
4	55	98	43	77	22	75	134	60	107	20	65	116	46	82					
5	61	107	43	76	30	100	176	33	58	67	84	148	26	46					
6	59	110	49	91	17	91	170	31	58	66	84	157	28	52					
7	52	99	33	63	37	81	154	26	49	68	60	114	18	34					
8	61	124	46	93	25	126	256	40	81	68	90	183	35	71					
9	52	100	40	77	23	66	134	60	115	10	54	104	50	96					
10	58	102	52	91	10	62	109	42	74	32	54	95	34	60					
11	60	104	48	82	20	95	164	47	81	51	80	138	41	71					
12	70	125	61	109	11	111	198	62	110	44	93	166	52	93					
13	64	110	43	74	33	84	144	50	86	41	64	110	37	64					
14	61	104	43	74	30	87	149	50	86	43	74	134	40	68					
15	65	111	33	56	49	119	202	37	63	69	104	177	27	46					
16	61	106	46	81	25	78	135	36	62	54	64	111	33	57					
17	64	111	46	80	28	81	141	28	49	65	72	115	20	35					
18	70	119	46	78	34	120	204	34	58	72	100	170	27	46					
19	62	116	49	92	21	70	131	33	62	53	57	107	28	52					
20	80	145	40	72	50	120	217	60	109	50	92	167	52	94					
21	52	93	40	71	23	110	196	45	80	59	92	164	35	62					
22	46	86	40	74	13	85	158	36	67	58	71	132	30	56					
23	61	111	46	84	25	141	257	40	73	72	124	226	37	67					
24	73	134	49	90	33	55	102	35	65	36	44	81	30	55					
25	76	131	43	74	43	113	194	25	43	78	92	158	26	45					
26	64	115	49	88	23	92	166	61	109	34	72	129	49	88					
27	55	98	33	59	40	73	130	43	77	41	58	103	34	61	62	1.2	7.2	1.2	7.4
28	58	100	49	84	16	72	124	40	69	44	62	107	26	55	60	1.4	8.8	1.8	9.2
29	110	175	64	108	42	115	194	65	109	44	110	185	48	81					
30	73	119	52	85	29	106	176	42	68	60	95	183	38	62					
31																			
ARITH. MEAN	64	113	46	82	27	92	164	43	76	51	77	138	35	62	62	1.2	8.2	1.5	8.4
STAT MEAN		114		82			162		75										

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1960

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

Transfer Supernatant #1 to #2 sludge near bottom

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Transfer Gals.	Transfer pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft.	Remarks
	8.5	30		%	%			%	%	Mg/l	Mg/l	%	%	Mg/l	#1	#1			
1	1768	14		4.1	71											91	35	35	Note – include gallons
2	1326	20		7.8	70											89	80	26	of sludge to beds
3	1326	19		5.9	86											92	52	7	
4	1768	25		7.8	69											94	64	12	
5	1326	15		5.5	73											93	53	3	
6	1326	15		5.5	73											95	74	21	
7	1768	24		6.5	73											96	74	74	
8	2210	22		5.2	72											94	60	60	
9	1768	19		5.5	70	20774		.41	49							93	89	36	
10	1326	16		5.3	80											96	59	5	
11	1768	25		8.0	64												71	8	
12	884	8		4.9	70											98	54	4	
13	884	8		4.9	70											100	29	29	
14	2210	24		5.5	72											96	77	23	
15	1326	17		6.6	71											94	66	11	
16	3536	119		12.8	93											96	39	23	
17	2210	24		5.3	73											94	86	86	
18	1326	12		4.2	77											93	70	70	
19	1768	22		6.2	73											92	52	52	
20	1768	19		5.9	70											90	42	42	
21	1326	12		4.5	70	9061		8.2	52							89	82	25	
22	1326	23		10.0	60											92	62	9	
23	1326	18		6.7	72											94	72	15	
24	1326	15		5.6	73											96	72	18	
25	1547	11		3.5	70											94	72	13	
26	1989	21		5.1	73												73	8	
27	1547	18		5.8	72											95	85	25	
28	1547	12		3.8	75	22984		.39	57							96	85	23	
29	1326	17		6.3	75											98	80	20	
30	1326	11		4.1	71												77	10	
31																			
ARITH. MEAN	1607	21		6.0	73	17606		3.0	53							94	66	26	
STAT MEAN		19																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1960 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Digested Sewage Sludge to beds

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	sludge near bottom: Gals.	sludge near bottom: pH	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Susp. Solids Mg/l x10	sludge near bottom: 5-Day B O D Mg/l x10	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — include gallons
2																			of sludge to beds
3																			
4																93			
5																97			
6																			
7																			
8																			
9						20774	.25	50		92	27								
10																92			
11																95			
12																			
13																			
14																90			
15																95			
16																			
17																			
18																			
19																			
20																			
21	7500			10.1	44														
22																			
23																			
24																87			
25																90			
26																94			
27																			
28																			
29						22984	.26	55		128	48								
30																94			
31																			
ARITH. MEAN	7500			10.1	44	21879	.255	52		110	37					93			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~XXXXX~~ water ~~XXXXX~~ cu. ft.	Cl_2 lbs.	Power KWH x10	AUX FUEL **Gas cu. ft. x 100	Remarks
1	.21	60	48	R	56	1.95			71		20	3	
2		64	38	Cl	56	1.87			83		20	4	
3		62	36	C	56	2.02			38		16	6	
4		62	40	C	56	1.99			17		20	8	
5	.06	72	42	R	56	2.02			25		20	6	
6		66	32	C	56	1.98			18		20	1	
7		60	36	C	56	1.96			55		16	5	
8		64	38	C	56	2.07			30		20	8	
9		70	36	C	56	2.07			23		16	6	
10		72	44	C	56	2.18			22		16	1	
11		76	46	C	56	1.96			103		20	2	
12		62	50	C	56	1.85			21		20	1	
13		76	52	C	56	1.88			22		16	1	
14	.72	78	56	R	56	1.98			36		20	1	
15	.01	64	50	R	57	1.90			20		20	3	
16		62	44	C	57	1.83			22		16	2	
17		66	32	C	57	1.87			41		20	5	
18		58	34	Cl	56	1.84			69		20	5	
19	.05	50	27	R	56	1.84			51		20	13	
20		46	34	Cl	56	1.77			17		16	7	
21		52	32	Cl	56	1.79			107		20	12	
22		60	40	Cl	56	1.75			23		16	16	
23		50	28	Cl	56	1.68			21		20	15	
24		44	20	C	56	1.76			28		16	15	
25	.25	50	34	R	56	1.60			29		16	13	
26		56	44	Cl	56	1.74			26		20	8	
27		56	48	Cl	56	1.73			27		16	7	
28		52	44	Cl	56	1.77			27		20	7	
29		58	42	Cl	56	1.72			29		20	6	
30		64	50	Cl	55	1.68			21		16	8	
31	.49	56	40	R	55	1.79			21		16	8	
ARITH. MEAN	.048	61	40		56	1.87			37		18.3	7	
STAT MEAN						1.86							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf.		Eff		Rem	Inf		Eff		Rem	Inf		Eff.		Temp	Above		Below	
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10		D.O.	B.O.D	D.O.	B.O.D
1	73	119	49	80	33	115	187	51	83	56	102	166	39	64					
2	79	124	33	52	58	100	157	44	69	56	85	133	34	53					
3	72	121	52	87	28	113	190	57	96	50	97	172	46	77					
4	58	97	48	80	17	98	164	52	87	47	80	133	41	68					
5	116	195	46	77	60	200	336	45	76	78	168	282	37	62	60	9.4	1.2	9.8	1.4
6	58	96	40	66	31	80	132	48	79	40	67	110	40	66	56	11.4	3.6	10.2	1.8
7	79	128	58	95	27	210	342	61	99	71	187	305	51	83					
8	64	110	55	95	14	69	119	42	72	39	64	111	39	67					
9	57	97	36	62	37	63	108	40	68	37	55	94	30	51					
10	49	89	43	78	12	100	182	50	91	50	80	146	40	73					
11	58	95	44	72	24	100	164	36	59	64	84	139	30	49	54	10.2	2.2	10.2	2.0
12	69	106	46	71	33	98	151	40	62	59	85	131	34	52	57	9.2	1.6	9.0	1.2
13	52	81	46	72	12	154	240	46	72	70	123	192	35	55					
14	52	86	40	66	23	97	160	32	53	67	79	130	23	38					
15	58	92	36	57	40	147	234	44	70	70	128	204	37	59					
16	33	50	30	46	9	60	92	35	54	42	53	81	31	47					
17	58	90	43	60	26	86	134	60	94	30	80	125	54	84					
18	52	80	24	39	54	89	136	33	50	63	80	122	29	44	54	8.8	1.8	8.8	1.8
19	55	85	52	62	6	70	108	60	92	14	58	89	50	77					
20	64	94	40	59	38	106	156	46	68	57	95	139	40	59					
21	58	86	55	82	5	86	128	46	68	47	75	112	39	58					
22	78	114	62	91	21	76	111	37	54	51	68	99	40	58					
23	73	102	33	46	55	105	147	24	33	77	90	126	23	32					
24	64	94	52	76	19	128	188	55	81	57	110	162	47	69					
25	91	121	46	61	49	210	279	51	68	76	169	224	40	53	45	11.0	2.4	11.4	2.8
26	58	84	43	62	26	118	171	43	62	64	97	141	37	54					
27	52	75	43	62	19	93	134	53	76	43	80	115	40	58					
28	76	112	60	89	21	90	133	44	65	51	76	112	35	52					
29	75	107	61	87	19	98	140	50	72	49	86	114	46	61					
30	67	94	27	38	60	130	182	45	63	65	113	158	36	50					
31	69	103	46	69	33	61	91	12	18	80	54	80	16	24					
ARITH. MEAN	65	101	45	69	29	108	168	44	69	56	93	143	37	58	54	10.0	2.1	9.9	1.8
STAT MEAN		101		70			153		71										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 19 60 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	transfer #1 to #2 Gals.	transfer #1 to #2 pH	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Susp. Solids Mg/l	sludge near bottom 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp pH #1	Temp °F #1	Gas Produced cu. ft X 100	Gas Wasted cu. ft.	Remarks
	8.5	30																	
1	1326	16		6.1	72												52	11	Note – include gallons
2	1768	23		6.8	69												72	65	of sludge to beds
3	2652	35		6.4	74											95	67	15	
4	1326	13		4.7	73											96	82	21	
5	1768	25		6.8	73											95	84	47	
6	2210	23		4.7	78												51	7	
7	1326	22		8.4	68	13260		6.8	48							92	38	15	
8	1326	19		6.9	76											94	69	13	
9	2431	30		5.8	76												67	10	
10	1547	18		5.6	75											98	64	32	
11	1326	15		5.2	76												60	21	
12	3094	35		5.4	75											94	74	24	
13	2210	29		6.3	73											96	73	35	
14	1326	18		6.7	71											96	72	2	
15	2210	38		8.6	72											99	63	0	
16	1768	16		4.4	72												70	0	
17	1768	28		7.1	80											97	52	52	
18	2431	39		7.1	80											95	70	70	
19	1326	17		6.0	74	2-530		.44	60							92	67	6	
20	2210	22		5.1	67											95	67	13	
21	1326	19		7.0	73											96	73	47	
22	1547	15		4.5	76											96	56	10	
23	1768	17		4.6	74											98	52	5	
24	1768	21		5.5	75											96	51	1	
25	1326	15		5.5	75												58	0	
26	1989	25		5.8	76											96	~7	3	
27	1989	29		7.9	65											98	67	45	
28	1326	17		6.3	74												66	14	
29	1326	22		7.3	81											94	51	3	
30	1768	17		5.2	66											96	58	0	
31	1326	20		6.6	83											94	70	0	
ARITH. MEAN	1758	23		6.1	74	18895		3.62	54							96	63	19	
STAT MEAN		21																	

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 19 60

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l X10	Supernatant 5-Day B O D Mg/l X10	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																96			Note — include gallons
2																97			of sludge to beds
3																			
4																			
5																90			
6																92			
7						13260		.59	59	303	61								
8																			
9																			
10																			
11																91			
12																92			
13																			
14																			
15																90			
16																94			
17																99			
18																			
19						24530		.37	62	256	34								
20																			
21																			
22																			
23																89			
24																90			
25																92			
26																			
27																89			
28																90			
29																94			
30																96			
31																			
ARITH. MEAN						18895		.48	60	279	47					93			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MARSHALL, MICHIGAN

MONTH NOVEMBER 19 60

MISCELLANEOUS DATA

OPERATOR R. J. Swalwell

Date	Weather: Precip Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~Plant Eff.~~ ~~XXXX~~ water MPN/100ml. cu. ft.	Cl_2 lbs.	Power KWH	AUX. FUEL **	Remarks
1	.02	43	39	R	55	1.76			20		16	11	
2	.05	44	38	R	55	1.78			21		20	27	
3	.	50	32	C	55	1.75	7.6		106		16	14	
4	.11	52	34	R	56	1.75	7.6		8		16	15	
5	.02	42	32	R&S	56	1.69	7.6		5		16	7	
6		42	20	CL	55	1.64	7.5		4		20	16	
7		40	22	C	55	1.72	7.6		54		16	14	
8	.18	42	32	R	56	1.72	7.7		12		16	8	
9	.26	46	30	R&S	55	1.72	7.6		20		20	14	
10		38	20	C	54	1.73	7.7		3		16	13	
11		38	24	C	55	1.72	7.8		10		20	14	
12		48	28	C	55	1.69	7.6		4		16	7	
13		56	34	C	54	1.64	7.6		6		16	6	
14		62	42	C	54	1.76	7.6		104		16	2	
15	.89	64	44	R	55	1.86	7.6		20		20	2	
16		50	34	C	55	1.80	7.6		15		16	8	
17		46	30	C	55	1.77	7.7		12		20	12	
18	.06	44	30	R	54	1.79	7.6		19		20	15	
19		48	32	C	54	1.73	7.6		11		16	11	
20	.01	48	32	R	54	1.68	7,5		11		20	14	
21		50	30	C	54	1.79	7.6		16		16	7	
22		56	22	C	54	1.77	7.6		81		20	7	
23		44	22	C	54	1.75	7.6		105		16	12	
24		50	28	C	54	1.64	7.5		72		20	7	
25		50	30	C	54	1.75	7.6		184		16	5	
26		60	40	C	54	1.66	7.5		69		16	4	
27	.01	56	42	R	54	1.64	7.5		52		20	4	
28	.25	64	26	R	54	1.85	7.4		93		16	12	
29	.22	30	20	[illegible]	54	1.76	7.5		85		20	18	
30		30	18	C	54	1.70	7.8		71		16	15	
31													
ARITH. MEAN	.07	48	32		55	1.73	7.6		44		18	10	
STAT. MEAN						1.73							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Receiving stream data				
	Inf.		Eff		Rem	Inf		Eff		Rem	Inf		Eff		Temp.	Above		Below	
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	x10	Mg/l	lbs. x10		D.O.	B.O.D.	D.O.	B.O.D
1	65	95	45	66	30	90	132	50	73	44	72	106	40	59					
2	76	113	67	99	12	185	274	51	76	73	177	263	46	68					
3	73	107	43	62	41	87	127	51	74	41	76	110	44	64					
4	76	111	61	89	20	85	124	45	65	47	74	108	39	57					
5	98	138	37	52	62	74	105	41	57	45	58	81	33	46					
6	60	82	46	63	23	120	164	40	54	67	100	137	35	48					
7	78	111	61	87	22	83	118	54	77	35	71	101	48	68					
8	79	113	40	57	49	131	188	51	73	61	108	155	37	53					
9	55	79	46	66	16	110	158	62	89	44	91	130	50	72					
10	86	124	43	62	50	112	162	56	80	50	97	140	59	71					
11	73	104	58	83	21	64	92	45	64	30	58	83	44	63					
12	91	128	69	97	24	103	145	54	76	48	88	124	43	60					
13	70	96	43	59	39	90	123	50	68	44	73	100	34	46					
14	55	81	46	68	16	103	151	56	82	45	85	125	44	64					
15	55	85	27	42	51	115	178	56	87	51	100	155	55	85	48	9.8	2.2	9.8	2.2
16	61	92	12	18	80	200	302	54	82	73	181	273	46	69	51	8.4	2.0	8.4	2.2
17	49	72	40	59	16	122	179	55	81	55	93	137	42	62	49	9.8		9.8	3.2
18	52	77	40	60	24	72	107	52	77	28	63	98	33	49					
19	67	96	52	75	22	77	111	34	49	56	73	105	36	52					
20	54	76	38	54	30	100	141	31	42	69	87	123	28	39					
21	59	88	40	60	32	105	156	44	66	58	94	140	40	60					
22	58	85	43	63	26	152	223	60	88	61	135	198	50	74	43	10.8	2.4	10.8	2.2
23	64	93	46	67	28	152	222	50	73	67	138	201	44	64	42	10.6	1.8	10.8	2.4
24	64	88	15	21	77	102	140	40	55	61	100	137	39	53					
25	70	102	46	67	34	122	178	37	54	70	108	158	30	44					
26	70	97	61	84	13	74	102	53	73	28	68	94	51	70					
27	88	120	58	79	34	124	171	48	66	62	108	148	41	55					
28	75	115	58	89	23	112	172	64	99	43	91	140	51	79					
29	82	120	70	103	15	98	145	75	109	24	87	128	56	82					
30	64	90	55	78	15	93	132	62	88	33	76	108	51	72					
31																			
ARITH. MEAN	69	99	47	68	32	109	157	51	73	53	94	137	43	61	46	9.9	2.1	9.9	2.4
STAT MEAN		99		69			152		74										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	transfer Supernatant #1 to #2 Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp °F #1	Gas Produced cu ft	Gas Wasted cu ft.	Remarks
	8.5	30																	
1	1768	21		5.3	76											95	51	3	Note – include gallons
2	1105	12		5.1	77	139237.1		2.4	60						7.0	97	74	28	of sludge to beds
3	2210	28	5.8	5.6	80										7.1	95	20	0	
4	1768	20	5.7	5.3	76										7.0	97	52	0	
5	1326	15		5.4	75											96	70	0	
6	1768	26	5.8	7.5	70											98	48	10	
7	2210	27	5.5	8.0	83										7.1	96	68	30	
8	2210	31	5.6	6.6	76											97	45	32	
9	1326	16	5.7	5.7	77	190067.1		3.4	55						7.0		74	23	
10	1326	15		5.3	77											96	48	24	
11	1768	24		5.6	85											94	68	25	
12	1326	13	5.8	4.4	80											96	62	24	
13	1768	15	5.9	3.9	76											96	38	3	
14	1547	22		6.6	77												60	60	
15	1547	22		6.6	77										7.1	93	60	8	
16	1768	23	5.7	5.8	80									429	7.1	90	69	8	
17	1547	11	5.8	3.2	79										7.1	94	62	17	
18	1326	17	6.0	6.4	75									395	7.1		61	21	
19	1326	20	5.6	6.9	76									389	7.1	93	45	5	
20	1989	27	5.6	6.6	74											94	54	33	
21	1768	18	6.0	4.8	78											92	62	16	
22	1326	11	6.2	3.8	77	141447.1		3.4	63					343	7.1	94	46	0	
23	1326	15	5.8	5.2	79										7.1	95	48	0	
24	2210	31		6.5	77											92	42	0	
25	1326	14	5.5	5.0	77										7.1	94	55	8	
26	1326	21	5.7	8.0	71											92	41	0	
27	1768	19	5.8	4.8	80											92	50	0	
28	3094	56	5.5	7.5	85											94	52	0	
29	1768	23	5.8	5.7	80	170177.0		3.1	65						7.0	92	54	0	
30	1547	14	5.7	4.2	78									335		95	39	0	
31																			
ARITH. MEAN	1680	21	5.8	5.7	77	160227.1		3.1	61					378	7.1	94	54	13	
STAT MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1960 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	to ~~Raw Sludge~~ beds Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x 10	5-Day B O D Mg/l x10	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																			Note — include gallons
2						139237	7.2	.32	60	202	31				7.2	92			of sludge to beds
3															7.2	93			
4															7.2				
5																95			
6																			
7															7.2	92			
8																			
9	7500		7.1	8.1	48										7.1				
10																			
11																			
12																			
13																84			
14																			
15															7.1				
16															7.2	86			
17															7.1				
18															7.1	86			
19															7.1				
20																			
21																			
22						141447	7.0	.31	63	170	21				7.0				
23															7.1				
24																84			
25															7.0				
26																85			
27																84			
28																88			
29						170177	7.1	.54	63	390	40				7.1				
30																			
31																			
ARITH. MEAN	7500		7.1	8.1	48	150287	7.1	.39	62	254	31				7.1	88			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1960

MISCELLANEOUS DATA

OPERATOR R.J. Swelwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~Manganese~~ ~~Excess~~ water MPN/100ml. cu. ft.	Cl_2 lbs.	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		32	16	C	53	1.71	7.7		55		20	19	
2		34	20	C	53	1.72	7.7		102		16	18	
3		44	26	C	53	1.66	7.7		19		16	5	
4		52	42	Cl	53	1.62	7.6		34		20	9	
5		52	40	Cl	54	1.76	7.6		18		16	8	
6	.02	42	26	R	54	1.72	7.6		120		16	12	
7		32	22	Cl	54	1.69	7.7		51		20	26	
8		26	8	Cl	53	1.70	7.7		51		16	22	
9		28	11	C	53	1.71	7.6		51		16	18	
10		32	14	Cl	53	1.65	7.5		48		20	20	
11		22	12	Cl	53	1.60	7.3		50		16	24	
12		16	0	Cl	53	1.66	7.7		53		16	25	
13		25	18	Cl	52	1.68	7.9		46		20	43	
14		36	24	Cl	52	1.70	7.7		56		16	12	
15	.11	36	20	S	53	1.68	7.6		51		20	17	
16	.01	26	16	S	53	1.68	7.5		62		16	46	
17	.01	28	12	S	53	1.63	7.7		47		16	17	
18		34	14	Cl	52	1.56	7.5		147		12	57	
19	.05	24	14	S	52	1.67	7.7		51		16	12	
20	.08	28	4	S	52	1.64	7.7		57		16	34	
21		21	-1	Cl	52	1.65	7.7		48		20	37	
22		10	-8	Cl	52	1.65	8.7		96		16	24	
23		10	-6	Cl	52	1.61	7.6		48		16	22	
24		24	2	Cl	52	1.64	7.8		46		16	20	
25		42	18	C	52	1.56	7.7		50		16	13	
26		38	12	Cl	52	1.63	7.7		82		16	19	
27		26	2	Cl	52	1.67	7.7		52		16	16	
28		30	10	Cl	52	1.66	7.7		49		20	19	
29		34	20	Cl	52	1.66	7.7		48		16	18	
30		34	22	C	52	1.65	7.7		50		16	11	
31		38	22	C	51	1.63	7.7		45		16	15	
ARITH. MEAN	.009	31	15		53	1.66	7.7		58		17	21	
STAT. MEAN						1.66							

C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1960

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	68	97	49	70	28	90	128	29	41	68	81	115	20	28	
2	76	109	61	87	20	76	109	55	79	28	61	87	44	63	
3	78	108	52	72	33	77	106	47	65	39	71	98	44	61	
4	69	93	55	74	20	86	116	38	51	56	74	100	34	45	
5	79	116	61	89	23	104	152	74	109	29	96	141	58	85	
6	70	100	58	83	17	92	132	42	60	54	78	112	34	48	
7	79	111	55	77	30	101	142	40	56	60	88	124	35	49	
8	79	112	49	69	33	100	142	47	67	53	82	116	44	62	
9	58	82	52	74	10	61	87	40	57	34	53	75	29	41	
10	85	117	61	84	28	67	92	46	63	31	65	89	39	54	
11	76	101	70	93	8	106	142	68	91	36	90	120	52	69	
12	75	104	55	76	27	91	126	54	74	41	70	97	42	58	
13	67	94	24	33	64	90	126	22	31	76	80	112	20	28	
14	77	109	64	90	17	134	190	55	78	59	118	167	47	67	
15	72	101	58	81	19	118	165	50	70	58	112	157	46	64	
16	78	109	63	88	19	201	281	50	70	75	187	261	43	60	
17	72	98	54	73	25	116	158	32	43	72	104	141	35	47	
18	104	135	52	67	50	119	155	36	47	70	97	126	34	44	
19	79	110	58	81	27	140	195	50	70	64	120	167	40	55	
20	70	95	55	75	21	71	97	61	83	14	65	89	50	68	
21	73	100	52	71	29	103	142	37	51	64	83	114	33	45	
22	80	110	62	85	23	110	151	63	86	43	88	121	53	73	
23	80	108	58	78	28	120	161	43	57	64	104	140	41	55	
24	82	112	55	75	33	86	118	40	54	54	73	100	28	38	
25	43	55	37	48	14	76	99	34	44	55	72	94	29	39	
26	88	120	52	71	41	101	137	40	54	60	91	123	36	49	
27	78	109	65	90	17	129	180	47	65	64	124	173	47	65	
28	85	118	61	84	28	124	172	47	65	62	106	147	40	55	
29	122	169	76	105	38	148	205	70	97	53	134	186	56	77	
30	80	110	61	84	24	97	134	48	66	50	78	107	37	51	
31	85	116	64	87	25	64	87	50	68	22	61	83	44	59	
ARITH. MEAN	78	107	56	78	27	103	143	47	65	52	90	125	40	55	
STAT MEAN		111		79			141		66						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 19 60

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

Date	Raw Sludge Gals. 8.5	Lbs. Per 1000 c f Digester 30	pH	Total Solids %	Vol Solids %	transfer ~~Sludge~~ #1 to #2 Gals.	pH	Total Solids %	Vol Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp pH #1	Temp °F #1	Gas Produced cu ft X 100	Gas Wasted cu ft.	Remarks
1	2210	23	6.2	4.5	80										7.0	92	49	0	Note – include gallons
2	1326	15	5.8	5.3	75											94	41	0	of sludge to beds
3	1326	13	5.8	4.8	71											94	32	0	
4	1547	20	5.5	6.1	77											96	41	0	
5	1768	20	5.8	5.1	79											93	31	0	
6	1326	18	5.6	5.7	84											93	45	0	
7	1768	28	5.8	6.9	81										7.0	94	44	0	
8	1989	20		4.6	77											94	32	11	
9	1326	39	5.3	13.4	78										7.1	92	51	12	
10	1326	18	5.7	8.3	59											93	25	0	
11	2210	26	5.9	5.1	80											92	47	0	
12	1326	16	5.7	5.1	82										7.1	93	37	0	
13	1326	17	5.9	5.8	80	22984	7.0.41	60							7.0	93	32	16	
14	1326	13	5.6	4.4	80											91	67	13	
15	1326	15	5.6	5.2	78												43	0	
16	1326	20	5.7	6.9	79											86	26	18	
17	1326	16	5.8	5.6	77											91	53	9	
18	1768	25	5.8	6.2	81											90	31	31	
19	1768	18	5.7	4.1	80											92	65	12	
20	1326	15	5.6	5.0	80											90	46	1	
21	1326	14	6.0	4.8	81										7.2		39	2	
22	1105	10	6.2	4.1	79										7.0	92	39	1	
23	1547	16		4.5	80	15028	7.0	.50	65								62	16	
24	2210	22	5.9	4.4	79											88	43	1	
25	1326	21	5.7	7.1	79											89	46	2	
26	1768	17	5.9	4.3	80										7.1	90	38	16	
27	1768	18	5.9	4.3	82											88	46	15	
28	1768	19	5.8	4.5	85											88	45	0	
29	1768	18	6.0	4.3	82											89	38	0	
30	1326	14	6.1	4.7	80											89	28	0	
31	1326	9	5.9	3.5	68											88	36	0	
ARITH. MEAN	1554	19	5.8	5.4	79	19006	7.0	.45	62						7.1	91	43	6	
STAT MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 19 60 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	to ~~raw sludge~~ beds Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1															7.1				Note – include gallons of sludge to beds
2																			
3																			
4																			
5																84			
6																			
7															7.2				
8																			
9															7.2				
10																			
11																			
12															7.1				
13						22984	7.0	.36	61	163	64				7.0				
14																78			
15																79			
16																			
17																			
18																79			
19																			
20																78			
21															7.1	81			
22						15028	7.2	.41	65	280	73				7.2				
23																80			
24																81			
25																			
26															7.1				
27																78			
28																			
29																			
30																			
31																			
ARITH. MEAN						19006	7.1	.38	63	221	69				7.1	80			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1962 MISCELLANEOUS DATA OPERATOR R.J. Swalwell

Date	Weather Precip. Inches	Weather Temp. (°F) Max.	Weather Temp. (°F) Min.	Type*	Raw Sewage Temp °F	Raw Sewage Flow MGD	pH	Grit cf/mg	Plant Eff. Water cu. ft.	Cl₂ lbs.	Power KWH X10	AUX. FUEL Gas ** cu. ft. X 100	Remarks
1		30	14	CL	52	1.59	7.3		96		16	19	
2	.01	32	22	S	52	1.70	7.2		323		20	12	
3		42	24	C	52	1.71	7.3		118		16	11	
4	.12	38	24	R	52	1.69	7.2		101		16	13	
5	.23	42	24	R	51	1.81	7.4		106		16	15	
6	.83	32	20	R&S	51	1.75	7.3		96		16	21	
7	.08	24	14	S	51	1.62	7.2		92		16	21	
8	.06	24	-2	S	51	1.72	7.5		103		16	20	
9		4	-10	CL	51	1.65	7.5		50		16	23	
10	.01	10	-8	S	50	1.65	7.6		106		20	24	
11		10	2	C	52	1.68	7.4		102		16	20	
12		22	16	CL	51	1.69	7.4		101		16	25	
13		34	22	C	52	1.66	7.3		98		16	17	
14	.58	38	30	R&S	52	1.62	7.3		115		16	18	
15		32	10	CL	51	1.73	7.4		175		16	19	
16		20	6	CL	51	1.65	7.3		93		16	19	
17		14	0	C	51	1.66	7.4		87		20	17	
18		16	-2	C	51	1.66	7.4		89		16	19	
19	.06	14	2	S	51	1.68	7.3		87		20	20	
20		28	4	CL	50	1.65	7.4		88		16	19	
21	.01	32	22	R&S	50	1.61	7.3		73		12	17	
22	.07	26	6	S	51	1.69	7.6		80		16	21	
23		20	10	CL	50	1.55	7.8		80		16	19	
24		32	16	C	50	1.60	7.5		80		16	10	
25	.16	38	16	R	51	1.64	7.4		328		20	8	
26	.26	38	18	R	49	1.79	7.4		78		16	15	
27	.01	22	12	S	50	1.66	7.3		78		20	14	
28	.08	22	12	S	50	1.58	7.1		81		16	15	
29		36	14	CL	50	1.70	7.5		90		16	16	
30		16	0	CL	50	1.68	7.5		93		16	24	
31	.06	16	6	S	50	1.68	7.7		89		16	23	
ARITH. MEAN	.08	26	11		51	1.67	7.4		109		16.1	18	
STAT. MEAN						1.67							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1962

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	73	97	64	85	12	59	78	41	54	31	51	67	41	54	
2	73	104	67	95	8	86	122	78	111	9	75	106	67	95	
3	65	92	52	74	20	95	135	56	79	41	78	111	45	64	
4	73	103	55	77	25	94	133	54	76	53	75	106	47	66	
5	64	97	52	79	19	73	110	52	79	29	53	80	47	71	
6	58	85	46	67	21	71	104	50	73	30	56	82	37	54	
7	63	85	40	54	37	92	124	35	47	62	70	95	31	50	
8	90	129	58	83	36	128	183	62	89	52	100	143	52	74	
9	77	106	50	69	35	58	80	43	59	26	50	69	37	51	
10	68	94	38	52	44	68	94	39	54	43	56	77	32	44	
11	77	108	64	90	17	130	182	74	104	43	114	160	64	90	
12	61	86	43	61	30	69	97	50	71	28	56	80	37	52	
13	69	96	33	46	52	84	117	42	58	50	67	93	33	46	
14	65	88	52	70	20	110	149	42	57	62	93	126	34	46	
15	72	104	56	81	22	84	121	56	81	33	70	101	48	69	
16	87	120	62	86	29	80	110	50	69	38	62	92	43	59	
17	85	118	67	93	21	78	108	46	64	41	67	93	45	63	
18	71	99	49	68	31	123	171	48	67	61	107	149	40	56	
19	73	102	61	85	16	84	118	58	81	40	70	98	49	69	
20	69	95	58	80	16	74	102	51	70	31	62	86	40	55	
21	81	69	36	48	56	151	202	25	44	83	130	174	17	23	
22	82	116	59	83	28	86	121	67	94	22	72	102	54	76	
23	112	144	95	123	15	120	155	74	95	38	104	134	60	77	
24	89	118	59	58	34	204	271	57	76	72	172	229	44	59	
25	65	89	58	79	11	102	140	54	74	47	81	111	43	59	
26	59	88	49	73	17	70	104	52	77	26	56	83	41	61	
27	65	90	49	68	25	60	83	37	51	38	52	72	29	40	
28	67	88	52	69	22	67	88	44	58	34	59	82	40	53	
29	94	133	69	98	27	163	231	66	94	60	142	202	50	71	
30	68	95	52	73	24	86	120	60	84	30	74	104	51	71	
31	59	83	35	49	41	64	90	46	64	28	54	76	36	50	
ARITH. MEAN	73	101	54	75	26	95	130	50	73	41	78	109	43	60	
STAT. MEAN		98		74			120		72						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1962 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Transfer Digester #1 to #2: Gals.	Transfer Digester #1 to #2: pH	Transfer Digester #1 to #2: Total Solids %	Transfer Digester #1 to #2: Vol. Solids %	Transfer Digester #1 to #2: Susp. Solids Mg/l	Transfer Digester #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp: pH #1	Temp: °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu ft.	Remarks
	8.5																		
1	1547	23	5.4	5.9	87											95	42	0	Note — Include gallons
2	1326	21		7.0	81	16354	6.9	1.8	52						6.9	96	37	0	of sludge to beds
3	1326	22	5.6	7.0	85											96	51	0	
4	1768	33	5.5	7.2	85											94	47	0	
5	1326	17	5.4	5.6	79											96	69	0	
6	1326	22	5.7	7.2	81											95	56	0	
7	1326	25	5.6	8.4	78											97	45	0	
8	1768	26	5.4	6.5	80											95	35	0	
9	1989	33	5.6	7.0	77										6.9	95	31	0	
10	1326	22	5.5	7.6	78											94	55	0	
11	1547	25	5.7	7.3	78	12597	6.9	7.8	54					626		96	42	0	
12	1547	27	5.5	7.6	82												36	0	
13	1326	16	5.4	5.7	77											94	66	0	
14	1547	26	6.0	7.0	83											92	55	0	
15	1989	27	5.4	6.3	77											94	52	0	
16	1326	20	5.5	6.7	77											96	36	0	
17	1326	20	5.5	6.9	76											96	63	0	
18	1326	19	5.5	6.8	76											95	44	0	
19	1326	17	5.9	6.0	73	13702	6.9	6.3	58					704	6.9	96	40	0	
20	1326	19	5.7	6.7	75											93	38	0	
21	1326	20	5.7	6.9	77											95	32	0	
22	1326	21	5.5	6.9	79											93	47	0	
23	1326	13	5.7	5.1	71											94	41	0	
24	1326	15	5.6	4.9	84											94	40	0	
25	1105	19	5.5	8.1	76											94	40	0	
26	1547	24	5.4	7.1	78											95	40	0	
27	1768	29	5.7	7.4	77											95	35	0	
28	1326	23	5.4	7.7	79											95	23	0	
29	1105	17	5.5	7.1	78											92	60	0	
30	1768	26	5.6	6.6	78	16575	6.9	.47	60					533	6.9	95	58	0	
31	1768	29	5.5	7.6	77											96	42	0	
ARITH. MEAN	1461	22	5.6	6.8	79	14807	6.9	4.1	56					621	6.9	95	45	0	
STAT. MEAN		23																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1962 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	To Beds					Supernatant x10					sludge near bottom x10			Temp		Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu ft.	
1																			Note — Include gallons
2						16354	7.0	.63	63	735	49				7.0				of sludge to beds
3																80			
4																82			
5																			
6																84			
7																			
8																82			
9															7.0				
10																			
11						12597	7.0	.50	59	204	37				7.0				
12																78			
13																			
14																82			
15																			
16																			
17																			
18																76			
19						13702	7.0	.55	63	343	55				7.0				
20																82			
21																			
22																82			
23																			
24																			
25																			
26																			
27																			
28																69			
29																70			
30						16575	7.0	.55	68	172	75				7.0				
31																			
ARITH. MEAN						14807	7.0	.56	63	363	54				7.0	79			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 19 62

MISCELLANEOUS DATA

OPERATOR R.J. Swalwell

Date	Weather: Precip (Inches)	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff. E. Coli. MPN/100ml.	Cl_2 lbs.	Power KWH	AUX. FUEL **Gas cu. ft. X 100	Remarks
1		16	-1	CL	50	1.66	7.5		85		16	19	
2	.12	30	8	S	49	1.68	7.5		84		16	21	
3		36	28	CL	50	1.68	7.4		77		16	14	
4		48	28	C	50	1.81	7.4		95		16	9	
5	.03	28	8	S	50	1.80	7.4		170		16	15	
6	.01	16	-2	S	50	1.75	7.3		86		20	30	
7	.02	20	-4	S	50	1.74	7.6		82		16	30	
8		28	14	CL	50	1.75	7.5		81		16	23	
9		26	-2	CL	50	1.75	7.7		82		16	12	
10	.12	20	0	S	49	1.73	7.3		80		16	18	
11	.15	24	12	S	49	1.65	7.2		77		16	25	
12		32	20	CL	50	1.75	7.5		80		16	15	
13	.02	34	20	R	50	1.78	7.5		81		16	21	
14		32	10	CL	50	1.70	7.4		89		16	18	
15	.01	38	14	S	50	1.75	7.6		217		16	15	
16		38	22	CL	49	1.73	7.5		88		16	18	
17		32	18	C	50	1.73	7.4		78		16	15	
18	.58	32	18	R&S	50	1.66	7.4		78		16	23	
19	.03	34	20	S	50	1.72	7.4		84		16	20	
20		30	20	CL	50	1.69	7.5		80		20	15	
21	.40	34	22	S	49	1.76	7.5		78		16	19	
22	.01	34	8	S	49	1.73	7.3		77		16	18	
23	.17	28	14	S	50	1.71	7.5		83		16	23	
24		28	12	C	50	1.71	7.3		72		20	15	
25	.14	44	22	R	49	1.70	7.2		78		16	15	
26		42	24	CL	49	1.88	7.4		83		16	14	
27	.01	34	22	S	50	1.83	7.6		264		20	16	
28		28	-2	CL	49	1.77	7.5		98		20	21	
29													
30													
31													
ARITH. MEAN	.065	31	13		50	1.74	7.4		97		16.7	19	
STAT. MEAN						1.73							

C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1962

PRIMARY TREATMENT DATA

OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff		Rem	Inf		Eff		Rem	Inf		Eff		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	70	97	67	92	4	106	146	50	69	53	97	134	43	59	
2	65	91	58	81	8	62	87	52	73	16	50	70	39	55	
3	71	99	52	73	27	60	84	38	53	37	52	73	31	43	
4	69	104	49	74	29	76	115	41	62	46	61	92	32	48	
5	71	107	58	87	18	83	125	58	87	30	72	108	48	72	
6	71	104	58	85	18	76	111	55	80	28	60	88	45	66	
7	65	94	47	68	28	78	113	37	54	53	63	91	31	45	
8	75	110	55	80	27	86	151	55	80	36	75	110	45	66	
9	64	93	49	72	23	55	80	30	44	45	44	64	25	37	
10	84	121	64	92	24	68	98	36	52	47	59	85	33	48	
11	62	86	43	59	31	59	81	29	40	51	51	70	25	35	
12	63	92	55	80	13	80	117	56	82	30	68	99	43	63	
13	67	99	67	99	0	75	111	59	87	21	67	99	50	74	
14	64	91	49	70	23	62	88	50	71	19	52	74	42	60	
15	88	128	58	85	35	122	178	61	89	50	106	155	49	72	
16	61	88	49	71	20	56	81	46	66	18	49	71	39	56	
17	91	131	67	96	26	90	130	47	68	48	79	114	45	65	
18	67	92	30	41	55	68	94	36	50	47	60	83	28	39	
19	76	109	55	79	28	112	160	45	64	60	100	143	40	57	
20	59	83	52	73	12	54	76	51	72	6	41	58	37	52	
21	61	90	52	76	15	88	129	50	74	43	80	118	36	53	
22	89	128	50	72	44	136	196	53	76	61	118	170	42	60	
23	71	102	50	72	30	66	94	44	63	33	59	84	40	57	
24	67	96	46	66	31	65	93	41	59	37	54	77	34	49	
25	65	92	58	82	11	81	115	51	72	37	70	99	42	60	
26	64	100	64	100	0	70	110	58	91	17	54	85	41	64	
27	73	112	65	99	11	124	190	68	104	45	109	167	55	84	
28	73	101	47	65	36	90	124	54	75	40	70	97	43	59	
29															
30															
31															
ARITH MEAN	70	101	54	78	22	80	117	48	70	38	69	99	39	57	
STAT MEAN		100		79			111		70						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 1962 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom			Temp	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. cu.	Wasted cu ft. ft. x 100	
1	1326	21		7.2	79											96	32	0	Note — Include gallons
2	1326	15		5.1	79											96	60	0	of sludge to beds
3	1326	19	5.6	6.2	82											99	47	0	
4	1768	25	5.4	6.5	79											100	37	0	
5	1326	21	5.5	7.1	79											98	51	0	
6	1326	20	5.6	6.8	79											99	50	0	
7	1326	22	5.5	7.3	82											100	11	0	
8	1326	24	5.4	8.0	80											96	68	0	
9	1105	19	5.3	7.4	81											98	51	0	
10	1105	14	5.6	5.5	79											98	49	0	
11	1326	15	5.5	4.7	84											97	12	0	
12	1326	20		6.7	80											94	44	0	
13	1326	26	5.8	8.5	81	21658	7.1	.34	61	163	40				6.9	95	43	0	
14	1547	24	5.6	6.6	81											95	61	0	
15	1768	31	5.5	7.7	79											100	46	0	
16	1105	21	5.5	8.1	82											100	68	57	
17	1547	22	5.7	6.3	81											96	50	50	
18	1547	20	5.8	5.4	85											93	35	35	
19	1547	23	5.6	6.4	82											90	51	0	
20	1326	21	5.8	6.9	82											92	44	0	
21	1326	20	5.5	6.7	80											94	45	0	
22	1326	17	5.4	5.5	83											94	25	0	
23	1326	19	5.5	6.5	78											92	65	0	
24	1326	15	5.7	4.9	82											96	46	0	
25	1105	19	5.3	8.1	76											96	55	0	
26	1547	24	5.4	6.8	80											98	45	0	
27	1768	27	5.5	7.5	71	15912	7.1	.30	58	152	41			600	6.8	97	63	0	
28	1326	17	5.4	5.9	76											100	46	0	
29																			
30																			
31																			
ARITH. MEAN	1381	21	5.5	6.7	80	18750	7.1	.32	60	157	40.5			600	6.85	96	46	5	
STAT. MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1962 — MISCELLANEOUS DATA — OPERATOR R.J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu.ft.X 10	Remarks
1		10	-2	C	49	1.66	7.6		76		16	20	
2		20	0	C	49	1.75	7.4		80		20	22	
3		26	12	C	49	1.74	7.5		73		20	21	
4	.17	32	12	S	46	1.68	7.4		74		20	24	
5		32	14	CL	48	1.77	7.4		74		16	18	
6		38	26	CL	49	1.77	7.4		92		20	17	
7		40	24	C	49	1.84	7.3		101		20	15	
8	.07	40	26	S	49	1.82	7.3		93		20	14	
9		40	30	CL	49	1.84	7.3		232		20	14	
10		42	30	C	49	1.92	7.4		88		20	8	
11	.49	46	32	R	49	2.08	7.4		94		20	12	
12	.17	42	32	R&S	49	2.19	7.3		89		20	15	
13	.02	36	28	S	49	2.18	7.3		103		20	14	
14		34	22	CL	49	2.12	7.5		100		24	16	
15	.01	36	20	S	49	2.12	7.4		93		20	19	
16		36	22	CL	49	2.13	7.5		97		20	20	
17		40	18	C	49	2.11	7.4		87		24	10	
18	.04	42	24	R	49	2.10	7.3		91		20	10	
19	.06	44	30	R	49	2.27	7.5		90		20	12	
20	.08	48	30	R&S	49	2.24	7.4		196		20	10	
21		42	30	CL	49	2.28	7.4		88		24	15	
22		38	30	CL	49	2.26	7.5		85		20	11	
23		44	32	CL	50	2.29	7.4		80		24	12	
24		48	26	C	50	2.26	7.3		90		20	7	
25		54	26	C	49	2.20	7.2		83		24	7	
26		52	24	C	49	2.29	7.4		150		20	6	
27		54	32	C	49	2.25	7.2		104		20	5	
28		66	42	C	49	2.24	7.2		97		24	5	
29	.21	74	32	R	49	2.29	7.2		264		20	3	
30		46	28	CL	49	2.20	7.3		82		24	10	
31		46	24	CL	49	2.18	7.0		78		20	19	
ARITH. MEAN	.043	42	24		49	2.07	7.4		104		20.6	13	
STAT. MEAN													

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 1962 PRIMARY TREATMENT DATA OPERATOR R.J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	79	109	52	72	34	82	113	48	66	42	73	101	43	59	
2	68	99	50	73	27	59	86	42	61	29	54	79	39	57	
3	81	117	73	106	10	103	149	52	75	50	82	119	41	59	
4	67	94	49	69	27	74	104	30	42	60	66	92	30	42	
5	66	98	49	73	26	97	144	56	83	42	85	126	48	71	
6	67	99	64	95	4	101	149	56	83	45	83	123	41	61	
7	62	95	49	75	21	128	196	70	107	45	87	133	43	66	
8	69	105	55	84	20	98	149	40	61	59	80	122	30	46	
9	65	99	43	66	34	89	136	41	63	54	77	118	34	52	
10	52	83	36	58	31	69	110	50	80	28	60	96	37	59	
11	77	133	58	100	25	100	173	56	97	44	68	118	37	64	
12	64	117	64	117	0	103	188	57	104	45	83	152	38	70	
13	85	155	69	126	19	88	160	50	91	43	56	102	45	82	
14	69	122	38	67	45	70	124	58	103	17	62	110	41	73	
15	65	115	57	101	13	84	149	55	97	35	69	122	45	80	
16	62	110	36	64	42	59	105	54	96	8	51	91	40	71	
17	77	135	52	92	33	82	144	43	76	48	57	100	29	51	
18	59	103	49	86	17	58	102	46	81	21	44	77	31	54	
19	56	106	40	76	29	83	157	31	59	63	69	130	25	47	
20	58	108	46	86	21	48	90	36	67	25	40	75	30	56	
21	59	112	57	108	3	54	103	42	80	22	44	84	36	68	
22	58	109	55	103	5	74	139	36	68	51	64	120	29	55	
23	55	105	43	82	22	54	103	41	78	24	52	99	39	74	
24	64	120	52	98	19	63	118	52	98	18	61	115	47	88	
25	61	112	41	75	33	66	121	29	53	56	62	113	29	53	
26	61	117	61	117	0	80	153	60	115	25	66	126	48	92	
27	67	126	55	103	18	63	118	42	79	33	52	98	38	71	
28	49	92	36	68	27	61	114	37	69	38	44	82	27	50	
29	73	139	46	88	37	153	292	48	92	69	115	220	39	74	
30	49	90	30	55	39	62	113	39	71	37	49	90	30	55	
31	69	126	58	106	16	66	120	28	51	58	62	113	29	53	
ARITH. MEAN	65	111	50	87	22	80	136	46	79	40	65	111	37	63	
STAT. MEAN		111		86			132		79						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR R.J. Swalwell

Date	Raw Sludge					transfer Supernatant #1 to #2						sludge near bottom			Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1326	28	5.6	9.2	80											98	30	0	Note — Include gallons
2	1326	19	5.4	6.3	81											99	56	0	of sludge to beds
3	1326	21	5.6	7.1	79											99	50	0	
4	1326	14	5.8	4.6	81												46	0	
5	1326	25	5.6	8.4	79											98	51	0	
6	1326	22	5.4	7.2	80											99	70	67	
7	1326	26		8.8	78											96	30	11	
8	1326	23	5.4	7.8	79											94	56	56	
9	1326	17	5.4	5.7	78											92	55	15	
10	1547	24	5.4	7.0	77											92	41	0	
11	1326	17	5.5	5.7	78											94	66	1	
12	2210	27	5.4	5.8	74											96	39	0	
13	1326	24	5.6	8.4	76	18564	6.9	.55	61						6.9	96	68	0	
14	1326	19		6.7	76											100	44	0	
15	1326	20		7.1	74											100	45	45	
16	1326	24		8.3	77	7072	6.9	.61	61						6.9	94	66	6	
17	1326	21	5.4	7.3	76											92	52	0	
18	1105	20	5.6	8.2	77											92	52	1	
19	1547	28	5.5	7.0	77											96	43	0	
20	1326	19	5.6	6.5	78												38	0	
21	1326	24		8.5	76											94	63	0	
22	1326	16		5.3	79												53	0	
23	1326	21	5.6	7.6	75											92	40	0	
24	1326	22	5.6	7.1	82											94	61	1	
25	1326	20	5.8	7.1	77											97	48	0	
26	2210	58	5.2	10.2	90											94	61	0	
27	1326	23	5.3	7.8	78											98	56	1	
28	1768	24	5.5	6.4	76												42	0	
29	1326	24	5.4	8.2	78	9282	6.9	.99	62						6.9	96	39	0	
30	1326	16	5.6	5.7	74												52	0	
31	1326	20	5.5	6.9	78											100	44	0	
ARITH. MEAN	1404	23	5.5	7.2	78	11639	6.9	.72	61						6.9	96	50	7	
STAT. MEAN		22																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 1962 DIGESTER AND SLUDGE DATA OPERATOR R.J. Swalwell

Date	Raw Sludge to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day BOD Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — Include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13						18564	7.0	.31	52	132	57				7.0				
14																			
15																			
16	7500		6.9	12.5	51										6.9	56			
17																70			
18																73			
19																			
20																72			
21																			
22																74			
23																77			
24																			
25																			
26																77			
27																			
28																76			
29	7500		6.9	10.0	54										6.9				
30																78			
31																			
ARITH. MEAN	7500		6.9	11.2	53	18564	7.0	.31	52	132	57				6.9	73			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Eff. water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas ** cu. ft. x 100	Remarks
1		44	22	CL	49	2.14	7.1		84		20	14	* Power was off due to a severe
2		42	20	CL	49	2.19	7.2		79		20	9	storm. Plant was bi-passed for
3		46	26	CL		2.17	7.3		83		24	10	about 7½ hrs. From 4:30 pm to 12
4		48	34	CL	50	2.14	7.3		85		20	17	midnight.
5	.23	52	40	R	50	2.17	7.3		85		24	13	
6		54	36	CL	50	2.21	7.3		85		20	24	** All gas produced is being
7		44	24	CL	50	2.11	7.3		48		20	29	vented to the atmosphere starting
8	.26	60	32	R&S	50	2.11	7.2		46		20	14	Apr. 10 due to unsafe conditions
9		46	32	CL		2.17	7.2		51		20	14	in our gas pipeing system. Until
10		48	30	CL		2.12	7.4		403		20	7	these conditions are corrected
11		56	28	C		2.11	7.3		51		24	17	there will be no metering of the
12	.33	56	30	S	50	2.12	7.3		51		20	25	sludge gas that we produce.
13	.04	40	26	S	49	2.15	7.4		40		24	30	
14		42	24	CL	50	2.12	7.2		40		20	22	
15		42	22	CL	50	2.02	7.1		39		24	14	
16		46	36	C	51	2.13	7.2		56		20	20	
17	.12	48	34	R	50	2.13	7.2		53		20	30	
18		56	30	C		2.11	7.5		298		24	24	
19		44	28	CL	50	2.09	7.1		73		20	27	
20		60	32	C		2.10	7.3		100		20	21	
21		70	48	C	50	2.07	7.2		26		20	10	
22	.06	74	38	R	51	2.05	7.1		30		20	13	
23		54	32	C		2.14	7.2		47		20	15	
24		70	48	C	50	2.10	7.2		63		20	1	
25		80	52	C	52	2.10	7.1		105		20	2	
26		82	54	C		2.11	7.2		62		20	1	
27		84	62	C		2.11	7.3		52		20	1	
28	.37	80	52	R	52	2.18	7.2		52		16	1	
29		76	54	C	52	2.06	7.1		59		20	1	
30	.30	86	56	R	54	*1.54	7.1		365		16	1	
31													
ARITH. MEAN	.057	58	39		50	2.10	7.2		90		20.5	14	
STAT. MEAN						2.12							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 1962 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Receiving Stream Data				
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		temp	above		below	
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10		D.O.	B.O.D.	D.O.	B.O.D.
																Remarks			
1	81	144	55	98	32	93	166	30	53	68	73	130	26	46					
2	58	106	36	66	38	94	172	42	77	55	63	115	37	68					
3	77	139	77	139	0	72	130	53	96	26	53	96	42	76	41	12.4	6.4	11.4	4.6
4	58	103	55	98	5	67	119	62	110	7	57	61	49	87	44	11.4	2.4	12.2	3.2
5	58	105	55	100	5	68	123	40	72	41	54	98	37	67	43	10.4	2.4	10.4	2.6
6	58	107	49	90	16	79	145	51	94	35	63	116	42	77					
7	69	121	61	107	12	85	150	43	76	49	78	137	39	69					
8	81	143	58	102	28	129	227	44	77	66	106	187	33	58					
9	64	116	52	94	19	94	170	47	85	50	80	145	41	74					
10	97	172	43	76	56	105	186	35	62	69	79	140	19	44	48	11.8	2.8	12.2	3.6
11	111	195	36	63	68	276	486	40	70	86	213	375	24	42	46	10.4	1.8	10.8	2.0
12	65	115	43	76	34	68	120	32	57	53	53	94	23	41	46	9.6	1.8	9.8	2.2
13	69	124	43	77	38	86	154	42	75	51	68	122	34	61					
14	77	136	65	115	16	88	156	60	106	32	78	138	48	85					
15	81	136	49	82	40	131	220	35	59	73	113	190	25	42					
16	84	150	58	103	31	99	176	51	91	49	78	139	40	71					
17	46	82	33	59	28	92	164	25	46	73	66	117	18	32	44	11.0	2.4	11.2	2.8
18	116	204	65	114	44	164	289	53	93	68	126	222	38	67	45	10.4	2.0	10.8	2.2
19	85	148	64	111	25	120	209	62	108	48	92	160	49	85	47	10.2	2.4	10.6	2.6
20	65	114	58	102	11	72	116	60	105	17	60	105	56	98					
21	64	111	55	95	14	66	114	46	80	30	58	100	39	67					
22	73	125	52	89	29	82	140	38	65	54	68	116	35	60					
23	60	107	28	50	53	72	128	26	46	64	62	110	21	37					
24	61	107	49	86	20	60	105	32	56	47	49	86	27	47	43	9.8	2.6	10.0	2.6
25	69	121	61	107	12	67	117	55	96	18	56	98	45	79	57	10.4	2.0	11.0	2.6
26	73	128	49	86	33	78	137	35	62	55	64	113	31	55	58	8.8	1.6	9.0	2.0
27	61	107	52	92	14	76	134	51	90	33	60	106	43	76					
28	69	126	61	111	12	107	195	56	102	48	72	131	43	78					
29	69	119	49	84	29	63	108	35	60	44	50	86	25	42					
30	61	78	61	78	0	72	92	50	64	31	72	92	46	59					
31																			
ARITH. MEAN	72	123	52	92	25	94	165	43	78	48	71	131	36	63	47	10.6	2.6	10.8	2.8
STAT. MEAN		122		91			150		78										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft. X 100	Remarks
1	1547	20	5.7	5.8	78												67	0	Note — Include gallons
2	1326	27	5.6	9.2	77											94	55	0	of sludge to beds
3	1547	27	5.5	8.5	73											94	33	0	* Scum
4	1326	23		8.6	71												45	45	pumped
5	1326	24	5.4	8.9	71											90	52	52	with
6	1326	26	5.5	9.8	72	17680	7.0	.31	62	56	52				6.9	88	50	50	sludge
7	1326	13	5.6	4.5	75											86	45	45	
8	1768	30	5.6	8.1	74												74	74	** See
9	1326	18	6.1	6.2	75											83	46	46	remarks
10	1768	32	5.8	8.8	73											82	14	14	on page
11	1326	19	5.4	7.4	73											80	**		one
12	1326	25	5.6	9.2	72											81			
13	1326	28	5.5	10.0	75											83			
14	1326	14	5.7	4.5	83											84			
15	1326	16		5.5	77											84			
16	1326	20	5.5	7.4	75											80			
17	1326	23	5.5	8.4	74											81			
18	1326	13	5.6	4.5	78											81			
19	1326	20	5.7	7.0	77	15028	7.0	.38	64	261	58				6.9	82			
20	1326	28	5.5	10.0	75											82			
21	1326	14		4.9	78											84			
22	1768	24	5.7	6.0	80											83			
23	1326	15	5.5	5.7	72														
24	1547	22	5.6	6.7	77											82			
25	*1989	60	5.4	11.5	93											81			
26	1547	23	5.7	6.6	79											80			
27	1105	11	5.5	7.6	72											79			
28	1326	23	5.5	8.1	76											78			
29	1326	18	5.6	6.6	72											77			
30	1326	22	5.6	8.1	74											77			
31																			
ARITH. MEAN	1414	23	5.6	7.5	76	16354	7.0	.35	63	158	55				6.9	83	48	47	
STAT. MEAN		22																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1962 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas ** cu. ft. x 100
1	1.11	66	44	R		2.29	7.1		70		20	2
2	.85	50	38	R	52	2.49	7.1		37		24	44
3		70	50	C	52	2.47	7.3		21		24	40
4		78	48	C	51	2.47	7.2		27		24	38
5		80	60	CL	52	2.39	7.1		17		20	39
6		68	36	CL	53	2.25	7.2		17		20	39
7	.03	64	44	R	52	2.33	7.2		28		24	38
8		64	40	CL	52	2.29	7.2		18		24	41
9	.06	60	40	R	52	2.22	7.2		16		20	41
10		64	46	C		2.12	7.2		20		20	40
11		70	46	CL		2.27	7.1		284		24	43
12	.18	66	50	R	52	2.22	7.1		30		20	40
13		84	60	C	52	2.20	7.2		25		20	52
14		88	66	C	54	2.37	7.3		30		20	8
15		90	62	C		2.33	7.1		70		20	1
16		92	64	C		2.37	7.2		1100	*67	24	1
17		94	64	C		2.34	7.1		1926	67	20	1
18		94	64	C	56	2.37	7.1		1942	67	24	1
19		90	70	C	54	2.30	7.1		1700	67	20	1
20		80	52	C	54	2.22	7.2		1730	67	20	1
21		72	50	C	54	2.12	7.1		1790	67	20	2
22		82	62	C	54	2.20	7.1		1700	67	20	1
23		84	60	CL	54	2.23	7.1		1660	67	24	1
24		68	48	CL		2.12			1280	57	20	1
25	.05	80	52	R		2.14	7.1		1750	70	20	1
26	.03	60	46	R	53	2.09	7.2		2100	69	20	1
27	.07	74	46	R	53	2.08	7.1		1730	64	20	1
28		82	60	CL	55	2.23	7.1		2000	74	24	4
29	.06	72	64	R		2.23	7.2		1810	74	20	4
30	.01	84	66	R		2.08	7.2		1780	62	20	5
31	.11	84	50	R	54	2.21	7.0		1950	80	20	4
ARITH. MEAN	.08	76	53		53	2.26	7.2		924	68	21.3	17
STAT. MEAN						2.26						

Remarks

* Chlorine scales put in service on the 24th. Loss in weight from the 16th to the 24th averaged 67 lbs./day.

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1962

PRIMARY TREATMENT DATA

OPERATOR Robert Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	126	241	43	82	66	300	573	44	84	85	210	401	36	69	
2	102	212	49	102	52	218	453	58	121	73	144	300	40	83	
3	65	134	55	113	15	108	222	64	132	41	86	177	53	109	
4	65	134	43	89	34	76	157	36	74	53	61	126	32	66	
5	61	121	58	115	5	71	141	50	100	30	59	117	45	90	
6	54	102	24	45	56	58	109	26	59	55	45	85	20	38	
7	68	132	52	101	24	92	178	46	89	50	70	136	34	66	
8	77	147	52	99	33	78	149	38	73	51	68	130	32	61	
9	73	125	64	118	12	92	170	49	91	46	74	137	39	72	
10	77	136	73	129	5	72	127	62	110	15	55	97	46	81	
11	61	115	55	104	8	72	136	46	87	36	60	113	41	77	
12	65	120	61	113	6	66	122	59	109	11	55	102	48	89	
13	45	82	36	66	20	65	119	27	49	59	48	88	19	35	
14	68	135	64	127	6	72	143	60	110	17	56	102	47	86	
15	56	109	51	99	9	56	109	42	81	25	48	93	35	68	
16	64	127	58	115	9	78	154	53	105	32	60	119	40	79	
17	52	101	49	96	6	62	121	48	94	23	47	92	36	70	
18	49	97	45	89	8	62	123	41	81	34	53	105	33	65	
19	61	117	55	106	10	63	121	46	88	27	56	108	39	75	
20	77	142	46	85	40	90	167	37	68	59	75	139	30	56	
21	85	140	52	92	39	112	198	40	71	64	94	166	33	58	
22	73	134	52	95	29	93	170	54	99	42	69	126	36	66	
23	81	151	64	119	21	145	270	67	125	54	130	242	56	104	
24	73	121	58	103	21	100	177	59	104	41	78	138	43	76	
25	61	109	40	71	34	68	121	33	59	52	55	98	24	43	
26	73	121	55	96	25	127	221	37	64	71	107	186	27	47	
27	51	88	40	69	22	100	173	31	54	69	83	144	28	48	
28	68	126	68	126	0	90	167	67	125	26	66	123	50	93	
29	61	113	49	91	20	53	99	43	80	19	45	84	35	65	
30	61	106	43	74	30	70	121	31	54	56	57	99	25	43	
31	65	120	53	98	19	78	144	76	140	3	63	116	62	114	
ARITH. MEAN	68	128	52	98	22	93	176	47	89	43	73	138	38	71	
STAT. MEAN		125		98			150		90						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

transfer supernatant #1 to #2

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft.	Remarks
1	1326	24	5.5	8.9	72											76			Note — Include gallons
2	1326	18	5.4	6.6	73											75			of sludge to beds
3	1768	29	5.4	8.4	70	20332	6.9	1.1	63						6.9	80			* Gas
4	1326	19	5.5	7.4	69											85			system
5	1326	17	5.4	6.2	73											90			put back
6	1326	21	5.5	7.7	71											95			into
7	1326	19	5.4	7.6	67											97			service.
8	1326	18	5.5	7.5	64											98			
9	1326	21	5.4	7.9	69														
10	442	2	5.3	2.4	71											98			
11	1768	29	5.4	8.9	66											96			
12	1326	18		9.2	51											95			
13	1326	19	5.5	7.2	70											94			
14	884	11	5.4	6.8	64											93			
15	884	18		11.2	65											92			
16						15912	6.9	4.1	60						6.9	92			
17	884	13	5.2	8.4	64											91			
18	1768	31	5.0	10.0	61											90			
19	1768	23	5.4	5.6	83											88	*26	0	
20	1768	30		9.2	64											90	25	〃	
21	1326	22	5.3	7.9	74											90	82	〃	
22	1326	26	5.3	10.0	68											98	32	〃	
23	1326	26	5.2	9.9	69												33	〃	
24	1326	21		8.1	68												83	〃	
25	1326	23		8.8	69											100	38	〃	
26	1768	26	5.4	7.3	71												72	〃	
27	1326	20	5.5	7.6	71											96	70	〃	
28	884	14	5.2	7.6	71											95	40	40	
29	884	15		9.0	68											94	57	57	
30	1326	26	5.1	10.1	69											92	49	49	
31	1326	25		9.6	69										6.9	52	52	52	
ARITH. MEAN	1311	21	5.3	8.1	69	17533	6.9	2.0	64						6.9	91	50	50	
STAT. MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.3
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1962 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	Digested sludge to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant x10: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom x10: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	Temp. °F	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — Include gallons
2																			of sludge to beds
3						20332	7.1	.28	59	96	58				7.1				
4																			
5																			
6																			
7																			
8																74			
9																78			
10																			
11																80			
12																84			
13																89			
14																94			
15	9950		10.2	59		5962	7.0	.31	64	100	60				7.0				
16																			
17																			
18																			
19																			
20																			
21																			
22																86			
23																86			
24																87			
25																			
26																			
27																94			
28																98			
29																			
30																			
31						16354	7.0	.31	68	103	61				7.0				
ARITH. MEAN	9950		10.2	59		14216	7.0	.31	64	100	60				7.0	86			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas ** cu. ft. x 100	Remarks
1		68	46	CL	90	2.15	7.2		2040	91	20	10	
2		70	44	C	96	2.07	7.0		1640	72	20	7	
3		78	56	CL	94	2.01	7.0		1380	69	20	6	
4	.45	88	64	R	92	2.20	7.2		1770	78	20	7	
5		78	60	CL	90	2.19	7.1		1820	72	24	7	
6		80	46	C	96	2.15			2000	73	20	6	
7		82	52	C	100	2.12	7.1		2140	72	20	7	
8		86	64	CL	99	2.14	7.1		1910	72	20	6	
9	1.06	84	64	R	96	2.28	7.1		1900	73	20	6	
10	.08	78	64	R	95	2.22	7.1		1780	80	20	7	
11	.01	82	52	R	92	2.31	7.1		1750	83	20	4	
12		70	50	C	91	2.12	7.1		2110	64	20	7	
13		76	56	C	98	2.07	7.1		1330	15	20	6	
14		80	50	C	102	2.08	7.2		1770	70	20	5	
15		90	54	C	106	2.14	7.1		1860	70	20	5	
16		88	62	C	98	2.08	7.1		1840	63	20	7	
17		94	66	C		2.03	7.1		1820	70	20	6	
18	.01	94	56	R	94	2.20	7.0		1700	75	20	6	
19		72	48	CL	95	2.05	7.1		1580	62	20	6	
20		80	54	C	98	2.04	7.1		1790	70	16	6	
21	.03	88	62	R	98	2.05	7.2		1330	75	20	6	
22	.03	88	66	R		2.13	7.1		1410	85	16	6	
23	.66	88	58	R	102	2.15	7.1		1305	85	20	7	
24		86	56	C		2.05	7.1		1305	62	20	6	
25		88	60	C	98	2.17	7.1		1770	71	16	8	
26		82	50	C	96	2.04	7.1		1740	70	20	7	
27		92	54	C	94	2.05	7.3		1770	70	20	6	
28		94	64	C	93	1.96	7.2		2120	74	20	7	
29		90	68	CL	92	2.02	7.2		1910	81	20	6	
30	.03	90	62	R	90	1.98	7.2		1900	84	20	7	
31													
ARITH. MEAN	.08	33	57		96	2.11	7.1		1750	72	19.7	6	
STAT. MEAN						2.11							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 1962 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	55	98	49	89	11	50	90	37	76	26	45	81	37	76	
2	70	121	64	111	9	72	125	54	93	25	64	111	51	88	
3	89	150	33	55	63	101	170	33	55	67	71	119	21	35	
4	61	112	61	112	0	76	139	52	95	32	62	113	44	81	
5	68	124	40	73	41	75	137	30	55	60	65	119	29	53	
6	58	104	46	82	21	80	143	39	70	51	33	59	31	55	
7	60	106	48	85	20	76	135	70	129	8	65	115	58	103	
8	52	93	52	93	0	64	115	51	91	20	49	88	42	75	
9	55	105	43	82	22	84	160	51	97	39	69	131	40	76	
10	69	128	40	74	42	84	155	22	41	74	60	111	16	30	
11	80	154	49	95	39	97	187	30	58	69	80	154	28	54	
12	61	108	52	92	15	80	142	47	83	41	63	112	43	76	
13	57	99	53	92	7	68	118	31	54	54	52	90	20	35	
14	55	95	45	78	20	71	123	40	69	44	60	104	33	57	
15	55	98	43	77	22	67	120	26	47	61	62	111	27	48	
16	64	111	53	92	17	75	130	45	78	40	66	114	38	66	
17	69	117	69	117	0	83	140	51	86	39	74	125	41	69	
18	65	119	55	101	15	70	128	39	71	44	54	99	36	66	
19	73	125	58	99	21	82	140	47	80	43	71	121	43	74	
20	52	88	49	83	6	62	105	45	77	27	51	87	35	60	
21	61	105	43	74	30	81	139	47	80	42	63	108	38	65	
22	102	182	40	71	61	161	287	39	69	76	124	221	28	50	
23	51	91	40	72	22	188	337	94	168	50	142	254	73	131	
24	106	181	52	89	51	117	200	35	60	70	97	166	30	51	
25	100	181	93	168	7	77	139	33	60	57	64	116	27	49	
26	144	245	58	99	60	159	270	35	60	78	131	223	31	53	
27	61	104	49	84	19	57	97	30	51	47	47	80	25	43	
28	61	99	61	99	0	51	83	42	68	18	40	65	31	51	
29	58	97	46	77	21	60	101	32	54	47	52	87	28	47	
30	65	107	52	86	20	62	102	29	48	53	51	84	24	40	
31															
ARITH. MEAN	69	122	51	90	23	84	149	42	74	47	68	119	35	63	
STAT. MEAN		110		88			142		72						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant transfer #1 to #2: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	Supernatant: Susp. Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp.: pH #1	Temp.: °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft. X 100	Remarks
1	1326	15	5.4	5.4	75											90	65	8	Note — Include gallons of sludge to beds
2	1326	16	5.5	5.8	72											96	52	1	
3	1326	17		6.5	68											94	31	25	*Waste gas meter out of service June 12-24.
4	1768	23	5.1	5.4	84											92	47	47	
5	1326	18	5.4	6.5	74											90	72	1	
6	1326	26	5.2	10.8	65											96	60	0	
7	884	10	5.2	5.8	71											100	32	13	
8	1326	15	5.5	7.8	52	7956	7.1	.87	68						7.1	99	64	18	
9	1326	18		6.2	76											96	42	32	
10	1768	23	5.6	5.5	73											95	16	16	
11	1547	61	4.9	14.5	96											92	0	0	
12	1547	24	5.5	7.8	71											91	82	1	
13	1768	27	5.3	7.3	72											98	58	*0	
14	1326	22	5.4	8.3	71											102	63	0	
15	1768	33	5.3	7.0	96	16354	7.1	1.3	64						7.1	106	30	0	
16	1326	11		3.8	80											98	20	0	
17	1326	14		5.2	70												10	0	
18	1326	15	5.6	5.8	71											94	30	0	
19	1326	19	5.6	7.0	72											95	41	0	
20	1326	23	5.5	7.4	74											98	30	0	
21	1326	20		7.2	74											98	25	0	
22	1326	16	5.6	5.6	78												68	0	
23	1326	28	5.5	9.8	76											102	28	0	
24	1326	22	5.6	8.3	70												20	0	
25	1768	26	5.3	6.2	82											98	44	44	
26	1326	19	5.4	7.3	69											96	51	51	
27	1326	21	5.4	7.9	71											94	42	42	
28	1547	21	5.5	6.7	73											93	61	61	
29	884	11	5.5	6.2	73	17900	7.1	1.3	62						7.1	92	51	51	
30	1326	20	5.5	7.1	73											90	42	42	
31																			
ARITH. MEAN	1393	21	5.4	7.1	74	14070	7.1	1.16	65						7.1	96	43	15	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Digested ~~sludge~~ to beds — Supernatant x 10 x10 — sludge near bottom — Temp. — Gas

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	Remarks
1																			Note — include gallons of sludge to beds
2																90			
3																94			
4																			
5																			
6																			
7																			
8	6975			12	52										7.0	94			
9																			
10																			
11																			
12																			
13																			
14																			
15						16354	7.2	.36	68						7.2				
16																92			
17																92			
18																92			
19																			
20																			
21																			
22																90			
23																			
24																92			
25																92			
26																			
27																			
28																			
29						17900	7.5	.35	66	340	49				7.5				
30																			
31																			
ARITH. MEAN	6975			12	52	17127		.355	67	340	49				7.3	92			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas** cu. ft. x 100	Remarks
1		84	62	CL	57	1.80	7.1		1830	83	20	6	
2	.84	68	58	R		2.06	7.1		1770	70	20	6	
3		76	56	CL	56	2.00	7.2		1810	70	20	6	
4		84	62	C	56	1.91	7.1		1770	62	20	6	
5		90	60	C	56	2.05	7.2		1710	70	20	6	
6		92	64	CL	57	2.09	7.2		1770	68	20	0	
7		98	70	C	56	2.05	7.1		1750	63	20	17	
8	.16	88	58	R	57	1.96	7.0		1700	62	20	7	
9		78	50	C		1.99	7.2		2070	68	20	14	
10		88	64	C	57	2.00	7.2		1800	65	20	10	
11	.81	92	62	R	57	2.09	7.3		1800	82	20	8	
12		84	56	C	57	2.02	7.3		1780	70	20	9	
13	.03	84	64	R	57	2.04	7.3		1790	76	20	1	
14	.02	76	54	R	57	2.00	7.4		1740	54	20	0	
15	.04	74	56	R	57	1.93	7.3		1650	69	16	0	
16		84	60	C	57	2.07	7.3		1720	71	20	0	
17		86	56	CL	56	2.00	7.3		1660	83	24	3	
18		82	54	C	57	1.94	7.2		2090	73	20	4	
19	.04	88	66	R	57	1.91	7.0		2030	72	20	4	
20	.54	84	62	R	58	2.06	7.2		1790	74	20	4	
21		78	54	C	58	2.00	7.1		1640	73	16	6	
22	.96	84	56	R	56	1.97	7.2		1750	73	20	5	
23		74	54	CL	57	2.01	6.9		1670	77	20	4	
24	.03	82	64	R	57	2.02	7.2		1680	77	16	4	
25		80	64	CL	57	2.00	7.2		1700	77	20	4	
26		70	48	C	56	1.90	7.3		1830	77	20	4	
27		78	56	C	56	1.98	7.2		1780	77	20	4	
28	.04	78	60	R	56	1.90	7.2		1670	69	20	4	
29		84	58	CL	56	1.81	7.2		1650	70	16	5	
30		82	58	C	58	2.06	7.2		1910	76	20	6	
31		78	54	C	57	1.93	7.3		1860	72	24	5	
ARITH. MEAN	.11	82	59		57	1.99	7.2		1780	72	19.7	5	
STAT. MEAN						1.99							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 19 62

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	
1	102	153	73	110	28	161	242	45	68	72	134	201	34	51	
2	65	112	65	112	0	87	150	70	120	20	63	108	53	91	
3	58	97	43	72	26	185	309	83	139	55	154	257	64	107	
4	126	200	81	130	36	71	113	51	81	28	53	84	37	59	
5	73	125	55	94	18	79	135	45	77	43	64	109	42	72	
6	85	148	69	120	19	104	181	55	96	53	97	169	53	92	
7	114	195	81	139	30	84	144	52	89	38	59	101	30	51	
8	54	88	52	85	4	138	225	75	122	54	115	187	71	116	
9	76	126	53	88	30	97	161	54	90	44	78	129	42	70	
10	61	102	52	87	15	71	119	39	65	45	56	94	31	52	
11	61	106	52	90	15	107	186	46	80	75	77	134	34	59	
12	70	118	52	87	26	137	230	41	69	70	120	202	35	59	
13	89	151	36	61	60	100	170	32	54	68	90	153	37	63	
14	61	102	52	87	15	73	122	40	67	45	66	110	36	60	
15	57	92	24	39	58	101	163	29	47	71	92	148	28	45	
16	64	111	64	111	0	84	145	52	90	26	64	111	40	69	
17	77	129	64	107	17	116	194	53	89	54	97	162	44	73	
18	61	99	49	79	20	108	175	52	84	52	83	134	38	62	
19	69	110	55	87	20	102	162	53	84	48	80	127	38	60	
20	49	83	36	62	29	70	120	29	50	59	55	95	23	40	
21	53	89	37	62	30	87	145	35	58	60	74	124	32	53	
22	73	120	40	66	44	90	148	28	46	69	70	115	23	38	
23	56	94	49	82	13	83	139	44	74	47	65	109	33	55	
24	61	102	61	102	0	110	185	47	79	57	100	168	39	66	
25	69	115	49	82	29	82	137	35	58	57	70	117	28	47	
26	80	126	61	96	24	79	125	46	73	42	64	101	36	57	
27	81	134	58	96	28	76	125	48	79	37	62	102	38	63	
28	102	161	52	82	49	97	153	36	57	63	86	136	36	57	
29	65	101	43	67	34	135	211	28	44	79	118	184	22	34	
30	64	110	58	100	9	84	144	39	67	54	69	119	33	57	
31	73	122	53	85	30	91	147	51	82	44	76	122	41	66	
ARITH. MEAN	73	120	54	89	24	100	165	46	77	53	82	136	38	63	
STAT. MEAN		115		89			158		75						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	transfer Digester #1 to #2: Gals.	transfer: pH	transfer: Total Solids %	transfer: Vol. Solids %	transfer: Susp. Solids Mg/l	transfer: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft. X 100	Remarks
1	884	14		8.5	68											89	71	9	Note — Include gallons of sludge to beds
2	2210	32		7.3	71											98	64	1	
3	1326	23		8.6	71												67	0	
4	1326	14		5.2	70											101	45	17	
5	1326	19	5.4	6.7	75												53	33	
6	1326	25		8.7	75											96	66	66	
7	884	12	5.6	6.8	73											95	41	41	
8	1326	15		5.8	71											94	41	41	
9	1326	19		7.2	72											92	51	51	
10	1326	19	5.3	7.0	73											92	25	25	
11	1768	33		9.2	72											90	66	5	
12	1326	30	5.2	9.0	71											96	27	1	
13	1326	15	5.4	5.5	74											96	30	3	
14	1326	18		7.2	67											96	66	1	
15	1326	15	5.4	5.4	73											94	68	1	
16	2210	16	5.3	3.1	81											102	68	2	
17	884	12		6.6	73	22100	6.9	4.2	56						6.9	104	46	40	
18	1326	26	5.2	10.0	69											100	56	56	
19	884	15	5.2	8.5	72											98	32	32	
20	1326	21	5.3	7.4	77											96	42	42	
21	1326	20	5.2	6.9	76											94	72	18	
22	1768	24	5.1	6.4	75											93	61	2	
23	1768	26	5.2	7.0	75											99	63	2	
24	1326	17	5.3	6.3	73											98	27	27	
25	884	17	5.3	9.5	71											96	59	59	
26	1326	23	5.3	8.4	73											94	32	32	
27	1326	20	5.2	6.9	76											92	62	5	
28	1326	15	5.4	4.8	81											98	66	2	
29	1326	16	5.3	5.5	77											95	43	17	
30	884	17	5.4	8.9	78											96	56	55	
31	1768	27	5.3	7.1	75											95	50	50	
ARITH. MEAN	1355	20	5.3	7.1	74	22100	6.9	4.2	56							96	52	24	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 1962 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Digested to beds

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Supernatant Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day BOD Mg/l	sludge near bottom Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																			Note — Include gallons
2																			of sludge to beds
3																92			
4																			
5																94			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																90			
15																94			
16																			
17	7500		7.0	6.8	54	14600	7.3	.42	66	130	31				7.3				
18																			
19																			
20																			
21																92			
22																96			
23																			
24																98			
25																			
26																			
27																			
28																92			
29																98			
30																			
31																			
ARITH. MEAN	7500		7.0	6.8	54	14600	7.3	.42	66	130	31				7.3	94			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min.	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	Gas ** cu. ft. x100	Remarks
1		80	50	C	57	1.96	7.2		1990	76	20	4	
2		84	60	C	57	1.91	7.2		1990	70	20	5	
3		90	66	C	57	2.00	7.2		1850	73	20	5	
4		90	62	C	58	1.96	7.1		1780	69	20	4	
5	.32	88	64	R	58	1.88	7.3		1300	70	16	4	
6	.74	78	58	R	59	2.10	7.2		1760	72	20	4	
7		86	62	C	57	2.06	7.2		1800	75	20	4	
8	.02	86	54	R	58	2.00	7.2		1790	70	20	5	
9		78	48	C	57	1.95	7.3		1770	72	20	4	
10		82	50	C	57	1.91	7.4		2170	70	20	1	
11		84	60	C	56	1.93	7.5		1750	69	16	0	
12	.15	82	58	R	56	1.91	7.3		1690	74	20	0	
13		68	56	CL	58	1.94	7.2		1780	*70	20	0	
14		78	46	C	56	1.90	7.2		1730	*70	20	0	
15		76	58	CL	57	1.92	7.3		1700	*70	20	0	
16		84	54	CL	57	1.93	7.1		1800	*70	20	0	
17		78	46	C	57	1.87	7.4		1800	*70	20	3	
18		82	58	C	57	1.86	7.2		1680	*70	20	3	
19	.12	88	64	R	57	1.89	7.2		1630	60	16	4	
20	.03	88	58	R	59	2.03	7.2		1820	60	20	3	
21		82	56	C	57	1.97	7.3		1800	77	20	1	
22		84	56	C	57	1.94	7.2		2170	72	20	3	
23		90	62	C	57	1.90	7.1		1830	68	20	3	
24		92	70	C	58	1.96	7.3		1960	71	20	2	
25	.23	78	62	R	59	1.94	7.1		1820	71	20	4	
26		74	50	CL	58	1.82	7.0		1740	73	20	3	
27		87	57	C	58	1.94	7.1		1700	77	20	0	
28		88	60	C	58	1.84	7.2		1730	71	20	0	
29		88	58	C	58	1.93	7.2		1715	71	20	4	
30		88	66	C	58	1.89			1715	70	16	3	
31	.34	80	64	R	58	1.99			1730	70	20	3	
ARITH. MEAN	.036	83	58		57	1.94	7.2		1785	71	19.5	2.5	
STAT. MEAN						1.94							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1962 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	76	124	55	90	28	75	122	54	88	28	64	104	47	77	* No samples taken.
2	65	103	58	92	11	117	186	45	72	62	95	151	30	48	Samples used are 24 hr.
3	58	96	52	87	10	75	125	46	77	39	65	109	42	70	composits collected by
4	85	139	73	119	14	112	183	52	85	54	77	126	45	73	automatic samplers. The
5	77	110	52	82	36	97	152	33	52	66	88	138	27	42	effluent samples contain
6	72	126	49	86	32	121	212	33	58	73	94	165	24	42	supernate while the raw
7	69	119	49	83	29	120	206	30	52	75	92	158	24	41	does not.
8	69	115	58	97	16	97	162	41	68	58	82	137	35	58	
9	69	112	55	90	20	129	210	41	67	68	115	187	35	57	
10	58	92	55	87	5	95	151	51	81	46	74	118	42	67	
11	61	98	57	92	7	116	187	48	77	59	104	167	36	58	
12	69	110	52	83	25	92	146	35	56	62	82	130	31	49	
13	96	156	52	84	46	132	214	50	81	62	108	175	41	66	
14	77	122	46	73	40	130	205	51	81	61	109	172	36	57	
15	59	94	49	78	17	78	125	46	74	41	71	114	45	72	
16	81	130	55	89	32	110	177	49	79	45	96	155	41	66	
17	61	95	43	67	30	116	181	31	48	73	96	150	23	36	
18	69	107	61	95	12	136	211	44	68	68	124	191	38	59	
19	97	153	49	77	50	93	147	38	60	59	78	123	28	44	
20	85	144	52	88	39	126	213	61	103	60	99	167	43	73	
21	69	113	61	100	12	109	178	60	98	45	90	148	49	80	
22	73	118	61	99	16	100	162	56	91	44	85	138	40	65	
23	81	128	61	96	25	100	158	52	82	48	80	126	39	62	
24	69	112	57	93	17	95	155	44	72	51	84	137	40	65	
25	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
26	85	129	55	84	35	81	123	31	47	62	71	108	29	44	
27	85	138	61	99	28	161	261	47	76	71	139	225	37	60	
28	77	118	61	93	21	101	155	50	77	51	83	127	40	61	
29	77	124	57	92	26	83	134	54	87	35	74	119	39	63	
30	73	115	49	77	33	187	295	38	60	80	171	270	36	57	
31	73	121	58	96	21	97	161	48	80	51	80	133	38	63	
ARITH. MEAN	74	118	55	89	24	109	177	45	73	57	92	149	37	59	
STAT. MEAN		120		90			171		74						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Transfer #1 to #2: Gals.	Transfer #1 to #2: pH	Transfer #1 to #2: Total Solids %	Transfer #1 to #2: Vol. Solids %	Transfer #1 to #2: Susp. Solids Mg/l	Transfer #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp.: pH #1	Temp.: °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft. X 100	Remarks
1	1326	19	5.4	6.4	78	11934		.9	60							94	46	46	Note — Include gallons
2	884	15	5.4	8.3	73											92	53	53	of sludge to beds
3	1326	21		7.3	76											92	49	49	
4	1326	21	5.3	7.1	78											90	50	50	
5	1326	20	5.4	6.9	77											90	48	48	
6	1326	22	5.3	7.6	76											89	42	42	
7	1326	22	5.2	8.0	72											88	40	40	
8	1326	24	5.2	8.9	72											88	36	36	
9	1326	22		8.0	73	13702	7.1	.88	64						7.1	87	31	31	
10	1326	19	5.4	6.8	76											86	70	1	
11	1768	27	5.5	7.1	76											94	26	1	
12	1105	17		7.1	76											94	63	1	
13	1105	15	5.4	6.5	76											100	59	1	
14	1768	28	5.4	7.2	77											98	61	0	
15	1326	18	5.5	6.3	76											102	63	1	
16	1326	10	5.5	3.4	75												34	1	
17	1326	14	5.3	5.3	71											100	63	63	
18	1326	17	5.2	6.4	71											98	43	43	
19	1326	19	5.4	6.4	78											96	42	42	
20	1326	22	5.3	7.5	78											94	38	38	
21	1326	18		6.5	75	15470	7.0	6.3	55						7.0	93	36	36	
22	1326	22	5.2	8.0	73											92	34	34	
23	1326	20		6.8	77											91	32	32	
24	1326	17	5.4	6.0	74											90	61	2	
25	1326	14	5.5	4.9	75											96	51	1	
26	1326	19	5.4	6.8	74											94	47	0	
27	1768	23	5.4	6.2	76											98	53	2	
28	1768	25	5.3	6.7	75											100	39	7	
29	1326	20		6.8	78												51	51	
30	1768	33		8.8	76											98	58	58	
31	1326	16	5.2	5.4	80											95	38	38	
ARITH. MEAN	1369	20	5.4	6.8	75	13702	7.0	2.7	60						7.0	94	47	27	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1962 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Digested sludge to beds					Supernatant					sludge near bottom				Temp.	Gas		Remarks
	Gals. x10	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l x10	5-Day B O D Mg/l x10	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1						11934		.31	64	161	22								Note — Include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9						13702		.27	63	62	46				7.3				
10																			
11																			
12																			
13																			
14																90			
15																90			
16																93			
17																			
18																			
19																			
20																			
21	665		7.2	11.6	49.3	3536		.31	65	85	37				7.2				
22																			
23																			
24																			
25																88			
26																92			
27																			
28																			
29																90			
30																			
31																			
ARITH. MEAN	663		7.2	11.6	49.3	9724		.30	64	103	35				7.2	91			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEAL

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1962 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather Precip. Inches	Weather Temp (°F) Max	Weather Temp (°F) Min	Type*	Raw Sewage Temp °F	Raw Sewage Flow MGD	pH	Grit cf/mg	~~XXXXX~~ water ~~XXXXX~~ cu. ft.	Cl₂ lbs	Power KWH x10	AUX FUEL Gas ** cc. ft. x100	Remarks
1		80	52	C	58	1.89	7.1		1930	64	20	8	
2		80	60	CL	58	1.78	7.0		1830	62	20	5	* Estimated
3	.17	84	66	R	58	1.86	7.0		1730	61	16	5	
4	.01	84	44	R	58	1.84	7.0		1740	90	20	3	
5		64	36	C	58	1.65	7.2		1400	72	20	4	
6		66	40	C	57	1.67	7.2		2280	65	20	4	
7		72	46	C	57	1.71	7.3		2020	75	20	6	
8	.08	78	60	R	57	1.75	7.1		2010	*70	16	0	
9	1.0	76	68	R	58	1.88	7.3		1850	*70	20	0	
10	.02	74	56	R	59	1.83	7.1		1870	*70	20	0	
11		70	50	C	58	1.75	7.4		1800	*70	16	0	
12		84	60	C	58	1.80	7.2		2050	*70	20	0	
13	.83	88	60	R	59	1.86	7.1		1780	*70	20	8	
14		76	52	C	58	1.76	7.3		1710	*70	20	10	
15		76	54	CL	58	1.71	7.2		1610	*70	20	9	
16	.65	80	56	R	58	1.71	7.1		215		20	9	
17		66	44	C	58	1.77	7.2		40		20	9	
18	.09	68	44	R	57	1.72	7.2		108		20	1	
19		60	34	CL		1.69	7.1		100		20	0	
20		54	34	C	56	1.65			37		20	5	
21	.09	62	42	R	57	1.70	7.3		44		20	5	
22		64	42	CL	57	1.65	7.2		40		16	9	
23		66	44	C	57	1.61	7.1		41		20	2	
24	.10	72	50	R	57	1.76	7.2		395		20	2	
25		68	48	CL	57	1.69			47		20	1	
26		64	42	C	57	1.68	7.3		40		20	2	
27		62	42	CL	57	1.68	7.2		38		16	5	
28		60	34	C	57	1.68	7.3		41		20	5	
29		60	36	C	57	1.65	7.2		40		16	8	
30		70	46	C	56	1.58	7.1		33		20	5	
31													
ARITH. MEAN	.10	71	47		57	1.73	7.2		962	70	19.2	4.3	
STAT. MEAN						1.73							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1962 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x10	5-Day BOD Rem. %	Suspended Solids Inf Mg/l	Suspended Solids Inf lbs x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x10	Suspended Solids Rem %	Suspended Volatile Solids Inf Mg/l	Suspended Volatile Solids Inf lbs x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x10	Remarks
1	73	115	52	82	29	67	106	20	32	70	62	98	16	25	Samples used are 24 hr.
2	73	107	65	96	11	63	93	32	47	49	56	83	28	41	composits collected by
3	77	119	53	82	31	174	270	39	60	78	157	243	32	50	automatic samplers. The
4	67	103	55	84	18	90	138	74	113	18	89	136	78	119	effluent samples contain
5	61	84	58	80	5	101	139	50	69	51	80	110	40	55	supefnate while the raw
6	77	107	52	72	33	103	143	44	61	57	92	128	42	58	does not.
7	61	87	15	21	75	84	120	32	46	62	62	89	20	29	
8	69	101	58	85	16	42	61	19	28	55	37	54	17	25	
9	61	96	46	72	25	74	116	35	55	53	56	88	29	46	
10	114	174	65	99	43	195	298	45	69	77	162	248	33	50	
11	85	124	46	61	46	108	158	46	67	57	90	131	34	50	
12	122	183	27	41	78	96	144	32	48	67	83	125	28	42	
13	65	101	58	90	11	103	160	36	56	65	99	153	29	45	
14	57	84	57	84	0	80	118	59	87	26	69	101	46	68	
15	65	93	43	61	34	146	209	32	46	78	134	192	28	40	
16	93	133	49	70	47	112	160	38	54	66	96	137	32	46	
17	85	126	61	90	28	207	306	43	64	79	178	263	37	55	
18	69	99	55	79	20	154	220	47	67	70	139	199	37	53	
19	64	90	61	86	5	111	157	46	65	59	88	124	39	55	
20	73	101	65	90	11	147	202	70	97	52	111	153	51	70	
21	73	104	64	91	12	98	139	50	71	49	77	109	47	67	
22	85	117	61	84	28	82	113	40	55	51	76	105	36	50	
23	81	112	58	78	28	183	246	39	52	79	150	201	31	42	
24	73	107	48	71	34	162	238	48	71	70	137	201	39	57	
25	81	114	49	69	40	148	209	36	51	76	132	186	30	42	
26	69	97	55	77	20	195	273	62	87	68	163	228	47	67	
27	73	102	61	85	16	180	252	34	48	81	162	227	25	35	
28	67	94	55	77	18	89	125	48	67	46	74	104	39	55	
29	81	112	64	88	21	112	155	38	52	66	104	144	34	47	
30	73	96	52	69	30	150	198	36	28	76	140	185	36	48	
31															
ARITH. MEAN	76	109	54	77	27	122	176	42	60	62	105	156	35	51	
STAT. MEAN		106		79			184		60						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft. X 100	Remarks
1	1326	18	5.8	5.8	82											94	31	31	Note — include gallons
2	1326	18		6.3	77											93	26	26	of sludge to beds
3	884	8	5.3	4.4	76											92	54	54	
4	1326	20	5.4	7.0	75	*24310	.38	64	248	49						91	47	47	
5	1326	20		6.9	76											90	28	28	
6	1326	17		6.1	75	The rest of the supernate										90	47	3	
7	1326	18	4.6	6.4	74	for the month was used on										94	50	0	
8	1326	19		6.5	78	on the plant lawn and not										99	54	4	
9	1326	15		5.6	72	sampled.										102	53	0	
10	2210	30	5.2	6.2	77											98	57	4	
11	1768	26		6.7	79											103	58	4	
12	1768	26	5.4	6.4	81												57	30	
13	1768	24		6.4	76											100	52	52	
14	1326	18		6.1	78											98	50	50	
15	1326	20	5.5	6.3	76											96	37	37	
16	1326	23	5.5	8.1	74											94	36	36	
17	1768	26	5.6	7.2	73											93	66	1	
18	1768	19		4.8	80											100	62	1	
19	3094	34		4.8	80											103	46	1	
20	1326	18		6.5	73											104	66	1	
21	1326	24		9.6	68												61	1	
22	1326	18	5.6	6.2	76											101	57	0	
23	884	13	5.4	6.7	77												62	1	
24	1326	19	5.8	6.7	76											106	61	0	
25	1105	22	5.4	9.8	71											104	57	0	
26	1105	16	5.3	6.9	77											102	48	1	
27	1768	30	5.5	8.1	74											107	4	4	
28	1326	18	5.4	6.6	73											102	55	55	
29	1326	19	5.3	7.9	76											100	41	41	
30	1326	20	5.3	6.9	78											98	40	40	
31																			
ARITH. MEAN	1459	20	5.4	6.7	76	24310	.38	64	248	49						98	49	18	
STAT. MEAN		21																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas ** cu. ft. x 100	Remarks
1		72	48	C	58	1.66	7.1		52		20	5	
2	.25	66	50	R	57	1.67	7.1		46		20	5	
3	.06	70	46	R	57	1.70	7.2		40		16	2	
4	.02	70	52	R	57	1.71	7.1		43		20	2	
5		68	46	CL	57	1.71	7.1		380		20	3	
6		68	44	CL	57	1.67	7.0		19		20	2	
7		72	52	CL	57	1.61	7.2		0		20	2	
8	.06	62	52	R	57	1.71	7.2		16		20	8	
9		66	42	CL	57	1.70	7.1		30		20	11	
10		74	48	C	57	1.71	7.4		6		20	10	
11		82	62	C	57	1.79	7.2		34		20	10	
12		72	44	CL	58	1.73			20		20	10	
13		70	48	C	57	1.66	7.3		23		20	11	
14		80	56	C	57	1.61	7.2		16		16	10	
15	.66	82	62	R	58	1.84	7.1		23		20	10	
16	.10	72	36	R	58	1.71	7.2		472		20	11	
17		58	40	CL	56	1.66	7.3		25		20	7	
18		64	42	C	56	1.65	7.3		19		20	8	
19	.25	70	46	R	56	1.71	7.3		24		20	7	
20	.66	58	42	R	56	1.78	7.2		16		16	1	
21	.01	58	38	R	56	1.63	7.2		20		20	9	
22	.04	58	36	R	57	1.69	7.2		29		20	1	
23	.03	46	26	R	56	1.66	7.3		29		20	10	
24	.01	42	26	S	55	1.65	7.3		55		20	22	
25	.14	52	32	S	55	1.61	7.5		27		16	25	
26	.01	60	30	S	55	1.58	7.4		27		20	24	
27		46	30	C	56	1.63	7.2		34		20	18	
28		52	30	CL	56	1.55	7.3		32		20	13	
29	.03	42	26	R	56	1.64	7.1		107		20	15	
30	.01	36	22	R	56	1.58	7.2		33		20	19	
31		44	32	CL	56	1.60	7.4		47		16	19	
ARITH. MEAN	.075	62	41		57	1.67	7.2		56		19.4	10	
STAT. MEAN						1.67							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 19 62 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	89	123	61	84	32	89	123	59	81	34	72	99	45	62	Samples used are 24 hr.
2	61	84	61	84	0	93	128	57	79	39	76	105	47	65	composits collected by
3	61	87	58	82	5	98	139	46	65	54	87	124	40	57	automatic samplers. The
4	81	116	58	83	28	78	112	46	66	41	63	90	38	54	effluent samples contain
5	65	93	46	66	29	76	109	42	60	45	69	99	31	44	supernatant while the raw
6	73	101	64	88	12	272	375	44	61	84	260	359	36	50	do not.
7	102	137	61	82	40	210	281	41	56	82	195	261	32	43	
8	77	110	58	83	25	101	144	51	73	50	79	113	39	56	
9	73	104	61	87	16	97	138	56	80	42	84	119	48	68	
10	85	122	30	43	53	109	156	34	49	69	92	132	27	39	
11	81	121	40	60	51	92	137	31	46	66	81	121	29	43	
12	73	105	58	84	21	81	117	46	66	43	73	105	42	60	
13	81	112	61	84	25	92	127	48	66	48	82	113	36	50	
14	81	109	58	78	28	195	261	24	32	89	190	255	21	27	
15	77	118	64	98	17	107	164	46	70	57	88	134	36	55	
16	65	93	55	79	15	97	139	39	56	60	86	123	33	47	
17	73	101	55	76	25	89	123	35	48	61	77	106	35	48	
18	73	101	65	90	11	102	141	59	81	42	92	127	49	68	
19	67	96	55	79	18	69	100	46	66	33	56	80	36	51	
20	77	114	61	90	21	166	246	50	74	70	154	228	44	65	
21	73	99	65	88	11	97	132	48	65	51	91	124	41	56	
22	81	114	61	86	25	95	134	35	49	63	79	112	30	42	
23	7C	97	49	68	30	137	189	36	50	74	132	182	36	50	
24	65	90	46	63	29	136	188	40	55	71	119	164	34	47	
25	69	93	52	70	25	159	213	33	44	79	144	193	34	46	
26	81	107	66	87	19	78	103	63	83	19	62	82	46	61	
27	81	110	61	83	25	47	64	22	30	53	36	49	18	24	
28	65	84	43	55	34	92	119	40	52	57	84	108	35	45	
29	77	105	49	67	36	78	107	30	41	62	67	92	27	37	
30	81	107	40	53	51	146	193	47	62	68	129	170	30	40	
31	65	86	61	81	6	126	168	43	57	66	110	146	38	51	
ARI. MEAN	75	104	56	77	25	113	157	43	60	57	100	139	36	50	
STA. MEAN		105		76			136		62						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Transfer #1 to #2: Gals.	Transfer #1 to #2: pH	Transfer #1 to #2: Total Solids %	Transfer #1 to #2: Vol. Solids %	Transfer #1 to #2: Susp. Solids Mg/l	Transfer #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp.: pH #1	Temp.: °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft.	Remarks
1	1768	28	5.4	7.4	77											95	39	39	Note — include gallons
2	1768	28		7.2	79											94	69	11	of sludge to beds
3	1326	18	5.4	6.2	78											99	69	1	
4	1105	21		8.8	75											104	62	1	
5	1105	19	5.4	7.8	79											108	60	1	
6	1326	20	5.3	6.9	78												67	0	
7	1768	25	5.6	6.5	78												67	1	
8	1326	18		5.8	81										7.0	106	41	21	
9	884	8	5.6	4.2	80	17238	7.0	6.0	56							105	58	58	
10	1326	19	5.3	6.4	79											102	53	53	
11	1326	18	5.4	6.1	78											100	48	48	
12	1326	19		6.2	81											98	56	8	
13	1326	19	5.4	6.0	83											102	65	11	
14	1547	25	5.1	7.0	81											100	61	8	
15	2431	34	5.3	6.2	79											99	64	10	
16	1768	28	5.4	6.7	82											102	66	12	
17	1326	21	5.5	6.9	82	10166	7.0	.78	69						7.0	105	41	38	
18	1326	26	5.3	8.1	84											102	50	50	
19	1768	24	5.8	6.0	81	9724		1.0	66							99	74	17	
20	1326	14	5.6	4.5	83											98	52	1	
21	1547	21	5.6	5.9	83											103	53	1	
22	1989	36	5.5	8.0	80											102	55	1	
23	1768	26	5.3	6.5	79											106	74	69	
24	1768	22	5.6	5.9	73											101	47	47	
25	1326	18	5.6	6.2	78											98	45	45	
26	1326	22		7.3	80											96	40	28	
27	1326	19	5.6	6.5	77											94	76	26	
28	1326	18	5.4	6.1	78											99	60	32	
29	1326	18		5.7	86											99	54	26	
30	2652	38	5.5	6.3	80											99	61	27	
31	2210	26	5.4	5.6	75	16354	6.9	.82	70						6.9	98	69	39	
ARITH. MEAN	1540	22	5.5	6.5	80	13371	7.0	2.2	65						7.0	100	58	24	
STAT. MEAN		22																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 1962 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Digested ~~Raw~~ sludge to beds					Supernatant x10					sludge near bottom x10			Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft.	Wasted cu. ft.	
1																			Note — include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																90			
7																95			
8															7.1				
9						5304	7.1	.36	70	367	64								
10																			
11																			
12																			
13																90			
14																94			
15																100			
16																			
17	8398		6.8	11	49														
18																			
19						9724	6.8	.43	71	158	76				6.8				
20																96			
21																			
22																96			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31						16354	7.2	.42	70	114	52				7.2				
ARIT. MEAN	8398		6.8	11	49	10461	7.0	.40	70	213	64				7.0	94			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas ** cu. ft. x 100	Remarks
1		46	36	CL	56	1.58	7.5		33		16	19	
2	.01	48	38	R	56	1.53	7.4		47		16	13	
3	.02	44	38	R	56	1.51	7.2		47		16	16	
4	.05	44	34	R	56	1.45	7.2		48		16	14	
5		42	22	C	56	1.53	7.4		54		20	7	
6	.04	58	26	R	55	1.55	7.7		50		16	7	
7		48	36	CL	55	1.53	7.5		541		20	10	
8		46	30	CL	54	1.51	7.4		158		20	14	
9		44	34	CL	55	1.50	7.5		39		20	4	
10		50	24	C	55	1.49	7.2		15		20	11	
11		46	26	C	54	1.41	7.3		15		16	12	
12		40	26	CL	55	1.56	7.4		55		20	6	
13		50	26	C	54	1.53	7.3		58		16	8	
14		48	30	C	54	1.52	7.7		60		20	8	
15	.12	52	36	R	54	1.57	7.5		80		16	11	
16	.27	46	34	R	55	1.61	7.2		47		20	12	
17	.01	36	30	R	54	1.52	7.3		50		16	21	
18		39	21	CL	54	1.47	7.5		56		16	17	
19	.01	42	26	R&S	54	1.58	7.1		109		20	12	
20	.02	42	34	R	54	1.59	7.2		66		20	14	
21		50	30	CL	55	1.59	7.2		59		16	9	
22		34	22	CL	55	1.48	7.3		47		16	11	
23	.01	44	24	S	54	1.53	7.4		49		20	24	
24		44	22	C	54	1.52	7.4		47		20	8	
25		44	20	C	54	1.47	7.2		47		16	11	
26		46	22	C	54	1.58	7.3		52		20	5	
27		48	22	C	54	1.56	7.5		58		16	6	
28		48	22	C	54	1.56			20		16	12	
29		54	24	C	53	1.55	7.4		16		16	18	
30		56	24	C	53	1.69	7.6		438		16	10	
31													
ARITH MEAN	.019	46	28		55	1.54	7.4		82		17.7	12	
STAT. MEAN						1.54							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH November 19 62 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	77	102	57	75	26	116	153	45	59	61	102	135	36	48	Samples used are 24 hr.
2	89	114	56	73	36	96	123	58	74	40	84	108	51	65	composits collected by
3	81	102	52	66	36	100	126	32	40	68	88	110	32	40	automatic samplers. The
4	77	93	52	63	33	107	129	32	39	70	105	127	32	39	effluent samples contain
5	61	78	37	47	39	102	131	43	55	58	86	110	42	54	supernatant while the raw
6	85	110	58	75	32	104	134	45	58	57	79	102	34	44	do not.
7	73	93	55	70	25	90	115	62	79	31	74	95	50	64	
8	69	87	61	77	12	165	208	55	69	67	159	200	55	69	
9	61	76	33	41	46	77	96	31	39	60	68	85	27	34	
10	61	76	43	53	30	114	141	34	42	70	98	122	32	40	
11	77	91	55	65	29	132	156	38	45	71	118	139	36	42	
12	73	95	52	68	29	110	143	59	77	46	91	118	49	64	
13	57	73	49	63	14	103	132	42	54	60	90	115	38	49	
14	65	83	55	70	15	110	140	53	67	52	96	122	36	46	
15	69	90	58	76	16	104	136	75	98	28	90	118	62	81	
16	61	82	40	54	34	80	107	44	59	45	68	91	34	46	
17	73	93	58	74	21	78	99	54	69	31	35	44	27	34	
18	57	70	49	60	14	65	80	42	52	36	57	70	40	49	
19	62	82	52	69	16	78	103	43	57	45	68	90	38	50	
20	65	86	56	61	29	90	120	37	49	59	80	106	30	40	
21	57	76	55	73	4	82	109	37	49	55	73	97	32	43	
22	85	105	58	71	32	47	57	24	30	49	43	53	24	30	
23	61	78	43	55	25	115	147	37	47	68	108	138	33	42	
24	69	88	55	70	20	78	100	43	55	45	62	79	36	46	
25	65	80	21	26	68	100	123	30	40	70	87	107	27	33	
26	85	112	64	84	25	205	271	52	69	75	185	244	41	54	
27	77	100	61	79	21	114	148	54	70	53	94	122	39	51	
28	62	81	62	81	0	86	112	47	61	45	68	88	37	48	
29	65	84	52	67	20	66	85	31	40	53	66	85	31	40	
30	63	89	55	78	13	72	102	43	61	40	56	79	32	45	
31															
ARITH. MEAN	69	89	52	66	25	100	128	44	57	54	86	110	37	48	
STAT. MEAN		89		66			124		56						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH November 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Transfer Supernant #1 to #2: Gals.	Transfer Supernant #1 to #2: pH	Transfer Supernant #1 to #2: Total Solids %	Transfer Supernant #1 to #2: Vol. Solids %	Transfer Supernant #1 to #2: Susp. Solids Mg/l	Transfer Supernant #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH #1	Temp. °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft.	Remarks
1	1768	20		5.2	77											99	59	11	Note — Include gallons
2	1326	17	5.4	5.5	80												58	1	of sludge to beds
3	1326	15		4.9	79											100	52	1	
4	1768	68		14.4	95												55	1	
5	884	14	5.1	7.2	78											102	47	1	
6	1768	28	5.5	7.1	80											104	50	1	
7	884	13	5.4	6.9	77											106	47	0	
8	1326	19	5.6	6.2	80	11934	6.7	6.2	61					343	6.7	108	49	1	
9	1326	21	5.4	7.2	77											105	53	1	
10	1326	21	5.5	7.1	78											102	50	1	
11	1768	29	5.4	7.7	75												46	0	
12	1326	21	5.2	7.3	76											100	46	1	
13	1768	31	5.4	7.6	82											99	43	1	
14	1326	16	5.5	5.1	82											102	47	1	
15	1768	28	5.7	6.7	78	12818	6.8	.82	71					436	6.8	104	53	1	
16	1326	18	5.3	6.1	80												47	0	
17	1326	16	5.3	5.2	81											100	59	53	
18	1326	23	5.4	7.7	80											98	41	41	
19	1326	14	5.3	4.6	82											95	44	7	
20	1768	29	5.1	7.1	81											96	46	1	
21	1326	17	5.3	5.7	82											100	46	1	
22	1326	19	5.5	6.2	83											102	47	1	
23	1326	16	5.5	5.3	78												42	0	
24	1326	14	5.3	4.4	84											95	44	1	
25	1326	13	5.5	4.0	85											98	41	0	
26	884	13	5.4	6.2	85									678	6.8	100	42	0	
27	1326	23	5.5	7.3	85	10166	6.8	2.0	55							102	43	1	
28	884	14		6.5	85												4	0	
29	884	14	5.4	6.5	85												54	54	
30	1326	13		5.0	83												47	47	
31																			
ARITH. MEAN	1355	21	5.4	6.5	81	11639	6.8	3.0	62					486	6.8	101	47	8	
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH November 19 62 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Digested ~~sludge~~ to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — include gallons
2																86			of sludge to beds
3																			
4																87			
5																			
6																			
7																			
8						11934	6.9	.42	70	225	64								
9																			
10																86			
11																90			
12																92			
13																94			
14																94			
15						12818	6.8	.63	72	432	107								
16																94			
17																94			
18																			
19																			
20																			
21																			
22																82			
23																84			
24																86			
25																			
26																			
27	8000		7.1	10.1	52		7.1												
28																80			
29																			
30																			
31																			
ARITH. MEAN	8000		7.1	10.1	52	12376	6.9	.52	71	329	85					88			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1962 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~XXXXX~~ Water ~~XXXXXX~~ cu. ft.	Cl lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		56	26	C	53	1.63	7.3		13		12	13	
2		56	26	C	53	1.63	7.3		6		12	14	
3		56	26	C	54	1.74	7.4		13		12	10	
4	.04	56	28	R	54	1.70	7.5		12		16	10	
5	.06	40	28	S	54	1.70			174		12	22	
6	.34	32	28	S	53	1.72			136		16	23	
7	.05	34	24	S	53	1.67	7.6		159		12	22	
8	.04	34	12	S	53	1.67	7.3		58		12	19	
9	.07	30	14	S	52	1.60	7.5		18		12	23	
10	.09	22	-4	S	53	1.68			56		12	28	
11		18	-12	CL	53	1.62	7.7		100		16	22	
12	.02	18	-2	S	53	1.63	7.5		317		12	23	
13	.03	20	8	S	52	1.66	7.6		15		16	23	
14	.01	28	10	S	52	1.64	7.7		14		12	20	
15	.02	32	22	S	52	1.66	7.5		15		16	22	
16		38	26	CL	52	1.60	7.4		8		12	10	
17		40	26	C	53	1.72	7.6		18		16	7	
18		41	29	CL	52	1.69	7.6		20		16	43	
19		38	20	CL	52	1.69	7.8		19		16	64	
20		26	12	CL	52	1.65	7.8		20		24	64	
21		30	16	CL		1.68			363		16	35	
22	.04	34	20	S	52	1.66	7.5		30		20	18	
23	.04	24	2	S	52	1.57	7.4		8		20	22	
24		24	4	CL	52	1.66	7.6		10		16	18	
25	.06	30	14	S	52	1.57	7.6		4		20	25	
26		20	-3	CL	52	1.70	8.2		20		20	18	
27		26	6	CL	52	1.69	7.7		30		16	19	
28	.01	32	14	S	52	1.68	7.6		25		20	10	
29		36	6	C	52	1.66	7.5		3		20	12	
30		14	-8	C	51	1.58	7.7		16		16	30	
31		14	-4	C	52	1.74	7.6		15		20	19	
ARITH. MEAN	.03	32	13		52	1.66	7.6		55		15.7	23	
STAT. MEAN						1.66							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 1962 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	93	126	58	79	38	102	139	44	60	56	46	63	20	27	Samples used are 24 hr.
2	93	126	67	91	28	174	233	45	61	74	153	208	45	61	composits collected by
3	81	117	64	93	30	107	155	83	120	22	81	117	56	81	automatic samplers. The
4	73	104	55	78	25	238	338	33	47	86	217	308	26	37	effluent samples contain
5	85	121	64	91	25	142	202	49	70	66	134	190	43	61	supernatant while the raw
6	76	109	47	67	36	155	222	25	36	84	134	192	21	30	do not.
7	64	89	46	64	28	75	104	42	58	44	53	74	25	35	
8	73	101	58	81	21	112	156	48	67	57	94	131	44	61	
9	72	96	63	84	13	157	209	43	57	73	152	202	43	57	
10	80	112	62	87	23	95	133	51	71	46	79	111	42	59	
11	76	103	54	73	29	138	186	39	53	72	123	166	35	47	
12	72	98	51	69	29	116	158	60	82	48	94	128	45	61	
13	92	127	30	41	67	112	155	44	61	61	100	138	38	52	
14	60	82	54	74	10	79	108	51	70	35	72	99	33	45	
15	76	105	60	83	21	84	116	50	69	41	72	99	48	66	
16	72	96	54	72	25	142	189	42	56	70	120	160	30	40	
17	84	120	54	77	36	139	199	42	60	70	122	174	33	47	
18	84	118	57	80	32	165	233	47	66	72	150	212	41	58	
19	76	107	72	102	5	87	123	56	79	36	75	106	47	66	
20	88	121	84	116	5	151	208	79	109	48	118	163	55	76	
21	72	101	51	71	29	83	116	53	74	36	68	95	39	55	
22	72	99	72	99	0	80	110	50	69	38	78	108	46	63	
23	68	89	60	79	12	95	124	34	45	64	86	113	26	34	
24	76	105	60	82	21	88	121	36	50	59	72	99	30	41	
25	60	79	48	63	20	89	117	43	56	52	73	96	34	45	
26	76	108	64	91	16	89	126	68	97	24	70	99	55	78	
27	84	118	68	96	19	110	155	66	93	40	100	141	56	79	
28	80	112	66	92	18	85	119	53	74	38	67	94	44	62	
29	84	116	66	91	21	140	193	44	61	67	124	171	36	50	
30	64	84	51	67	20	68	90	31	41	54	53	70	24	32	
31	96	139	69	100	28	96	139	59	86	39	79	115	49	71	
ARITH. MEAN	77	107	59	82	24	116	161	49	68	54	99	137	39	54	
STAT. MEAN		108		82			167		69						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Transfer Sludge #1 to #2					sludge near bottom			Temp.		Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals. x10	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1326	13	5.4	4.4	80												44	44	Note — Include gallons
2	1326	15		5.0	81												38	38	of sludge to beds
3	1326	14	5.5	4.9	77												36	36	Sludge
4	1326	20		7.1	77												35	35	circulating
5	1326	19		6.1	83												38	38	pump out of
6	1326	18		5.7	82									549			42	42	service
7	1326	23		7.8	79												40	40	from Nov.
8	1326	19	5.3	6.0	83												43	43	28 to Dec.
9	884	11	5.3	4.9	86												38	38	18
10	884	10		5.0	82												32	32	
11	1326	16	5.9	5.2	81												20	20	
12	884	13	5.8	6.2	82												35	35	
13	1326	13	6.0	4.4	81												34	34	
14	1326	17	5.8	5.4	82										6.8		33	33	
15	884	11	5.5	5.4	83												36	36	
16	1326	16	5.5	5.1	84												34	34	
17	884	12	5.9	5.8	82												32	32	
18																72	33	33	
19	884	12		5.8	81											78	36	36	
20	1326	22		7.3	80	1945	6.8	.94	65						6.8	85	47	47	
21	1326	22		7.0	83											92	53	13	
22	1326	18		5.8	81											95	43	2	
23	1768	30	5.1	7.3	83											90	44	2	
24	1105	19		7.3	82											92	53	2	
25	1105	10		3.7	83											95	50	50	
26	1105	13	6.3	5.4	77	1039	6.9	1.7	70					807	6.9	91	55	8	
27	1326	17	5.8	5.7	81											94	51	1	
28	1326	19	5.6	6.0	82											92	70	31	
29	1326	18		5.7	83											94	56	23	
30	1326	17	5.9	5.9	77											94	56	22	
31	2210	29	5.7	5.7	82											95	42	1	
ARITH. MEAN	1260	17	5.7	5.8	81	1492	6.8	1.3	67					678	6.8	90	42	28	
STAT. MEAN		17																	

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MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1962 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Digested Raw Sludge to beds: Gals. x10	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals. x10	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D x10 Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — include gallons
2																			of sludge to beds
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14															7.1				
15																			
16																			
17																			
18																			
19																			
20	975			3.8	63	970	6.9	.38	67	173	81				6.9				
21																			
22																64			
23																66			
24																			
25																			
26						1034	7.1	.69	69	396					7.1				
27																			
28																67			
29																			
30																			
31																			
ARITH. MEAN	975			3.8	63	1004	7.0	.53	68	285	81				7.0	66			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1964 — MISCELLANEOUS DATA — OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff. E. Coli. MPN/100ml.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1		28	16	C	52	1.21	7.7		31		16	15	
2		40	26	C	52	1.33	7.8		29		20	21	
3		40	30	C	52	1.31	7.8		24		16	20	
4		36	22	C	52	1.28	7.6		46		16	20	
5		42	24	C	52	1.26	7.9		26		12	19	
6		38	20	CL	52	1.37	7.9		34		16	22	
7		34	20	C	52	1.32	7.6		27		20	12	
8	.40	36	26	R	52	1.38	7.8		235		16	12	
9	.11	36	10	R&S	51	1.40	7.9		108		16	19	
10	.03	20	10	S	52	1.33	7.7		26		16	19	
11		26	8	C	52	1.30	7.7		24		16	22	
12		18	10	CL	51	1.25	7.8		31		16	25	
13		20	2	CL	52	1.34	7.9		37		16	21	
14		26	6	C	52	1.34	7.9		35		20	20	
15		26	18	C	51	1.34	7.9		34		16	18	
16	.03	32	20	S	52	1.33	8.0		42		16	17	
17		32	22	C	52	1.34	7.8		27		16	20	
18		40	30	C	51	1.31			20		16	22	
19	.03	44	30	R	51	1.33	7.6		58		20	20	
20	.03	40	26	R	52	1.42	8.1		255		16	13	
21		46	28	C	51	1.42	7.9		104		16	14	
22		52	42	C	51	1.39	7.9		60		16	10	
23		52	38	CL	52	1.38	7.9		31		16	14	
24	.14	52	18	R	52	1.42	7.9		30		20	12	
25	.02	28	18	S	51	1.39	7.8		46		16	24	
26		28	16	CL	50	1.30	7.9		37		16	26	
27	.01	30	8	S	51	1.38	7.8		42		16	17	
28		26	10	C	50	1.36	7.8		26		16	15	
29		34	18	C	50	1.35	7.9		32		16	19	
30		40	22	C	50	1.35	7.9		342		16	16	
31	.22	40	30	R	51	1.39	7.9		90		20	19	
ARITH. MEAN	.033	35	20		51	1.34	7.8		64		16.6	18	
STAT. MEAN						1.34							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff		Rem	Inf		Eff		Rem	Inf		Eff		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
W 1	80	81	67	68	17	68	69	53	53	22	60	61	45	45	Samples taken are 24 hr.
Th 2	96	106	64	71	33	100	111	47	52	53	88	98	43	48	composits collected by
F 3	86	94	60	66	30	113	124	60	66	47	96	105	50	55	automatic samplers. The
SA 4	76	81	57	61	25	94	100	44	47	53	78	83	39	42	effluent samples contain
S 5	92	97	63	66	32	90	95	42	44	53	78	82	32	34	supernatant while the raw
M 6	91	104	51	58	44	119	136	56	64	53	100	114	40	46	do not
T 7	102	112	80	88	22	80	88	75	83	6	64	70	57	63	
W 8	84	97	72	83	14	98	113	54	62	45	82	94	44	51	
Th 9	96	112	68	79	29	79	92	59	69	25	66	77	42	49	
F 10	102	118	57	66	44	96	111	55	64	43	75	87	48	56	
SA 11	102	111	76	82	26	126	137	43	47	66	113	122	36	39	
S 12	90	94	39	41	57	93	97	36	38	61	84	88	25	26	
M 13	89	100	72	80	19	89	100	62	69	30	70	78	52	58	
T 14	117	131	66	74	44	116	130	55	61	53	100	112	46	51	
W 15	88	98	54	60	39	81	91	60	67	26	70	78	47	53	
Th 16	84	93	64	71	24	95	105	54	60	43	84	93	47	52	
F 17	108	121	64	72	41	129	144	58	65	55	107	120	47	53	
SA 18	96	105	24	26	75	207	226	42	46	80	191	209	28	31	
S 19	88	98	72	80	18	86	95	50	55	42	74	82	41	45	
M 20	102	121	72	85	29	260	308	65	77	75	227	269	45	53	
T 21	88	105	76	91	14	110	131	76	91	31	95	113	62	74	
W 22	76	88	62	72	18	93	108	69	80	26	77	89	49	57	
Th 23	88	101	76	88	14	101	116	61	70	59	81	93	48	55	
F 24	90	107	72	85	20	103	122	55	65	47	88	104	45	53	
SA 25	90	104	72	83	20	100	116	67	79	33	87	89	60	70	
S 26	90	98	51	55	43	152	165	31	34	80	132	143	20	22	
M 27	89	102	64	74	28	116	134	62	71	47	103	119	52	60	
T 28	95	108	72	82	18	199	226	58	66	71	184	209	48	54	
W 29	76	86	57	64	25	153	172	61	69	60	133	150	44	50	
Th 30	88	99	72	81	18	100	113	79	89	21	85	96	65	73	
F 31	88	102	66	76	25	110	127	62	72	44	87	101	37	43	
ARITH. MEAN	91	102	64	72	29	115	129	56	64	47	99	111	45	50	
STAT MEAN		102		72			118		64						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	transfer ~~Xxxxx~~ #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp °F #1	Gas: Produced cu. ft. x 100	Wasted cu. ft. x 100	Remarks
1	884	15	5.5	7.1	82											98	60	0	Note — Include gallons
2	1768	26	5.5	6.0	86												59	0	of sludge to beds
3	1326	18	5.5	5.7	83											104	73	50	
4	884	12	5.6	5.7	83											100	51	51	
5	884	14		6.4	84											97	50	50	
6	1105	16	5.7	6.1												94	64	48	
7	884	16		7.8	84	13481		1.3	68						7.1	93	67	15	
8	1768	20	5.7	4.7	85											92	60	0	
9	884	14	5.4	6.8	83	7072		1.3	69							93	54	0	
10	1326	21	5.5	6.7	82											93	56	0	
11	1326	14	5.5	4.8	82											94	48	0	
12	884	13	5.5	6.3	80												54	0	
13	1768	23	5.8	5.6	83											98	52	0	
14	1326	19	5.7	5.7	87												54	0	
15	1768	29		6.8	84											96	57	0	
16	884	13	5.5	6.2	83											102	60	0	
17	1326	22	5.6	6.8	84												67	49	
18	884	12		6.0	83											98	17	17	
19	1105	18	5.4	7.1	81											94	54	54	
20	1547	23	5.7	6.5	81											92	59	0	
21	884	13	5.7	6.4	80											99	45	29	
22	2873	48	5.3	7.0	85	13260		1.5	68						7.2	96	78	15	
23	1547	30	5.5	8.8	77											104	57	33	
24	1325	20	5.7	6.6	81											100	79	79	
25	1325	18	5.6	5.9	81											95	60	60	
26	1325	21	5.7	7.1	78											91	54	54	
27	1763	26	5.8	6.5	80											89	57	0	
28	884	16	5.7	7.8	80											95	60	0	
29	1325	15	5.6	6.0	80											102	62	0	
30	1325	18	5.8	6.5	76	11528		1.4	69						7.1	108	58	48	
31	884	19	5.6	7.1	80											102	68	68	
ARITH. MEAN	1290	20	5.6	6.5	82	11435		1.4	69						7.1	97	58	23	
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	digested ~~Raw~~ Sludge to Beds					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1																			Note — Include gallons of sludge to beds
2																			
3																			
4																			
5																			
6						13481		.52	71	265	96				7.2				
7																			
8																82			
9	7072		10.3	52												85			
10																85			
11																88			
12																90			
13																			
14																86			
15																88			
16																			
17																86			
18																			
19																			
20																			
21																			
22						13260		.54	73	200	114				7.2				
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30						11528		.51	75	167	102				7.2				
31																			
ARITH. MEAN	7072		10.3	52		12756		.52	73	211	101				7.2	86			
STAT. MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1		36	22	CL	51	1.32	7.8		31		16	23	
2		30	12	CL	50	1.29	7.7		40		16	18	
3		30	12	C	50	1.41	7.9		30		16	16	
4		42	24	C	51	1.37	7.9		35		16	12	
5		46	26	C	50	1.36	7.8		40		20	12	
6	.01	40	28	S	50	1.35	7.8		40		16	19	
7	.07	30	18	S	50	1.35	7.9		32		16	20	
8	.02	28	18	S	50	1.31	7.8		53		16	26	
9		28	10	CL	50	1.24	7.7		34		16	24	
10		24	6	C	50	1.34	7.8		29		16	16	
11		36	10	C	51	1.34	7.8		238		16	14	
12	.15	40	24	S	51	1.32	7.8		80		20	23	
13		36	18	CL	51	1.32	7.9		31		16	20	
14		36	16	C	50	1.32	7.9		55		16	16	
15	.07	38	20	S	50	1.29	7.8		37		16	20	
16		32	12	C	50	1.23	7.9		41		16	22	
17		38	20	C	50	1.34	7.8		59		16	14	
18	.02	36	24	S	50	1.23	7.9		48		16	15	
19		34	24	CL	50	1.33			50		20	14	
20		30	16	CL	50	1.29	7.9		41		16	33	
21		28	6	C	50	1.30	7.9		113		16	25	
22		30	10	CL	50	1.27	7.8		35		16	25	
23	.01	32	14	S	50	1.23	7.7		38		16	29	
24		28	16	CL	50	1.31	8.0		54		16	16	
25	.03	40	18	S	50	1.34	7.9		40		16	16	
26		22	2	C	50	1.29	7.8		61		16	20	
27		28	6	C	50	1.31	7.9		45		16	13	
28		36	16	CL	50	1.29	7.8		47		16	16	
29	.01	44	30	R&S	50	1.29	7.7		35		16	13	
30													
31													
ARITH. MEAN	.013	34	16		50	1.31	7.8		52		16.3	19	
STAT. MEAN						1.31							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 1964

PRIMARY TREATMENT DATA

OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	88	97	80	88	12	99	109	57	63	42	91	100	43	47	Samples taken are 24 hr. composits collected by automatic samplers. the effluent samples contain supernatant while the raw do not.
2	120	129	68	73	43	103	111	52	56	50	86	93	41	44	
3	102	120	76	89	25	108	127	70	82	35	92	108	58	68	
4	102	117	72	82	29	95	109	68	78	28	77	88	56	64	
5	96	109	65	74	32	100	113	59	67	41	79	90	45	51	
6	84	95	72	81	14	109	123	53	60	51	95	107	44	50	
7	90	100	80	89	11	117	130	71	79	39	104	115	59	65	
8	90	98	72	79	20	82	90	58	63	29	76	83	52	57	
9	102	105	80	83	22	81	84	50	52	38	71	73	40	41	
10	94	105	72	80	23	92	103	60	67	35	73	82	47	53	
11	102	114	88	98	14	113	126	80	89	29	95	106	64	72	
12	80	88	64	70	20	82	90	51	56	38	75	83	47	52	
13	84	92	72	79	14	90	99	58	64	36	72	79	46	51	
14	89	98	68	75	24	99	109	60	66	39	82	90	48	53	
15	80	86	76	82	5	92	99	66	71	28	89	96	58	62	
16	120	123	76	78	37	137	141	49	50	64	119	122	39	40	
17	96	107	80	89	17	186	208	65	73	65	177	198	51	57	
18	102	103	76	77	25	101	102	63	64	38	82	83	50	50	
19	84	93	72	80	14	100	111	56	62	44	82	91	42	47	
20	90	97	72	77	20	112	121	62	67	45	97	104	48	52	
21	93	101	72	78	23	110	119	59	64	46	95	103	46	50	
22	108	114	88	93	19	106	112	51	54	52	92	97	43	46	
23	90	92	69	71	23	134	137	59	61	56	114	117	48	49	
24	132	144	96	105	27	105	115	52	57	50	86	94	40	44	
25	80	89	72	80	10	91	102	80	89	12	71	79	46	51	
26	76	82	63	68	17	86	93	50	54	42	75	81	40	43	
27	84	92	62	68	26	87	95	58	63	33	80	87	50	55	
28	88	95	48	52	45	153	165	47	51	69	134	144	34	37	
29	96	103	64	69	33	110	118	43	46	61	105	113	42	45	
30															
31															
ARI MEA	95	103	73	80	22	106	116	59	64	43	92	100	47	52	
STAT MEAN		101		80			114		64						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH February 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l (x10)	Supernatant 5-Day B O D Mg/l (x10)	transfer Total Solids %	transfer Vol. Solids %	transfer Vol. Acids Mg/l	pH #1	Temp °F #1	Gas Produced cu. ft. x 100	Gas Wasted cu. ft. x 100	Remarks
1	1326	15	5.7	5.0	82											97	60	60	Note — include gallons
2	1547	20	5.7	5.6	80											93	67	0	of sludge to beds
3	1105	16	5.6	6.1	82										7.1	101	51	0	
4	442	5	5.5	4.7	82											108	67	63	
5	1326	14	5.7	4.5	85											100	54	54	
6	884	14	5.6	6.6	83											96	57	57	
7	1105	17	5.8	6.9	81											92	80	31	
8	884	14		6.5	86											98	81	34	
9	1105	15	5.7	5.7	82											102	75	30	
10	884	12	5.8	6.0	80											103	46	31	
11	1547	22	5.8	5.9	84	12818		.51	76	252	90	1.8	68		7.1	100	37	37	
12	1105	15	5.8	5.8	83											95	84	33	
13	1326	19	5.8	6.0	83											104	75	30	
14	884	12	5.7	6.0	82											106	67	23	
15	1326	16	5.7	5.0	84											110	62	18	
16	1547	18	5.8	5.0	82											102	58	11	
17	1105	17	5.7	6.6	83											100	62	0	
18	1326	23		7.6	80											98	66	0	
19	884	16	5.8	7.7	81												59	38	
20	1105	18		7.2	82											100	44	44	
21	1105	16	5.7	6.1	81											94	61	61	
22	884	14	5.7	7.3	78											92	52	52	
23	1768	20	5.8	5.4	74											89	41	41	
24	884	14	5.7	6.7	81											87	60	0	
25	884	14	5.5	6.8	83	13260		.57	70	318	36	1.4	68		7.1	94	51	45	
26	1326	23	5.5	7.2	84											90	68	15	
27	1326	20	5.9	6.5	83											99	60	0	
28	1326	18		5.7	83											104	61	0	
29	884	11	5.8	5.2	84											108	56	0	
30																			
31																			
ARITH. MEAN	1143	16	5.7	6.1	82	13039		.54	73	285	63	1.6	68		7.1	99	61	28	
STAT. MEAN		16																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1964 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1		46	26	CL	50	1.24	7.6		76		16	14	
2		54	30	C	50	1.35	7.9		96		16	7	
3		58	38	CL	50	1.34	7.8		364		16	7	
4	.27	58	34	R&S	51	1.32	7.8		50		16	6	
5		36	18	CL	50	1.37	7.8		63		16	24	
6		48	24	C	50	1.36	7.7		33		16	13	
7	.21	40	30	S	50	1.32	7.8		57		20	13	
8	.73	38	30	R	50	1.38	7.7		48		16	14	
9	.08	36	24	S	50	1.41	7.6		372		16	15	
10	.05	34	16	S	51	1.39	8.0		50		16	16	
11	.01	40	20	S	50	1.40	7.9		42		16	21	
12		44	28	CL	50	1.40	7.7		59		16	18	
13		50	30	CL	50	1.39	7.5		406		20	3	
14	.01	60	24	R	50	1.36	7.5		50		16	0	
15		48	24	CL	50	1.31	7.6		54		16	19	
16	.01	62	24	S	50	1.42	7.6		57		16	17	
17	.01	28	8	S	50	1.37	7.7		67		20	17	
18		32	14	C	50	1.36	7.9		54		16	15	
19		42	20	C	50	1.35	7.6		41		16	11	
20	.16	32	26	R&S	50	1.40	7.6		37		16	12	
21		44	22	CL	50	1.33	7.6		63		16	18	
22		44	24	C	50	1.29	7.7		37		16	13	
23		52	30	C	51	1.38	7.7		65		20	7	
24	.48	62	34	R	51	1.44	7.8		403		16	6	
25	.36	40	28	R	50	1.44	7.9		83		16	13	
26	.04	30	18	S	50	1.40	7.9		47		20	23	
27	.15	38	20	S	50	1.39	7.6		38		16	20	
28		38	18	CL	50	1.44	7.8		44		16	20	
29	.07	34	18	S	50	1.39	7.6		57		20	21	
30	.04	30	20	S	50	1.49	7.7		60		16	26	
31	.03	34	18	S	50	1.47	7.8		50		20	17	
ARITH. MEAN	.087	43	24		50	1.38	7.7		98		16.9	14	
STAT MEAN						1.38							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 1964

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf		Eff		Rem	Inf		Eff		Rem	Inf		Eff		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	90	93	90	93	0	126	130	83	86	34	108	112	64	66	
2	84	95	72	81	13	133	150	58	65	56	117	132	44	50	
3	96	107	64	72	33	161	180	63	70	61	143	160	52	58	
4	84	92	68	75	19	87	96	64	70	26	69	76	49	54	
5	96	110	27	31	72	127	145	38	43	70	103	118	31	35	
6	102	116	78	88	24	78	88	70	79	14	62	70	55	62	
7	88	97	84	92	5	126	139	68	75	46	104	115	55	61	
8	90	104	63	73	30	98	113	56	64	43	68	78	39	45	
9	76	89	68	80	11	121	142	56	66	54	102	120	42	49	
10	80	93	60	70	25	88	102	54	63	39	72	83	42	49	
11	76	89	66	77	13	91	106	62	72	32	77	90	50	58	
12	92	107	76	89	17	120	140	75	88	38	71	83	71	83	
13	88	102	72	83	18	125	145	51	59	59	106	123	42	49	
14	102	116	84	95	18	169	192	60	68	65	142	161	51	58	
15	156	171	104	114	33	150	164	54	59	64	143	156	51	56	
16	165	195	112	133	32	140	166	82	97	42	119	141	67	79	
17	132	151	60	69	55	238	272	60	69	75	215	246	48	55	
18	120	136	88	100	27	157	178	60	68	62	134	152	48	54	
19	102	115	68	77	33	224	252	64	72	71	204	230	51	57	
20	102	119	64	75	37	148	173	50	58	62	126	147	41	48	
21	108	120	72	80	32	140	155	60	67	57	116	129	48	53	
22	126	136	88	95	30	239	257	63	68	74	215	231	47	51	
23	108	124	88	101	19	125	144	68	78	45	106	122	53	61	
24	90	108	76	91	16	125	150	66	79	47	101	121	48	58	
25	102	123	80	96	22	132	159	80	96	39	102	123	59	71	
26	96	112	72	84	25	117	137	56	65	52	90	105	45	53	
27	96	111	72	83	25	100	116	56	65	44	85	99	46	53	
28	90	108	72	86	20	148	178	62	74	58	132	159	51	61	
29	80	93	72	83	10	94	109	81	94	14	80	93	65	75	
30	96	119	68	85	29	121	150	63	78	48	99	123	48	60	
31	90	110	68	83	24	99	121	63	77	36	80	98	46	56	
ARITH MEAN	100	115	74	85	25	134	153	63	72	49	113	129	50	57	
STAT MEAN		111		85			148		71						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 19 64 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					transfer meter #1 to #2					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. x 100	Wasted cu. ft. x 100	
1	1326	20	5.8	6.5	82											100	57	0	Note — Include gallons
2	1326	27	5.4	7.9	91											100	60	0	of sludge to beds
3	2210	46	5.5	8.0	92											107	63	0	
4	2210	41	5.7	5.8	85												64	0	
5	442	6	5.4	6.6	73	12818		1.2	69							106	23	23	
6															7.1	105	38	16	
7	1326	22	5.5	6.9	84												48	0	
8	1326	19	5.5	6.0	84											106	57	0	
9	1326	19	5.7	6.5	79											103	47	0	
10	1326	23	5.7	7.5	81												52	0	
11	1768	30	5.7	7.5	80											100	57	0	
12	1326	19	5.7	6.4	80												61	0	
13	2652	38	5.6	6.2	82											104	14	45	
14	884	12	5.6	5.5	86											101	0	46	
15	1326	18	5.7	6.0	81											98	0	50	
16	1326	21	5.7	7.0	81											95	0	28	
17	2210	29		5.5	83	14144		2.3	66							99	59	1	
18	1326	18	5.6	6.1	81											103	53	0	
19	884	15		7.6	81												51	0	
20	1768	24	5.8	5.7	82												53	0	
21	1326	18	6.0	5.5	85												48	0	
22	1989	29	5.8	6.5	82											100	52	40	
23	1105	16	5.9	6.2	84												17	28	
24	1105	16	5.6	6.4	84	9503		2.5	63						7.2	98	0	79	
25	1326	19	6.0	6.7	76											94	39	20	
26	1105	17	6.1	6.8	82											99	42	38	
27	1547	23	5.3	6.5	81											101	34	42	
28	1326	21	5.7	6.8	81	12155		2.6	67							101	37	42	
29	1105	13	6.2	5.2	82										7.3	102	34	32	
30	1105	16	6.0	6.1	84											103	49	38	
31	1547	25	6.0	6.9	81											100	51	11	
ARITH. MEAN	1429	22	5.7	6.5	82	12155		2.2	66						7.2	101	41	19	
STAT. MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

digested ~~Raw Sludge~~ to beds

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant x10 Total Solids %	Supernatant x10 Vol. Solids %	Supernatant x10 Susp. Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																72			Note — include gallons
2																78			of sludge to beds
3																			
4																80			
5						12818		.47	73		57								
6															7.1				
7																86			
8																			
9																87			
10																88			
11																90			
12																91			
13																			
14																			
15																			
16																			
17						14144		.64	73	416									
18																			
19																80			
20																84			
21																86			
22																			
23																			
24	7500			8.8	55										7.3				
25																			
26																			
27																			
28						12155		.56	76	361	72								
29																			
30															7.2				
31																83			
ARITH. MEAN	7500			8.8	55	13039		.56	74	388	65				7.2	84			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~Sludge~~ water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1	.05	42	22	R	50	1.48	7.6		41		16	10	
2	1.72	44	30	R&S	50	1.79	7.6		322		20	12	
3		35	17	CL	49	1.72	7.6		404		16	12	
4		40	22	C	49	1.69	7.6		65		16	14	
5	.26	54	28	R	50	1.68	7.6		44		24	10	
6	.01	66	46	R	51	1.82	7.6		73		16	3	
7		66	30	CL	51	1.75	7.4		75		20	1	
8		34	24	CL	50	1.68	7.7		41		20	19	
9	.06	50	30	R	49	1.67	7.7		40		16	11	
10		56	30	C	49	1.65	7.6		51		20	10	
11		70	54	C	50	1.64	7.6		66		16	8	
12		68	52	CL	51	1.58	7.6		37		20	7	
13		68	40	CL	50	1.68	7.7		37		16	8	
14		60	34	CL	51	1.61	7.7		120		20	11	
15		56	36	CL	51	1.60			284		16	10	
16		76	50	C	51	1.61	7.6		33		16	15	
17		82	46	CL	52	1.71	7.6		42		20	12	
18	.19	52	38	R	52	1.68	7.6		45		16	8	
19		46	40	CL	50	1.61	7.6		33		20	19	
20	.01	52	40	R	52	1.69	7.6		37		16	11	
21	.34	76	42	R	51	1.77	7.5		41		16	19	
22		52	32	CL	51	1.69	7.9		27		20	11	
23		58	32	C	51	1.67	7.7		44		20	11	
24		56	34	C	51	1.70	7.9		35		20	3	
25		62	38	C	51	1.68	7.7		52		16	3	
26		74	48	CL	51	1.62	7.7		27		16	5	
27	.59	60	50	R52	52	1.81	7.5		451		20	8	
28	.32	72	48	R	52	1.75	7.6		38		16	5	
29	.22	66	48	R	52	1.75	7.7		59		20	5	
30		60	44	C	52	1.73	7.7		40		20	10	
31													
ARITH. MEAN	.126	58	38		51	1.68	7.6		90		18.1	10	
STAT. MEAN						1.69							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	84	104	66	81	21	124	153	59	73	76	100	123	45	56	Samples used are 24hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	85	127	48	72	45	182	272	51	76	72	131	196	33	49	
3	84	120	60	86	29	84	120	50	72	41	62	89	34	49	
4	76	107	51	72	33	67	94	40	56	40	51	72	29	41	
5	68	95	54	76	21	92	129	53	74	42	80	112	42	59	
6	80	121	60	91	25	134	203	80	121	41	101	153	56	85	
7	86	126	53	77	38	97	142	62	91	36	70	102	44	64	
8	60	84	42	59	30	80	112	45	63	44	66	92	31	43	
9	60	84	54	75	10	74	103	50	70	32	57	79	36	50	
10	90	124	54	74	40	82	113	44	61	46	68	94	34	47	
11	64	88	57	78	11	79	108	33	45	58	63	86	25	34	
12	52	69	51	67	2	65	86	47	62	28	50	66	36	47	
13	60	84	60	84	0	70	98	66	92	6	59	83	50	70	
14	63	85	63	85	0	85	114	50	67	41	76	102	43	58	
15	64	85	60	80	4	82	109	39	52	53	66	88	30	40	
16	60	81	54	73	10	75	101	53	71	29	58	78	41	55	
17	114	163	60	86	47	221	315	50	71	77	190	271	36	51	
18	76	106	51	71	33	102	143	42	59	59	85	119	31	43	
19	87	117	64	86	26	170	228	51	68	70	148	199	42	56	
20	92	130	68	96	26	98	138	54	76	45	78	110	42	59	
21	80	118	63	93	21	111	164	55	81	51	82	121	38	56	
22	84	118	84	118	0	96	135	74	104	23	85	120	64	90	
23	78	109	72	100	8	91	127	58	81	36	76	106	42	59	
24	92	130	84	119	9	94	133	79	112	16	84	119	72	102	
25	84	118	68	95	19	89	125	54	76	39	73	102	43	60	
26	80	108	51	69	36	73	99	31	42	58	60	81	27	36	
27	80	121	72	109	10	102	154	60	91	41	92	139	59	89	
28	76	111	63	92	17	167	244	61	89	64	140	204	41	60	
29	68	99	54	79	21	85	124	58	85	32	68	99	42	61	
30	87	126	60	87	31	95	137	64	92	33	83	120	54	78	
31															
ARITH. MEAN	77	109	60	84	21	102	144	54	76	44	83	118	41	58	
STAT. MEAN		107		82			128		75						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 19 64 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J; Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant x10 Total Solids %	Supernatant x10 Vol. Solids %	Supernatant x10 Susp. Solids Mg/l	Supernatant x10 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. x 100	Gas Wasted cu. ft. x 100	Remarks
1	1768	24	5.9	5.8	81												92	42	Note — include gallons
2	1326	20	5.8	6.8	80											102	76	60	of sludge to beds
3	1326	21	5.8	6.9	80											100	66	66	
4	884	12	6.0	6.1	79											95	67	67	
5	1326	20		6.7	78											92	69	69	
6	1326	20	6.2	6.3	85	7072	7.4	.57	75	337	32				7.1	90	43	39	
7	1326	19		6.4	80											87	59	11	
8	884	15	5.8	7.5	78											95	52	0	
9	1326	17	6.1	5.7	81											102	73	57	
10	1768	31	5.4	7.8	79											96	66	66	
11	884	15	5.5	7.4	80											92	67	67	
12	884	11	5.7	5.6	77											89	81	35	
13	1326	20	5.9	7.0	77	13260	7.0	.50	74	320	48				7.1	96	43	32	
14	884	14		7.3	77											92	68	59	
15	884	15		7.8	76											90	57	57	
16	1105	18	5.7	7.8	76											88	63	63	
17	1105	19	5.9	7.6	78											86	55	44	
18	1105	18	5.7	7.3	79											87	42	36	
19	1105	13	5.7	5.2	79											85	48	36	
20	884	13	5.9	6.6	81											85	73	62	
21	1105	20		8.1	80											85	69	40	
22	884	15	6.2	7.6	79											85	48	48	
23	1326	19	5.9	6.5	77											85	61	31	
24	884	15	5.6	7.6	81											88	66	42	
25	1105	17	5.7	7.1	78											90	68	58	
26	1547	23	5.7	6.3	82											88	51	45	
27	1547	21	6.0	6.0	81											86	55	35	
28	663	12		8.2	77											87	79	73	
29	884	15	5.5	7.9	78											86	66	47	
30	1547	21		6.5	75	17680	7.2	.50	79		102				7.1	87	62	54	
31																			
ARITH. MEAN	1168	18	5.8	6.9	79	12670	7.2	.52	76	328	61				7.1	90	63	48	
STAT. MEAN		18																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	XXXXX XXXXX water XXXXXXXX cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas Cu. ft. x 100	Remarks
1		70	46	C	52	1.75	7.6		42		20	6	
2		72	48	C	52	1.72	7.6		39		16	5	
3		80	48	C	52	1.67	7.6		23		20	6	
4		84	58	C	52	1.78	7.7		57		16	4	
5		84	58	C	53	1.76	7.6		36		20	5	
6		84	60	C	54	1.75	7.6		348		16	6	
7	.94	86	64	R	54	1.86	7.6		336		20	5	
8	.21	82	54	R	55	1.91	7.6		50		20	5	
9		68	50	CL	53	1.75	7.6		56		20	9	
10		66	42	C	52	1.69	7.5		20		16	6	
11		78	56	CL	53	1.83	7.5		26		20	5	
12	.81	62	50	R	53	1.79	7.6		62		16	5	
13	.27	60	40	R	53	1.82	7.5		79		20	16	
14		68	38	C	52	1.80	7.6		65		20	9	
15	.52	78	54	R	52	1.83	7.6		1585	99	20	6	
16	.05	72	46	R		1.75			1625	100	20	9	
17		76	44	CL	53	1.75	7.6		1580	77	20	6	
18		84	64	C	53	1.91	7.6		1880	94	20	6	
19	.01	80	44	R	55	1.85	7.6		1730	91	20	8	
20		70	40	CL	54	1.77	7.6		1550	102	20	7	
21		82	54	C	53	1.77	7.6		1600	100	20	5	
22		90	66	C	54	1.86	7.6		1550	110	20	5	
23	.02	90	68	R	56	1.81			1560	106	20	9	
24		80	46	CL	54	1.69	7.3		1570	92	20	7	
25	.01	80	58	R	54	1.77	7.6		1530	89	16	8	
26		86	50	CL	54	1.77			1720	84	20	7	
27		66	42	C	54	1.69	7.6		1520	87	20	2	
28		62	36	C	54	1.66	7.6		1560	90	20	1	
29		66	38	C	54	1.66	7.6		1980	89	20	5	
30		74	48	CL	54	1.59	7.6		1620	85	20	6	
31		74	44	CL	54	1.59	7.5		1570	87	16	6	
ARITH. MEAN	.091	76	50		52	1.76	7.6		934	93	19	6.3	
STAT. MEAN						1.76							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
F 1	108	158	80	117	26	100	146	50	73	50	82	120	40	58	
S 2	84	120	80	115	5	109	156	73	105	33	102	146	69	99	
S 3	96	134	92	128	4	100	139	84	117	16	86	120	68	95	
M 4	68	109	68	101	0	82	122	55	82	33	73	108	45	67	
5	80	117	67	98	16	182	267	53	78	71	163	239	42	62	
6	84	123	63	92	25	89	130	45	66	49	78	114	34	50	
7	96	149	63	98	34	103	160	56	87	46	83	129	46	71	
8	76	121	54	86	29	101	161	45	72	55	83	132	38	61	
9	84	123	59	79	36	105	153	46	67	56	97	142	40	58	
10	76	107	63	89	17	84	118	50	70	41	70	99	40	56	
11	102	156	68	104	33	153	233	64	98	58	132	201	52	79	
12	88	131	24	36	27	120	179	55	82	54	78	116	36	54	
13	90	137	60	91	33	107	162	60	91	44	99	150	47	71	
14	84	126	54	81	36	80	120	47	71	41	66	99	36	54	
15	72	110	45	69	38	116	177	27	41	77	100	153	23	35	
16	92	134	68	99	26	143	209	30	44	79	132	193	29	42	
17	72	105	72	105	0	77	112	40	58	48	61	89	29	42	
18	84	134	72	115	14	89	142	48	76	46	80	127	45	72	
19	72	111	57	88	21	99	153	44	68	56	84	130	34	52	
20	67	99	63	93	6	94	139	56	83	41	84	124	47	69	
21	84	124	72	106	14	121	179	50	74	58	98	145	38	56	
22	83	129	66	102	20	92	143	57	88	38	78	121	46	71	
23	96	145	68	103	29	88	133	45	68	49	85	128	44	66	
24	82	116	72	101	12	90	127	45	63	50	77	108	35	49	
25	72	106	60	89	17	144	213	54	80	63	132	195	46	68	
26	83	123	72	106	13	83	123	42	62	49	74	109	38	56	
27	68	96	48	68	29	115	162	37	52	68	100	141	31	44	
28	76	105	65	90	15	92	127	48	66	46	77	107	37	51	
29	80	111	77	107	4	78	108	48	66	38	64	89	41	57	
30	114	151	65	86	44	73	97	40	53	45	66	88	32	42	
S 31	102	135	72	95	29	105	139	44	58	58	94	125	40	53	
ARITH. MEAN	84	124	65	95	21	104	153	50	73	50	90	132	41	60	
STAT. MEAN		123		96			148		74						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 19 64 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	transfer ~~xxxxx~~ #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas: Produced cu. ft. x 100	Gas: Wasted cu. ft. x 100	Remarks
1	1547	29		8.7	76											85	61	61	Note — include gallons
2	1326	17	5.6	5.9	76											83	60	60	of sludge to beds
3	1768	24	5.6	6.0	79											81	44	44	
4	884	17	5.6	7.5	90											80	71	71	
5	884	12	5.6	7.3	67											79	50	50	
6	1326	21		7.2	77											78	51	41	
7	1547	24		7.1	77											79	50	50	
8	884	15	5.7	7.7	78											78	40	40	
9	884	14	5.6	7.2	79											78	67	67	
10	1768	26		7.2	73											77	55	55	
11	1105	18	5.8	7.7	76											76	50	50	
12	884	17	5.5	9.5	72											75	50	50	
13	1768	25	5.7	6.5	76											74	44	44	
14	1768	23	6.0	6.0	76	9282		.81	67							74	44	44	
15	884	14		7.4	76											73	55	55	
16	884	12		6.5	76											73	49	49	
17	1326	22		7.5	76											72	51	51	
18	1326	18		6.0	80											72	50	50	
19	1768	37	5.7	9.2	80											72	50	50	
20	884	15	5.6	7.8	78											72	49	49	
21	1326	15	5.6	5.3	75											72	48	48	
22	1326	18	5.6	6.3	76											72	32	32	
23	1326	16		5.2	80	9282		1.4	65						7.0	71	40	40	
24	1105	14	5.9	5.5	83											71	64	64	
25	1547	20	5.7	5.6	82											71	50	50	
26	884	14		7.2	76											71	46	46	
27	884	14	5.5	7.2	76											71	47	47	
28	884	9	5.8	4.2	81											71	44	44	
29	1326	24	5.6	7.7	82											70	51	28	
30	884	13	5.7	6.5	81											74	48	48	
31	1768	18	5.7	4.5	80											72	50	50	
ARITH. MEAN	1248	19	5.7	6.8	78	9282		1.1	66						7.0	75	50	49	
STAT. MEAN		19																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1964

DIGESTER AND SLUDGE DATA

OPERATOR Robert Swalwell

Digested Raw Sludge to beds | Supernatant x10 x10⁻ | sludge near bottom | Temp. | Gas

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	Remarks
1																			Note — include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15	8525			9.0	57														
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23						9282		.41	71		32				7.1				
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
ARITH. MEAN	8525			9.0	57	9282		.41	71		32				7.1				
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~Power~~ water ~~Gas~~ cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL ~~Gas~~ cu. ft. x 100	Remarks
1		72	38	C	55	1.68	7.7		1520	94	20	2	
2		72	42	C	54	1.66	7.7		1550	104	20	3	
3		68	46	C	54	1.66	7.6		1550	103	20	3	
4		74	48	CL	54	1.63	7.5		1590	94	20	5	
5		80	50	CL	54	1.65	7.5		1610	79	16	4	
6	.82	78	60	R	54	1.72	7.4		1600	87	20	3	
7	.10	84	54	R	54	1.67	7.4		1560	81	16	5	
8		90	66	C	56	1.80	7.5		1550	94	20	6	
9	.21	94	62	R	58	1.80	7.6		1560	83	20	9	
10		76	50	C	56	1.68	7.5		1730	84	20	2	
11		80	58	C	56	1.67	7.5		1580	100	20	4	
12	.04	90	60	R	56	1.75	7.5		1590	94	20	4	
13		88	66	C	57	1.75	7.6		1550	96	16	5	
14	.97	90	62	R	57	1.73	7.7		1520	89	20	5	
15	.06	72	42	R	56	1.74	7.6		1510	88	16	3	
16		74	46	C	55	1.69	7.7		1580	92	20	3	
17	.02	80	60	R	55	1.69	7.6		1550	88	20	6	
18		88	70	C	56	1.78	7.6		1540	90	20	5	
19	.06	96	66	R	58	1.82	7.5		1520	107	16	7	
20		90	68	CL	57	1.77	7.6		1540	86	20	6	
21	.07	80	62	R	57	1.67	7.5		1770	80	20	5	
22	.42	92	66	R	58	1.86	7.6		1640	90	16	6	
23		88	60	C	58	1.80	7.7		1570	90	20	6	
24		72	50	C	57	1.64	7.7		1540	106	20	6	
25		88	62	C	56	1.71	7.6		1590	89	20	5	
26		94	66	C	56	1.78	7.6		1610	91	16	5	
27		96	62	C	58	1.70	7.7		1480	124	20	6	
28		94	64	C	57	1.61	7.6		1560	94	20	5	
29		100	66	C	59	1.78	7.5		1530	102	16	6	
30	.01	98	68	R	59	1.70	7.5		1600	82	20	5	
31													
ARITH. MEAN	.093	85	58		56	1.72	7.6		1573	93	18.9	4.8	
STAT. MEAN						1.72							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf		Eff		Rem	Inf		Eff.		
	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	%	Mg/l	lbs. X10	Mg/l	lbs. X10	
M 1	114	160	84	118	26	100	140	53	74	47	74	104	37	52	
2	96	133	81	112	16	116	161	58	80	50	86	119	38	53	
3	88	122	77	107	13	94	130	57	79	39	80	111	49	68	
4	80	109	69	94	14	113	154	60	82	47	93	126	42	57	
5	96	132	69	95	29	223	307	55	76	75	191	263	44	61	
6	132	189	78	112	48	167	239	46	66	72	145	208	41	59	
7	102	142	72	100	29	98	137	47	65	52	82	114	34	47	
8	96	144	80	120	17	194	291	47	71	76	163	245	35	53	
9	102	153	80	120	22	86	129	42	63	51	75	113	37	56	
10	84	118	60	84	29	91	127	43	60	53	80	112	34	48	
11	90	125	64	89	29	137	191	69	96	60	114	159	41	57	
12	96	140	68	99	29	159	232	68	99	57	140	204	54	79	
13	84	123	60	88	29	90	131	42	61	53	72	105	36	53	
14	114	165	72	104	37	147	212	50	72	66	114	165	38	55	
15	120	174	68	99	52	132	192	48	70	64	108	157	39	57	
16	96	135	68	96	29	105	148	57	80	46	96	135	51	72	
17	68	96	60	85	12	116	163	50	70	57	100	141	38	54	
18	108	160	68	101	37	107	159	38	56	65	96	143	40	59	
19	114	173	64	97	44	113	172	44	67	61	97	147	34	52	
20	126	186	68	100	46	89	131	39	58	56	79	117	30	44	
21	64	89	48	67	25	76	106	37	52	51	64	89	32	45	
22	78	121	60	93	23	106	164	50	78	53	83	129	38	59	
23	94	141	51	77	46	150	225	58	87	61	128	192	44	66	
24	90	123	68	93	24	111	152	66	90	41	90	123	53	73	
25	96	137	56	80	42	231	329	72	103	69	200	285	60	86	
26	64	95	60	89	6	90	134	51	76	43	83	123	47	70	
27	80	113	64	91	20	91	129	41	58	55	87	123	41	58	
28	72	97	54	73	25	99	133	54	73	45	90	121	45	60	
29	90	134	68	101	24	122	181	51	76	58	92	137	40	59	
Y 30	104	147	72	102	31	100	142	48	68	52	84	119	38	54	
31															
ARITH. MEAN	95	136	67	96	29	122	175	51	74	56	103	148	41	59	
STAT. MEAN		136		96			156		74						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	Raw Sludge					Transfer Sludge #1 to #2					sludge near bottom			Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1326	20	5.4	6.9	79										7.0	72	49	25	Note — include gallons
2	1326	20	5.7	6.6	80											75	55	27	of sludge to beds
3	1768	19	5.9	4.8	81											78	44	27	
4	1326	16	5.7	5.4	80	11934		1.4	65							78	68	40	
5	1326	23	5.6	7.7	81											80	65	23	
6	884	14	5.6	6.8	82											84	52	38	
7	1326	17	5.7	5.6	82											84	86	52	
8	2210	64	5.3	10.9	94											87	78	58	
9	1326	18	5.6	6.2	79											86	65	65	
10	884	16	5.5	8.1	79											85	65	19	
11	1547	26	5.4	7.1	84											90	56	26	
12	1326	18	5.6	5.9	84	13039		1.1	66						7.0	92	47	35	
13	1326	17		5.6	83											90	72	29	
14	1326	18	5.7	5.8	83											94	61	24	
15	1326	20	5.6	7.0	78											97	59	20	
16	884	13	5.6	6.8	78											96	97	52	
17	1326	20	5.6	6.6	80											96	96	70	
18	1326	17	5.6	5.5	80											97	83	43	
19	1326	16	5.7	5.4	78											99	91	47	
20	884	11	5.6	5.3	82											96	40	34	
21	1768	23	5.6	5.6	81											96	101	65	
22	884	11		5.4	8o											98	71	71	
23	884	14	5.2	7.0	78	26216		1.4	65						7.1	97	45	45	
24	1326	18	5.5	6.4	75											94	63	63	
25	884	14	5.5	6.9	79											92	91	91	
26	884	14	5.6	7.3	79											90	81	31	
27	1326	16	5.5	5.3	81											102	51	43	
28	1105	13	5.6	5.3	79											98	46	35	
29	884	10	5.7	5.3	79											96	85	85	
30	1105	15	5.7	6.0	81											94	58	58	
31																			
ARITH. MEAN	1245	18	5.6	6.4	81	17063		1.3	65						7.0	90	67	45	
STAT. MEAN		17																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 19 64 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

digested ~~Raw Sludge~~ to beds

Date	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant x10 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	pH #2	Temp. °F	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1															7.1				Note — include gallons
2																			of sludge to beds
3																			
4						11934		.38	66	201	75								
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12						13039		.36	67	113	30				7.0				
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24	13260		8.9	56		12956		.59	72		45				7.1				
25																			
26																			
27																			
28																			
29																			
30																			
31																			
ARITH. MEAN	13260		8.9	56		12643		.44	69	157	50				7.1				
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather Precip. Inches	Weather Temp. (°F) Max.	Weather Temp. (°F) Min.	Raw Sewage Type*	Raw Sewage Temp. °F	Raw Sewage Flow MGD	Raw Sewage pH	Grit cf/mg	~~XXXX~~ water ~~XXXXX~~ cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1	.04	90	66	R	59	1.71	7.8		1490	86	16	5	
2	.72	88	62	R	59	1.76	7.5		1600	99	20	5	
3	.01	80	50	R	60	1.62	7.5		1720	110	20	2	
4		86	50	C	57	1.44	7.5		1650	90	16	3	
5		88	54	C	57	1.43	7.6		1410	88	20	3	
6	.09	88	64	R	58	1.67	7.6		1410	112	16	2	
7	.79	82	60	R	58	1.72	7.7		1490	89	20	3	
8		82	62	C	58	1.68	7.7		1500	81	16	1	
9		88	56	C	58	1.64	7.6		1460	95	20	4	
10		96	58	C	58	1.71	7.6		1520	92	16	4	
11	.19	92	60	R	58	1.66	7.6		1480	94	20	5	
12		72	50	CL	57	1.51	7.6		1490	88	16	4	
13	.57	68	56	R	58	1.70	7.6		1390	106	20	0	
14	.02	70	54	R	58	1.68	7.6		1760	95	16	0	
15		90	66	C	58	1.70	7.7		1470	93	20	0	
16		94	64	C	59	1.71	7.7		1460	97	20	0	
17		95	70	C	59	1.74	7.6		1490	79	16	5	
18		88	64	C		1.71	7.6		1490	77	16	4	
19		98	70	C	58	1.61	7.6		1450	81	20	5	
20	.05	96	68	R	61	1.74	7.6		1420	113	16	5	
21	.04	92	68	R	59	1.69	7.6		1510	77	20	2	
22		95	67	C	61	1.75	7.6		1500	85	16	3	
23		94	64	C	60	1.66	7.7		1550	83	20	4	
24		98	68	C	60	1.67	7.5		1640	75	16	10	
25		92	64	C	60	1.65	7.5		1530	92	20	3	
26		98	64	C	60	1.53	7.7		1500	81	16	3	
27		98	70	C	61	1.69	7.6		1430	103	16	2	
28		96	66	C	61	1.65	7.7		1430	90	20	5	
29		82	52	CL	60	1.61	7.5		1510	86	16	2	
30		80	60	CL	59	1.48	7.5		1520	75	16	4	
31	.12	86	60	R	58	1.53	7.5		1520	90	20	6	
ARITH. MEAN	.085	88	62		59	1.65	7.6		1511	90	17.9	3.3	
STAT. MEAN						1.66							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH July 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
W 1	68	97	48	68	29	136	194	39	56	71	123	175	35	50	Samples used are 24 hr.
2	72	106	42	62	42	183	269	34	50	82	163	239	30	44	composits collected by
3	76	103	68	92	11	105	142	51	69	52	89	120	41	55	automatic samplers. The
4	76	91	60	72	21	73	88	30	36	59	64	77	26	31	effluent samples contain
5	90	107	76	91	16	100	119	52	62	48	83	99	39	47	supernatant while the raw
6	96	134	72	100	25	129	180	55	77	57	104	145	42	59	do not.
7	72	103	57	82	21	122	175	54	77	56	94	135	32	46	
8	80	112	59	83	26	116	163	49	69	58	100	140	41	57	
9	80	109	76	104	5	106	145	68	93	36	86	118	51	70	
10	76	108	64	91	16	144	205	52	74	64	130	185	42	60	
11	78	108	72	100	4	88	122	40	55	55	73	101	26	36	
12	90	113	72	91	20	86	108	50	63	42	73	92	41	52	
13	102	145	76	108	25	115	163	55	78	52	92	130	40	57	
14	88	123	33	46	63	106	149	30	42	66	88	123	22	31	
15	80	113	80	113	0	101	143	52	74	48	79	112	41	58	
16	68	97	64	91	5	91	130	50	71	45	73	104	39	56	
17	83	120	64	93	23	158	229	49	71	69	137	199	37	54	
18	90	128	54	77	40	93	133	44	63	53	87	124	44	63	
19	84	113	68	91	19	106	142	45	60	68	90	121	35	47	
20	76	110	64	93	16	115	167	56	81	51	98	142	47	68	
21	72	101	54	76	25	87	123	38	54	56	77	108	36	51	
22	79	115	64	93	19	70	102	45	66	36	58	85	30	44	
23	68	94	64	89	5	78	108	53	73	32	66	91	42	58	
24	76	106	72	100	5	85	118	44	61	48	74	103	42	59	
25	90	124	68	94	24	79	109	41	56	48	77	106	41	56	
26	72	92	64	82	11	95	121	38	48	60	79	101	38	48	
27	108	152	80	113	26	112	158	58	82	49	97	137	53	75	
28	90	124	60	83	33	235	323	45	62	81	208	286	32	44	
29	84	113	78	105	7	89	120	51	68	43	71	95	41	55	
30	96	118	60	74	38	150	185	46	57	69	133	164	34	42	
31	108	138	72	92	33	114	145	42	54	63	92	117	28	36	
ARITH. MEAN	83	113	65	89	21	112	154	47	65	55	95	131	38	52	
STAT. MEAN		112		88			146		64						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	Raw Sludge Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	transfer ~~XXXXXX~~ #1 to #2 Gals.	pH	sludge near bottom Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft. X 100	Remarks
1	2210	34	5.6	6.8	80											92	52	26	Note — Include gallons
2	1326	18		6.3	78											94	65	35	of sludge to beds
3	1326	25	5.2	7.8	85											96	81	81	
4	1326	16	5.4	5.6	77											94	64	64	
5	1326	15		5.0	78											92	62	62	
6	1326	15	5.6	5.3	77											90	56	56	
7	1326	21	5.6	7.5	76											88	47	47	
8	884	12	5.4	6.3	76											88	71	3	
9	1326	15	5.5	5.0	81											90	74	49	
10	1768	26	5.6	6.4	80	11934		1.8	63							92	70	70	
11	884	12	5.6	6.1	76											90	16	16	
12	2210	31	5.6	6.4	77											88	54	54	
13	1768	21	5.7	5.2	79											87	61	0	
14	1326	21	5.8	7.1	78										7.2	96	67	0	
15	884	21	5.5	7.8	79	12818		1.8	64								69	0	
16	884	9		4.8	76											104	79	66	
17	884	12	5.4	6.2	80											100	55	55	
18	1768	23	5.6	5.9	78											96	61	61	
19	884	12	5.5	6.0	78											94	63	63	
20	1768	23	5.5	5.6	82											93	46	46	
21	1768	18	5.5	4.5	81											91	74	52	
22	884	15	5.5	6.6	88	8398		7.2	57							92	51	51	
23	884	15	5.4	6.6	88											92	50	50	
24	1105	10	5.5	4.2	79											91	37	37	
25	1326	17	5.4	5.4	84											89	60	60	
26	1547	19	5.4	5.5	79											88	49	49	
27	884	14	5.4	6.4	87											87	56	31	
28	1105	17	5.3	6.7	80											92	47	47	
29	1105	15		5.9	81											90	54	11	
30	1768	23	5.6	5.5	84											96	68	45	
31	1326	21	5.7	6.9	81											95	68	68	
ARITH. MEAN	1326	18	5.5	6.0	80	11050		3.6	61							72	59	44	
STAT. MEAN		18																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Plant Eff. water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		92	62	CL	60	1.58	7.6		1490	78	16	5	
2	.05	100	74	R	60	1.56	7.6		1490	84	16	5	
3		98	64	CL	62	1.72	7.6		1430	98	16	2	
4		92	60	C	62	1.65	7.6		1630	85	16	3	
5		84	54	C	60	1.55	7.7		1480	101	20	6	
6		90	60	C	60	1.53	7.5		1530	85	20	2	
7		90	52	C	60	1.58	7.5		1540	95	16	0	
8		76	42	CL	59	1.44	7.5		1580	81	20	0	
9		76	50	CL	59	1.34	7.7		1480	95	16	0	
10		80	62	C	60	1.49	7.6		1490	92	16	3	
11	.94	78	54	R	60	1.60	7.6		1500	97	16	3	
12	.01	62	50	R	59	1.45	7.6		1490	87	16	6	
13	.08	66	40	R	59	1.48	7.7		1490	101	20	7	
14		70	40	CL	59	1.52	7.6		1510	97	16	2	
15		80	46	C	58	1.52	7.6		1520	89	20	2	
16		79	53	C	58	1.45	7.6		1440	101	16	3	
17		84	56	C	60	1.54	7.6		1590	106	16	5	
18		74	46	CL	59	1.50	7.5		1500	92	16	4	
19	.65	76	56	R	59	1.52	7.6		1480	95	16	8	
20	.90	72	56	R	59	1.60	7.5		1440	107	16	4	
21	.04	78	60	R	60	1.72	7.6		1510	103	20	3	
22	.58	74	56	R	60	1.72	7.7		1470	98	20	4	
23		70	52	CL	59	1.58	7.6		1520	92	16	3	
24		76	60	C	60	1.67	7.6		1440	103	16	8	
25		72	44	C	60	1.62	7.6		1530	91	16	6	
26		78	52	C	58	1.59	7.6		1660	105	20	6	
27	.06	84	60	R	59	1.64	7.6		1610	98	16	5	
28	.51	88	56	R	60	1.73	7.6		1420	104	20	2	
29	.07	86	62	R	60	1.65	7.5		1490	112	16	2	
30		88	52	C	60	1.54	7.6		1500	90	16	5	
31		76	50	C	59	1.61	7.6		1420	99	16	10	
ARITH. MEAN	.125	80	54		60	1.57	7.6		1505	96	17.2	4	
STAT. MEAN						1.57							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 19 64

PRIMARY TREATMENT DATA

OPERATOR Robert Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
SA 1	126	166	42	55	33	112	148	37	49	67	92	121	27	36	
2	102	133	76	99	25	98	127	49	64	50	80	104	38	49	
3	76	109	72	103	5	189	271	53	76	72	168	241	43	62	
4	72	99	72	99	0	113	155	47	65	58	99	136	46	63	
5	108	140	76	98	30	225	291	74	96	67	195	252	51	66	
6	96	122	76	97	21	132	168	54	69	59	116	148	47	60	
7	132	174	64	84	49	204	269	41	54	80	186	245	32	42	
8	126	151	88	106	30	136	163	44	53	68	129	155	39	47	
9	114	127	76	85	33	115	129	41	46	64	97	108	33	37	
10	108	134	88	109	19	161	200	57	71	65	144	179	47	58	
11	84	112	51	68	39	135	180	47	63	65	104	139	33	44	
12	120	145	84	102	30	119	144	61	74	49	90	109	43	52	
13	84	104	84	104	0	97	120	52	64	46	80	99	42	52	
14	96	122	80	101	17	147	186	70	89	52	118	150	50	63	
15	144	183	80	101	44	170	216	43	55	75	138	175	35	44	
16	120	145	80	97	33	158	191	54	65	66	141	170	43	52	
17	126	162	88	113	30	178	229	69	89	61	151	194	51	65	
18	114	143	68	85	40	123	154	47	59	61	98	123	36	45	
19	90	114	54	68	40	136	172	44	56	68	115	146	34	43	
20	96	128	80	107	17	152	203	58	77	62	120	160	38	51	
21	84	120	80	115	5	108	155	67	96	38	83	119	45	65	
22	96	138	80	115	17	118	169	50	72	58	99	142	47	67	
23	96	127	72	95	25	102	134	58	76	43	82	108	46	61	
24	96	134	80	111	17	143	199	77	107	46	110	153	58	81	
25	102	138	80	108	22	94	127	54	73	43	78	105	41	55	
26	96	127	92	122	4	261	346	74	98	72	231	306	50	66	
27	102	140	88	120	14	119	163	90	123	24	100	137	69	94	
28	95	137	80	115	16	150	216	60	87	60	120	173	47	68	
29	90	124	84	116	7	107	147	46	63	57	94	129	44	61	
30	80	103	60	77	25	95	122	56	72	41	78	100	45	58	
M 31	84	113	68	91	19	123	165	67	90	46	109	146	57	77	
ARITH. MEAN	102	133	76	99	23	139	183	56	74	58	118	154	44	58	
STAT. MEAN		131		100			172		74						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	Supernatant: Susp. Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH #1	Temp °F #1	Gas: Produced cu ft. x 100	Gas: Wasted cu. ft.	Remarks
								x10	x10										
1	884	10	5.6	4.7	84											92	60	0	Note — include gallons
2	1547	26	5.6	7.4	81											91	47	0	of sludge to beds
3	1547	19	5.4	5.6	79											90	71	16	
4	1768	26	5.2	6.5	80											91	61	0	
5	1105	18	5.4	7.3	80	12155		.39	73	139	42				7.0	90	57	0	
6	1768	25	5.6	6.2	81											88	74	74	
7	1326	19	5.5	6.3	82											100	70	70	
8	884	9	5.6	4.9	77												70	70	
9	1547	24	5.5	6.7	80											98	67	67	
10	1326	23	5.3	7.0	87											106	65	12	
11	1547	19	5.4	5.6	79											103	64	0	
12	1768	21	5.5	5.3	80											98	63	0	
13	1768	25	5.4	6.2	79											96	62	0	
14	1326	18		5.9	82											94	69	54	
15	1326	17	5.5	5.5	81											102	69	69	
16	884	15	5.4	7.3	81											98	60	60	
17	1105	16	5.4	6.2	81											104	74	0	
18	1547	23	5.6	6.4	81											102	61	0	
19	2210	32	5.4	6.2	82											99	55	0	
20	2210	29	5.2	5.7	81											96	63	49	
21	884	18	5.4	9.2	79											102	26	26	
22	884	10	5.4	5.0	78	11492		.39	71	122	75				7.0	102	75	70	
23	1326	16	5.7	5.8	75											100	42	42	
24	884	21	5.4	9.6	88											104	40	12	
25	2210	37	5.4	7.8	75											102	60	0	
26	1768	28	5.5	7.4	76											99	59	0	
27	1326	18	5.6	6.2	76											96	45	0	
28	1326	20	5.4	7.0	77											94	82	69	
29	1326	19	5.5	6.5	79											104	54	54	
30	1768	26		7.0	73											108	76	8	
31	884	13		6.7	76											104	55	0	
ARITH MEAN	1419	21	5.5	6.5	80	11823		.39	72	130	58					98	62	27	
STAT MEAN		21																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1		70	50	C	59	1.54	7.7		1470	114	16	5	
2		80	58	C	59	1.59	7.7		1510	100	20	10	* Plant bi-passed from 9:15P.M.
3		86	64	C	60	1.60	7.7		1450	115	16	8	until 7:45 A.M. due to a power
4		82	50	C	60	1.60	7.6		1640	94	20	9	failure.
5		72	46	C	60	1.53	7.5		1810	98	20	8	
6	.01	68	54	R	58	1.41	7.5		1440	108	16	8	
7		90	64	C	59	1.55	7.6		1460	99	16	3	
8		88	66	C	60	1.67	7.6		1500	115	16	4	
9	.17	88	64	R	61	1.66	7.7		1520	100	20	6	
10	.35	90	58	R	61	1.63	7.6		1450	106	16	6	
11		66	38	C	60	1.51	7.5		1490	114	16	4	
12		60	34	C	58	1.40	7.6		1510	107	16	2	
13		64	38	C	58	1.44	7.6		1430	108	20	1	
14	.05	72	42	R	60	1.51	7.6		1430	105	20	2	
15		54	42	CL	58	1.44	7.6		1560	86	16	6	
16		70	44	C	58	1.45	7.5		110		16	4	
17		80	54	C	59	1.47	7.7		24		12	4	
18	.87	68	58	R	60	1.59	7.6		146		16	6	
19		70	56	CL	60	1.52	7.5		31		16	4	
20	.10	84	62	R	59	1.47	7.5		23		16	2	
21		84	62	CL	60	*1.07			53		12	10	
22	.12	76	60	R		1.56	7.6		13		16	2	
23	.02	68	48	R	60	1.51	7.6		40		16	1	
24	.14	64	46	R	59	1.44	7.7		30		16	3	
25	.02	74	48	R	58	1.47	7.6		18		16	5	
26	.63	54	32	R	59	1.48	7.8		10		16	5	
27		58	34	CL	58	1.36	7.6		37		20	8	
28		64	40	C	59	1.47	7.6		29		16	5	
29		62	40	C	57	1.43	7.7		41		16	0	
30		58	42	C	58	1.37	7.6		263		16	5	
31													
ARITH. MEAN	.083	72	50		59	1.49	7.6		785	104	16.7	4.9	
STAT MEAN						1.50							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	
1	84	108	84	108	0	103	132	75	96	27	81	104	55	71	
2	84	111	84	111	0	133	176	74	98	44	112	149	56	74	
3	126	168	88	117	30	118	157	62	83	48	100	133	52	69	
4	84	113	72	97	14	107	145	57	77	47	93	126	51	69	
5	90	115	76	97	16	163	208	57	73	65	153	195	54	69	
6	90	106	72	85	20	112	132	63	74	44	91	107	63	74	
7	102	132	88	114	14	115	149	72	93	37	92	119	56	72	
8	102	142	76	106	25	156	217	68	95	56	126	176	52	72	
9	108	149	72	100	33	161	223	45	62	72	136	188	33	46	
10	96	130	72	98	25	188	255	47	64	77	163	222	38	52	
11	108	136	76	96	30	121	152	58	73	52	96	121	52	65	
12	120	140	60	70	50	139	162	43	50	69	117	137	35	41	
13	96	115	80	96	17	149	179	78	94	48	124	149	58	70	
14	102	128	88	111	14	128	161	65	82	49	102	128	48	60	
15	108	130	76	91	30	116	139	49	59	58	99	119	39	47	
16	96	116	72	87	25	147	178	52	63	65	126	152	40	48	
17	108	132	80	98	26	214	262	67	82	69	160	196	47	58	
18	132	175	80	106	39	229	304	68	90	70	179	237	50	66	
19	108	137	64	81	41	105	133	45	57	57	87	110	38	48	
20	120	147	76	93	37	134	164	60	74	55	109	134	44	54	
21	119	106	75	67	37	148	132	59	53	60	121	108	46	41	
22	102	133	72	94	29	100	130	61	79	39	82	107	49	64	
23	96	121	68	86	29	144	181	68	86	53	97	122	48	60	
24	92	110	92	110	0	113	136	70	84	38	81	97	64	77	
25	102	125	76	93	25	166	204	54	66	68	154	189	42	51	
26	104	126	54	67	47	125	154	51	63	59	102	126	42	52	
27	90	102	72	82	20	132	150	61	69	54	111	126	58	66	
28	92	113	92	113	0	110	135	100	123	9	85	104	74	91	
29	108	129	39	47	64	106	126	33	39	69	73	87	21	25	
30	88	101	84	96	5	113	129	56	64	51	95	109	45	51	
31															
ARITH. MEAN	102	127	75	94	25	136	170	61	76	54	112	139	48	60	
STAT. MEAN		125		96			156		75						

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH September 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	transfer #1 to #2: Gals.	transfer #1 to #2: pH	transfer #1 to #2: Total Solids %	transfer #1 to #2: Vol. Solids %	transfer #1 to #2: Susp. Solids Mg/l	transfer #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH #1	Temp. °F #1	Gas: Produced cu. ft. x 100	Gas: Wasted cu. ft. x 100	Remarks
1	884	13		6.6	79	10166		1.4	64							102	39	39	Note — Include gallons of sludge to beds
2	884	13	5.5	6.6	79											100	67	19	
3	1326	22	5.4	7.9	95	6188		8.2	55							106	53	34	
4	3094	43	5.5	6.4	77											102	67	67	
5	884	7		4.5	64											98	63	63	
6	1326	14	5.5	4.8	78											96	98	48	
7	2210	29	5.5	5.8	80											102	65	0	
8	2652	35	5.6	5.8	80												88	64	
9	3094	41	5.5	5.8	81											96	68	68	
10	1326	16	5.5	5.5	79										7.0	94	70	60	
11	1326	15	5.6	5.0	80	11050		.90	66							94	81	18	
12	884	11	5.6	5.4	81											102	69	0	
13	1326	16	5.5	5.4	79											100	57	30	
14	1768	20	5.7	5.1	79											100	78	31	
15	884	7	5.7	3.5	84											104	63	7	
16	1326	17		5.8	78											102	57	38	
17	1326	18	5.6	5.8	81											102	48	48	
18	1326	16	5.6	5.3	82											100	47	47	
19	1326	17	5.6	5.6	80											97	70	47	
20	1547	22	5.5	6.1	82											99	57	51	
21	1547	28	5.4	7.6	84	22542		1.2	65						7.0	97	58	56	
22	2210	30	5.6	6.1	78											96	59	14	
23	1326	19	5.5	6.2	81											102	64	54	
24	1768	24	5.8	5.7	83											98	87	34	
25	1768	22	5.8	5.2	82											106	69	22	
26	1768	14		3.2	85											110	72	23	
27	1768	24	5.6	5.9	81											104	74	24	
28	1768	22	5.6	5.4	79											101	68	19	
29	1326	16	5.3	5.3	81											108	67	16	
30	1326	14	5.8	5.6	66	12818		1.3	66						7.2	112	52	50	
31	1326	20	5.6	5.6	79	12553		2.6	63						7.1	104	66	36	
		19																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu. ft.	Wasted cu. ft.	
1						10166		.40	75										Note — include gallons of sludge to beds
2	6188			10	57														
3																88			
4																			
5																			
6																			
7																			
8																			
9																94			
10															7.2				
11						11050		.51	72	278	95								
12																92			
13																98			
14																			
15																			
16																96			
17																			
18																			
19																			
20																			
21						22542		.45	71	216					7.4				
22																			
23																			
24																			
25																			
26																			
27																90			
28																93			
29																			
30						12818		.45	76	170	57				7.2				
31																			
ARITH. MEAN	6188			10	57	14144		.45	74	221	76				7.3	93			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1964 MISCELLANEOUS DATA OPERATOR R.J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~XXXX~~ water ~~XXXX~~ cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		70	44	C	58	1.45	7.7		24		16	5	
2		64	38	CL	60	1.47	7.6		28		16	7	
3		68	46	C	58	1.43	7.6		32		20	5	
4		56	32	C	57	1.33	7.7		24		16	13	
5	.05	50	32	R	57	1.39	7.6		36		16	12	
6		46	26	CL	57	1.41	7.7		38		16	15	
7		56	30	C	58	1.42	7.6		33		16	15	
8	.36	52	36	R	57	1.45	7.5		20		20	7	
9	.03	44	32	R&S	57	1.43	7.6		40		16	17	
10		42	22	C	57	1.34	7.6		69		16	14	
11		50	28	C	57	1.28	7.5		97		16	13	
12		58	34	CL	59	1.40	7.6		297		16	12	
13		64	34	C	57	1.37	7.6		114		16	12	
14		64	34	C	57	1.32	7.6		114		16	7	
15		68	36	C	57	1.35	7.8		109		16	7	
16		70	36	C	57	1.33	7.7		109		20	11	
17		72	42	C	57	1.33	7.6		131		16	8	
18		58	32	CL	57	1.21	7.7		109		16	12	
19	.05	48	24	R&S	59	1.31	7.8		107		16	12	
20		46	32	CL	56	1.28	7.7		122		16	9	
21	.01	52	28	R	56	1.29	7.7		147		16	10	
22		50	28	C	56	1.31	7.7		255		16	9	
23		46	28	C	56	1.30	7.8		188		20	10	
24		54	34	C	56	1.26	7.6		134		16	4	
25		70	36	C	56	1.44	7.8		126		16	4	
26		68	38	C	59	1.35	7.8		119		16	5	
27	.01	64	40	R	56	1.37	7.7		100		16	5	
28	.18	64	40	R	56	1.41	7.7		75		16	5	
29		50	26	CL	56	1.34	7.8		137		16	11	
30		52	28	C	56	1.38	7.7		85		20	16	
31		58	32	C	56	1.36	7.6		81		16	14	
ARITH. MEAN	.02	57	33		57	1.36	7.7		100		16.6	9.9	
STAT. MEAN						1.36							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 19 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
Th 1	88	106	57	69	35	179	216	64	77	64	155	187	52	63	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	90	110	39	48	57	126	154	45	55	64	109	134	34	42	
3	114	136	21	25	82	139	166	30	36	79	113	135	30	36	
4	138	153	64	71	54	163	181	55	61	66	141	156	45	50	
5	84	97	80	93	5	102	118	81	94	21	80	93	58	67	
6	102	120	102	120	0	130	153	83	98	34	102	120	63	74	
7	102	121	80	95	22	204	242	66	78	68	161	191	38	45	
8	80	97	68	82	15	114	138	73	88	36	90	109	55	66	
9	95	113	72	86	24	109	130	56	67	49	92	110	43	51	
10	108	121	84	94	22	112	125	49	55	56	94	105	43	48	
11	132	141	108	115	18	124	132	70	75	44	100	107	53	57	
12	102	119	88	103	14	158	185	79	92	50	137	160	61	71	
13	102	117	60	69	35	117	134	47	54	60	93	106	38	43	
14	96	106	84	92	13	113	124	59	65	48	100	110	47	52	
15	114	128	57	64	50	142	160	74	83	48	112	126	48	54	
16	120	133	54	60	55	133	147	76	84	43	99	110	44	49	
17	120	133	88	98	27	183	203	59	65	68	160	177	49	54	
18	126	127	104	105	17	137	138	73	74	47	125	126	61	62	
19	112	122	80	87	29	112	122	60	66	47	89	97	44	48	
20	108	115	68	73	37	96	103	35	37	64	82	88	34	36	
21	102	110	57	61	44	106	114	53	57	50	94	101	42	45	
22	102	111	63	69	38	118	129	44	48	63	91	99	29	32	
23	102	111	68	74	33	135	146	54	59	60	113	122	45	49	
24	138	145	80	84	42	157	165	50	53	68	132	139	42	44	
25	114	137	63	76	55	129	155	46	55	64	129	155	46	55	
26	102	115	72	81	29	121	136	67	75	45	97	109	54	61	
27	120	137	64	73	47	100	114	53	61	47	81	93	40	46	
28	88	103	60	71	32	125	147	55	65	56	105	123	47	55	
29	88	98	64	72	27	109	122	59	66	46	81	91	38	42	
30	102	117	80	92	22	124	143	66	76	47	106	122	54	62	
Sa 31	108	122	76	86	30	119	135	65	74	45	98	111	51	58	
ARITH. MEAN	106	120	71	80	33	130	148	60	68	53	108	123	46	52	
STAT. MEAN		119		80			141		67						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	Raw Sludge					transfer ~~Separator~~ #1 to #2						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. x 100	Wasted cu. ft. x 100	
1	2652	32	5.7	5.1	83											102	41	41	Note — include gallons
2	1768	22		5.3	82											97	40	40	of sludge to beds
3	1326	20	5.6	6.6	82											94	68	26	
4	2210	28	5.6	5.7	78											100	93	20	
5	2210	28	5.7	5.7	80											97	83	20	
6	1326	18	5.8	6.0	79											106	76	20	
7	1326	17	5.7	5.6	80											111	73	23	
8	1768	22	5.8	5.4	80											112	67	21	
9	1326	14	5.6	4.5	80	13260		1.7	63						7.1	105	68	14	
10	1326	16	5.7	5.2	81											112	66	9	
11	2210	27		5.4	80											107	57	9	
12	2210	33	5.7	6.5	80											110	21	21	
13	3536	55	5.5	6.5	84											102	52	52	
14	1768	23	5.6	5.5	82											96	37	37	
15	1768	26		6.4	82	13702		6.6	60							94	42	42	
16	1326	19	5.6	6.9	75											91	44	44	
17	1326	16	6.0	5.3	80											89	45	40	
18	3094	52	5.7	7.5	78											88	43	0	
19	2210	30		6.2	79											93	42	0	
20	2652	36	5.7	6.0	80											95	49	0	
21	2210	29		5.7	82	8398		.6	86							98	53	0	
22	2210	34	5.6	6.6	82											102	61	0	
23	2652	36	5.6	6.0	81											98	67	0	
24	1768	19	5.6	4.8	80											98	68	0	
25	1768	24	5.6	5.8	88											98	77	0	
26	1768	40	5.3	9.0	88											95	59	46	
27	1768	22	5.8	5.4	83											95	60	60	
28	2210	24	5.6	4.9	78											92	60	19	
29	1768	24	5.8	5.9	81											96	57	34	
30	1326	17	5.7	5.6	80	11934		.82	70						7.1	96	72	18	
31	2210	27	5.7	5.5	78											94	70	0	
ARITH. MEAN	1968	27	5.7	5.9	81	11823		2.4	70						7.1	99	58	21	
STAT. MEAN		26																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH October 1964 DIGESTER AND SLUDGE DATA OPERATOR Robert Swalwell

Date	digested sludge to beds					Supernatant					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	x10 Susp. Solids Mg/l	x10 5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	°F #2	Produced cu ft.	Wasted cu. ft.	
1																			Note — include gallons of sludge to beds
2																			
3																			
4																			
5																93			
6																			
7																			
8																			
9						13260		.43	72	150	90				7.2	97			
10																			
11																97			
12																			
13																			
14																			
15						13702		.47	74	235	42								
16																			
17																			
18																			
19																			
20	8398		9.0	56															
21																			
22																			
23																85			
24																90			
25																94			
26																100			
27																			
28																			
29																			
30						11934		.44	73						7.3				
31																95			
ARITH MEAN	8398		9.0	56		12965		.45	73	192	66				7.2	94			
STAT MEAN																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1964 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~BOD~~ ~~SS~~ water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1		66	38	CL	56	1.32	7.5		75		16	11	
2	.12	72	50	R	57	1.48	7.7		315		16	9	
3		70	44	CL	57	1.45	7.7		81		16	9	
4		68	44	C	56	1.43	7.6		31		16	9	
5		54	30	C	56	1.43	7.7		31		16	13	
6		52	30	C	56	1.43	7.7		82		20	15	
7		56	42	CL	56	1.42	7.8		25		16	14	
8		60	37	CL	57	1.41	7.6		30		16	14	
9		62	42	C	57	1.46	7.7		78		16	13	
10		64	44	C	56	1.44	7.7		40		16	12	
11		66	50	C	56	1.44	7.8		75		16	9	
12		68	44	W	57	1.45	7.7		203		16	10	
13		56	30	C	56	1.42	7.6		50		16	18	
14		58	34	CL	56	1.40	7.6		40		16	13	
15	.59	58	32	R	56	1.36	7.7		38		16	10	
16	.01	60	30	R	57	1.49	7.7		35		16	14	
17		48	22	CL	56	1.43	7.7		48		16	16	
18		42	34	CL	56	1.41	7.6		38		16	20	
19	.01	36	22	S	55	1.39	7.7		48		16	21	
20	.10	32	16	S	55	1.38	7.7		98		16	25	
21	.10	22	12	S	55	1.33	7.8		116		12	27	
22		26	14	C	55	1.32	7.6		120		20	24	
23		38	20	C	56	1.42	7.5		343		12	19	
24		42	20	C	55	1.40	7.8		39		20	19	
25		50	22	C		1.43	7.7		18		12	12	
26		48	24	CL	55	1.25	7.7		5		15	10	
27	.70	50	26	R	54	1.48	7.7		30		16	9	
28	.34	50	20	R&S	56	1.47	7.8		13		16	18	
29	.01	24	12	S	55	1.38	7.7		16		16	22	
30		24	12	CL	55	1.43	7.9		18		16	29	
31													
ARITH. MEAN	.066	51	30		56	1.41	7.7		73		16	15	
STAT. MEAN						1.42							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH November 1964 PRIMARY TREATMENT DATA OPERATOR Robert Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs. x10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs. x10	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs. x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs. x10	Suspended Solids Rem %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs. x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs. x10	Remarks
1	138	152	104	115	25	157	173	75	83	52	130	143	59	65	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	96	118	72	89	25	144	178	64	79	56	114	141	51	63	
3	108	131	57	69	47	101	122	42	51	58	78	94	32	39	
4	90	107	57	68	37	138	165	46	55	67	104	124	36	43	
5	78	93	57	68	27	106	126	40	48	62	97	116	38	45	
6	102	122	76	91	25	134	160	54	64	60	122	146	50	60	
7	108	128	76	90	29	146	173	42	50	71	132	156	38	45	
8	108	127	76	89	29	98	115	39	46	60	86	101	36	42	
9	102	124	76	93	25	160	195	49	60	69	142	173	41	50	
10	91	109	65	78	29	100	120	41	49	59	92	110	36	43	
11	85	102	51	61	40	90	108	58	70	35	80	96	52	62	
12	108	131	57	69	47	114	138	36	44	56	100	121	34	41	
13	120	142	57	67	53	128	151	36	43	72	126	149	30	36	
14	150	175	88	103	41	100	117	48	56	48	84	98	42	49	
15	120	136	60	68	50	104	118	26	29	75	84	95	18	20	
16	96	119	60	75	38	136	169	52	65	62	120	149	38	47	
17	100	119	100	119	0	110	131	74	88	33	92	110	60	72	
18	102	120	76	89	26	88	103	44	52	50	84	99	44	52	
19	84	97	76	88	10	104	121	38	44	64	92	107	36	42	
20	114	131	96	110	13	82	94	40	46	51	82	94	40	46	
21	96	106	96	106	0	150	166	72	80	52	142	157	62	69	
22	96	106	54	59	44	108	119	36	40	67	98	108	32	35	
23	84	99	30	36	64	124	147	20	24	84	102	121	20	24	
24	102	119	80	93	22	78	91	48	56	38	68	79	42	49	
25	96	115	44	52	54	104	124	74	88	29	94	112	68	81	
26	126	131	68	71	46	104	108	54	56	48	86	90	42	44	
27	96	118	84	104	13	120	148	60	74	50	94	116	52	64	
28	108	132	60	74	44	142	174	34	42	76	130	159	32	39	
29	102	117	76	87	25	84	97	42	48	50	74	85	36	41	
30	108	129	100	119	7	74	88	62	74	16	68	81	58	69	
31															
ARITH. MEAN	104	122	71	83	31	114	135	48	57	56	101	118	42	49	
STAT. MEAN		120		82			134		56						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH

MONTH November 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	transfer #1 to #2: Gals.	transfer #1 to #2: pH	transfer #1 to #2: Total Solids %	transfer #1 to #2: Vol. Solids %	transfer #1 to #2: Susp. Solids Mg/l	transfer #1 to #2: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH #1	Temp. °F #1	Gas: Produced cu. ft. x 100	Gas: Wasted cu. ft. x 100	Remarks
1	1326	18	5.6	5.9	80											101	99	39	Note — include gallons
2	1326	17	5.8	5.5	81											99	81	30	of sludge to beds
3	2652	26	5.7	4.3	80											104	78	25	
4	884	12	5.8	6.0	80											106	69	14	
5	1326	13	5.8	4.9	83												19	19	
6	1326	21	5.7	7.0	81	14586		.6	72							101	64	63	
7	884	13	5.9	6.6	77											98	58	58	
8	1326	17		5.6	81											94	66	66	
9	1326	26	5.6	8.1	86											93	68	66	
10	2210	28	5.7	5.6	80											90	69	0	
11	1326	18		6.1	77											101	75	0	
12	1326	17		5.6	79												71	59	
13	1326	20	6.0	6.7	78											98	65	65	
14	1326	17	5.8	5.6	81											94	70	70	
15	1768	22	5.8	5.6	80											92	73	73	
16	884	12		6.0	78											90	65	22	
17	1326	19	5.6	6.2	82	12818		1.5	63							95	70	66	
18	884	12	5.7	6.0	80											90	63	63	
19	884	11		5.5	81											88	79	10	
20	884	11		5.4	82											99	74	0	
21	1326	13	5.8	4.3	83											96	67	0	
22	2210	27	5.6	5.5	81											94	60	0	
23	3536	40		5.0	80											100	79	79	
24	1326	15	5.9	4.8	82											94	65	65	
25	884	11		5.4	81	11934		1.6	62							90	72	22	
26	1768	23	5.8	5.7	79											102	64	0	
27	1768	23	5.8	6.0	78											94	73	0	
28	1768	26	5.7	6.0	88											94	71	0	
29	2652	29		5.0	78											94	63	0	
30	1105	11	5.4	4.5	80											102	79	57	
31																			
ARITH MEAN	1495	19	5.8	5.7	80	13113		1.2	66							96	69	34	
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH D-4.5

MONTH November 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

digested ~~Raw Sludge~~ to beds

Date	digested Gals.	digested Lbs. Per 1000 c.f. Digester	digested pH	digested Total Solids %	digested Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day BOD Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	sludge near bottom pH	Temp. °F #2	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1																			Note — include gallons of sludge to beds
2																98			
3																			
4																94			
5																100			
6						14586	.40			322									
7																			
8																			
9																			
10																			
11																90			
12																94			
13																			
14																			
15																			
16																			
17						12818	.37	70		160	30								
18																			
19																			
20																			
21																83			
22																86			
23																			
24																			
25						11934	.38	67		145	63								
26																			
27																87			
28																92			
29																96			
30																			
31																			
ARITH. MEAN						13113	.38	69		152	46					92			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1964 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Raw Sewage: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Eff. water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu.ft. x 100	Remarks
1	.12	30	16	S	54	1.43	7.8		16		12	14	
2	.23	34	20	S	54	1.43	7.8		16		16	23	
3	.13	30	22	S	54	1.43	8.0		224		16	19	
4	.31	30	16	S	54	1.42	7.7		84		16	18	
5		24	-6	C	54	1.42	7.7		43		16	20	
6		24	12	CL	44	1.32	7.8		39		12	22	
7	.04	28	18	S	54	1.45	8.0		39		16	23	
8		32	-4	CL	54	1.39	7.8		34		16	20	
9		28	16	C	54	1.42	7.7		41		16	24	
10	.27	40	32	R	52	1.45	7.7		39		16	18	
11	.15	42	34	R	53	1.52	7.7		39		16	20	
12	.13	46	30	R&S	54	1.50	7.7		41		16	20	
13		36	22	CL	54	1.48	7.8		34		16	22	
14	.01	28	6	S	54	1.53	8.0		301		16	25	
15		28	18	C	52	1.49	7.7		129		20	22	
16		42	22	C	53	1.50	7.6		34		16	20	
17	.01	22	8	R	53	1.48	7.8		41		16	26	
18		22	8	CL	52	1.46	7.7		34		16	27	
19	.12	26	10	S	52	1.43	7.7		42		16	28	
20		32	10	C		1.38	7.8		30		16	24	
21		36	16	CL	53	1.50	7.8		66		16	20	
22	.01	38	30	R	52	1.50	7.7		33		16	20	
23	.02	48	28	R	53	1.52	7.7		38		16	25	
24	.12	54	32	R	53	1.48	7.6		47		16	6	
25	.08	36	32	R	52	1.37	7.5		26		16	6	
26		34	18	C	52	1.42	7.8		26		16	17	
27		30	18	CL	52	1.38	7.8		24		16	17	
28		32	22	CL	52	1.52	7.6		57		16	15	
29		42	32	CL	52	1.49	7.8		24		12	16	
30		42	22	CL	52	1.49	7.7		27		16	14	
31	.12	36	22	R	52	1.47	7.6		22		16	20	
ARITH. MEAN	.06	34	19		53	1.45	7.7		55		15.7	20	
STAT. MEAN						1.46							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 19 64 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	102	122	76	91	26	86	103	66	79	23	78	93	62	74	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	114	136	57	68	50	87	104	33	39	62	73	87	29	35	
3	138	164	72	86	48	210	251	50	60	76	202	241	49	58	
4	114	135	57	67	50	74	88	54	64	27	64	76	48	57	
5	88	104	72	85	18	134	159	66	78	51	126	149	64	76	
6	126	139	84	92	33	102	112	58	64	43	94	103	56	62	
7	90	109	72	87	20	112	135	64	77	43	100	121	56	68	
8	108	125	64	74	41	84	97	42	49	50	70	81	36	42	
9	108	128	63	75	42	140	166	36	43	74	128	152	34	40	
10	114	138	78	94	32	128	155	56	68	56	118	143	50	60	
11	94	119	72	91	23	84	107	58	74	31	68	86	46	58	
12	102	128	60	75	41	122	153	36	45	71	112	140	34	43	
13	84	104	60	74	29	72	89	38	47	47	70	86	36	44	
14	108	138	57	73	47	98	125	36	46	63	88	112	32	41	
15	91	113	54	67	41	120	149	38	47	68	110	137	30	37	
16	90	113	68	85	24	100	125	52	65	48	84	105	44	55	
17	96	118	60	74	38	100	123	42	52	58	90	111	40	49	
18	90	110	64	78	29	82	100	40	49	51	64	78	40	48	
19	96	115	57	68	41	114	136	34	41	70	110	131	32	38	
20	88	101	54	62	39	83	96	30	35	64	74	85	28	32	
21	114	143	68	85	40	104	130	54	68	48	88	110	44	55	
22	132	165	88	110	33	106	133	34	43	68	100	125	34	43	
23	114	145	112	142	2	114	145	106	134	8	104	132	98	124	
24	96	118	76	94	21	106	131	40	49	62	88	109	36	44	
25	78	89	66	75	15	106	121	40	46	62	96	110	36	41	
26	108	128	33	39	70	136	161	34	40	75	120	142	34	40	
27	90	104	64	74	29	74	85	46	53	38	68	78	38	44	
28	102	129	63	80	38	88	112	40	51	55	78	99	38	48	
29	96	119	64	80	33	100	124	52	65	48	92	114	48	60	
30	78	97	56	70	28	120	149	52	65	56	102	127	42	52	
31	96	118	80	98	17	96	118	64	78	33	90	110	60	74	
ARITH. MEAN	101	123	67	81	33	106	128	47	59	52	95	115	44	55	
STAT. MEAN		122		80			124		58						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					transfer ~~Digester~~ #1 to #2					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. x 100	Wasted cu. ft. x 100	
1																98	66	66	Note — include gallons
2	1105	20	5.7	6.5	81											95	67	67	of sludge to beds
3	1326	16	5.9	4.2	80											92	65	15	
4	1326	21		5.7	81											98	63	0	
5	1326	22	5.8	5.8	81											102	56	0	
6	1326	23	5.5	6.2	78	13260		.93	65							106	75	64	
7	1326	16	5.8	4.3	78											94	63	63	
8	1768	28	5.6	5.6	82											90	60	20	
9	1768	34	5.6	6.8	81											96	65	0	
10	1326	17	5.6	4.5	78												65	0	
11	1326	23	5.7	6.0	79											94	66	0	
12	1326	20		5.3	77											100	66	0	
13	1768	34	5.8	6.7	76												66	0	
14	1326	22	5.8	5.8	77											96	63	0	
15	1989	37	5.9	6.5	78											102	87	65	
16	884	17	5.7	6.7	78											100	70	70	
17	1547	25	5.8	5.8	79	8840		1.9	61							94	66	23	
18	1105	17	5.6	5.3	79											100	62	0	
19	1547	27	5.6	6.1	79											104	65	0	
20	1326	19	5.6	5.1	78												65	0	
21	1105	24	5.6	7.6	91											99	81	61	
22	1326	18	5.7	4.8	85											98	68	68	
23	884	13	5.6	5.0	81	17017		5.6	59							94	22	19	
24	1326	21	5.6	5.7	82											92	61	0	
25	1326	20	5.6	5.3	78											100	63	0	
26	884	16	5.5	6.5	78											105	63	0	
27	1768	37		7.3	76											100	63	0	
28	2210	47	5.6	7.5	81											99	35	0	
29	884	30		8.1	76											98	82	81	
30	1105	19	5.7	6.0	81											94	18	18	
31	1547	23	5.6	5.2	81											90	41	41	
ARITH MEAN =	1370	23	5.7	5.9	80	13039		2.8	62							97	62	24	
STAT MEAN =		22																	

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MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH December 1964 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	digested sewage sludge to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																			Note — include gallons
2																			of sludge to beds
3																			
4																			
5																			
6						13260		.35	69	85	60								
7																			
8																			
9																			
10																82			
11																88			
12																			
13																90			
14																94			
15																			
16																			
17						8840		.43	72	167	75								
18																			
19																			
20																			
21																84			
22																88			
23						17017		.39	71	132	70								
24																			
25																			
26																			
27																82			
28																87			
29																93			
30																			
31																			
ARI MEAN						13039		.39	71	128	75					88			
STAT MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH January 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	water MPN/100ml.	Cl₂ lbs.	Power KWH x10	AUX. FUEL gas cu. ft. x 100	Remarks
1	.80	36	30	R	52	1.42	7.5		15		16	20	
2		36	18	CL	52	1.49	7.7		22		16	20	
3		34	18	CL	52	1.47	7.6		20		16	21	
4		40	20	Cl	52	1.57	7.8		239		16	15	
5		38	28	CL	52	1.53	7.7		300		16	16	
6		42	28	CL	52	1.52	7.6		12		16	15	
7	.06	56	38	R	52	1.54	7.6		22		16	9	
8	.39	60	18	R	53	1.60	7.5		25		16	10	
9		22	10	C	52	1.53	7.7		13		16	21	
10		24	10	CL	52	1.48	7.7		19		16	20	
11		34	20	C	52	1.59	7.6		4		16	20	
12	.01	32	20	S	52	1.55	7.8		30		16	30	
13		22	2	CL	52	1.52	7.9		12		16	23	
14	.01	14	10	S	51	1.53	7.9		222		16	23	
15	.01	16	4	S	51	1.49	7.8		67		20	24	
16		14	-3	C	51	1.48	7.8		12		16	24	
17	.08	22	4	S	51	1.44			9		20	25	
18		20	0	CL	52	1.53	7.6		79		16	24	
19	.01	30	10	S	52	1.53	7.8		23		16	21	
20	.01	32	8	S	52	1.50	7.7		8		16	23	
21	.09	40	10	R	51	1.50	7.6		178		20	14	
22	1.02	42	24	R	52	1.61	7.6		211		16	20	
23	.21	36	22	R	52	1.57	7.5		52		16	20	
24		36	24	CL	51	1.52	7.9		55		16	20	
25	.15	38	26	R	52	1.61	7.6		60		16	16	
26	.02	46	16	S	51	1.67	7.8		305		16	23	
27	.02	26	12	S	52	1.62	7.6		1.44		20	22	
28		14	0	CL	51	1.62	7.7		55		16	32	
29		10	-4	CL	51	1.59	7.6		53		20	40	
30	.01	10	2	S	50	1.54	7.6		28		16	23	
31	.20	16	6	S	50	1.49	7.9		29		16	22	
ARITH. MEAN	.10	30	14		52	1.54	7.7		75		16.6	21	
STAT. MEAN						1.53							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 19 65

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	76	90	36	43	53	92	109	48	57	48	78	92	44	52	
2	85	106	57	71	33	84	104	44	55	48	72	89	36	45	
3	84	103	63	77	26	76	93	48	59	37	64	78	40	49	
4	84	110	80	105	5	92	120	52	68	44	88	115	32	42	
5	108	138	88	112	19	82	105	62	79	24	68	87	54	69	
6	88	112	76	96	14	148	188	80	101	46	132	167	46	58	
7	102	131	65	83	36	134	172	58	74	57	106	136	50	64	
8	76	101	64	85	16	106	141	60	80	43	90	120	60	80	
9	96	122	57	73	41	116	148	58	74	50	98	125	48	61	
10	96	118	92	114	4	120	148	64	79	47	104	128	58	72	
11	96	127	88	117	8	128	170	72	95	44	118	156	64	85	
12	84	109	69	89	18	70	91	52	67	26	56	72	42	54	
13	80	101	65	82	19	78	99	50	63	36	72	91	44	56	
14	80	102	76	97	5	76	97	50	64	34	70	89	50	64	
15	80	99	51	63	36	72	89	48	60	33	70	87	48	60	
16	96	118	63	78	34	92	114	42	52	54	72	89	30	37	
17	128	154	80	96	37	100	120	85	102	15	88	106	75	90	
18	88	112	68	87	23	76	97	46	59	39	66	84	42	54	
19	84	107	100	127	-16	98	124	84	107	14	86	109	70	89	
20	80	100	30	38	63	82	103	36	45	56	64	80	24	30	
21	114	143	104	130	9	114	143	94	118	18	96	120	96	120	
22	85	114	60	81	29	101	136	40	54	60	100	134	34	46	
23	88	115	68	89	23	84	110	60	79	29	72	94	48	63	
24	76	96	45	57	41	72	91	36	46	50	62	79	32	41	
25	102	137	68	91	33	102	137	46	62	55	88	118	44	59	
26	80	111	57	79	29	70	98	46	64	34	66	92	42	59	
27	76	103	76	103	0	90	122	60	81	33	78	105	46	62	
28	83	112	60	81	28	104	141	56	76	46	94	127	48	65	
29	76	101	51	68	33	76	101	40	53	47	72	95	40	53	
30	90	116	48	62	47	60	77	50	64	17	60	77	48	62	
31	84	104	48	60	43	104	129	36	45	65	92	114	34	42	
ARITH. MEAN	89	113	66	85	25	94	120	55	70	40	82	105	47	61	
STAT. MEAN		111		84			120		68						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	transfer #1 to #2: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas: Produced cu. ft. x 100	Wasted cu. ft.	Remarks
1	884	10	5.7	5.2	79											90	87	38	Note — include gallons
2	1326	20	56	6.8	79											95	69	27	of sludge to beds
3	884	14	5.5	7.4	78											98	66	25	
4																100	58	18	
5	1326	24	5.7	7.8	81											103	68	24	
6	884	12	5.6	6.0	77											105	47	31	
7						15912		.6	71							102	55	13	
8	1768	25	5.6	6.2	82											100	65	0	
9	2652	38	5.6	6.3	81											100	51	0	
10	1326	22		7.3	79												63	63	
11	1326	16	5.7	5.4	80											94	45	45	
12	884	8	5.9	4.0	78											92	50	50	
13	1326	22	5.6	7.4	77											90	68	13	
14	1326	14	5.6	5.4	71											96	65	0	
15	1326	21	5.6	7.0	78											102	56	0	
16	884	12	5.6	6.0	83											104	67	0	
17	884	12		5.7	83												67	0	
18	1326	17		5.3	83											98	71	0	
19	1768	26	5.6	6.4	81											104	46	0	
20	1326	18	5.7	5.6	84	12376		1.6	63						7.0	106	68	16	
21	2210	35		6.9	80											102	65	0	
22	2652	38	5.6	6.6	76											98	63	0	
23	1768	24	5.5	6.3	76											102	67	0	
24	1768	24		6.0	78											100	64	0	
25	1326	16	5.9	5.8	73											98	61	0	
26	1768	26	5.7	6.7	79											103	71	53	
27	1326	13	5.9	4.6	77											99	56	56	
28	1768	26	5.9	6.7	76	12818		1.5	59						7.0	95	57	57	
29	884	13	5.8	6.3	81											92	63	7	
30	1547	21	5.7	6.1	78											98	61	0	
31	1326	18	5.7	6.3	75											102	11	0	
ARITH. MEAN	1440	20	5.7	6.2	79	13702		1.2	64						7.0	99	60	17	
STAT. MEAN		19																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 19 65 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	digested sludge to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #2	Temp. °F #2	Gas: Produced cu ft.	Gas: Wasted cu. ft	Remarks
1																			Note — include gallons
2																			of sludge to beds
3																			
4																			
5																			
6																			
7						15912	.47	69		300	90								
8																86			
9																90			
10																			
11																			
12																			
13																			
14																			
15																			
16																75			
17																78			
18																86			
19																			
20						13760	.54	71		315	42				7.1				
21																92			
22																95			
23																			
24																94			
25																98			
26																			
27																			
28						12818	.47	71		179	54				7.2				
29																			
30																			
31																			
ARITH. MEAN						13702	.49	70		265	63				7.15	88			
STAT. MEAN																			

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH February 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1	.06	24	10	S	50	1.60	7.6		29		16	25	
2		16	-4	C	50	1.55	7.7		33		16	25	
3		14	4	CL	50	1.55	7.8		31		16	30	
4		18	6	C	50	1.54	7.8		30		16	30	
5		40	16	C	51	1.54	7.7		277		16	20	
6	.01	50	38	R	51	1.65	7.6		36		16	16	
7	.25	52	30	R	51	1.68	7.7		24		20	18	
8		34	22	CL	50	1.76			32		16	20	
9	.97	52	26	R	50	1.96	7.8		153		20	21	
10		50	24	CL	51	1.89	7.7		175		16	20	
11	.08	44	26	R	51	1.86	7.7		172		20	13	
12	.01	36	16	S	51	1.84	7.7		235		16	22	
13		26	14	CL	51	1.77	7.8		140		16	26	
14		36	19	CL	51	1.72	7.9		142		16	24	
15		44	18	C	50	1.81	7.6		78		20	18	
16	.04	36	20	S	50	1.79	7.8		267		16	9	
17		38	22	CL	50	1.77	7.7		144		16	13	
18	.04	32	14	S	50	1.76	7.8		85		20	20	
19		22	12	C	50	1.73	7.8		56		16	18	
20		42	20	CL	50	1.70	7.6		45		16	13	
21		28	2	C	50	1.65	7.9		39		16	21	
22		12	2	C	50	1.73	7.9		51		16	20	
23	.09	22	6	S	49	1.70	7.8		90		20	25	
24	.38	24	12	S	50	1.72	7.8		60		20	25	
25	.14	22	10	S	49	1.60	7.8		63		20	20	
26		20	12	C	50	1.66	7.7		351		20	20	
27		40	20	C	50	1.66	7.8		44		20	14	
28		44	25	C	50	1.56	7.7		60		16	15	
29													
30													
31													
ARITH. MEAN	.07	33	15		50	1.71	7.8		105		17.4	20	
STAT. MEAN						1.70							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 19 65

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem	Inf.		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs x 10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
1	90	120	64	85	29	84	112	56	75	33	72	96	54	72	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	80	103	68	88	15	80	103	60	78	25	64	83	52	67	
3	84	109	60	78	29	78	101	44	57	44	68	88	40	52	
4	84	108	63	81	25	76	98	44	56	42	66	85	40	51	
5	90	116	60	77	33	76	98	48	62	37	72	92	48	62	
6	100	138	90	124	10	104	143	92	127	12	92	127	88	121	
7	60	84	55	77	8	80	112	42	59	48	68	95	32	45	
8	76	112	66	97	13	86	126	54	79	37	66	97	48	70	
9	72	118	54	88	25	82	134	46	75	44	62	101	44	72	
10	56	88	39	61	30	52	82	38	60	27	42	66	30	47	
11	60	93	51	79	15	80	124	36	56	55	70	109	36	56	
12	80	122	12	18	85	86	131	20	31	77	76	116	20	31	
13	84	124	51	75	39	80	118	40	59	50	74	109	38	56	
14	80	115	21	30	74	80	115	40	57	50	70	100	36	52	
15	90	136	57	86	37	120	181	60	91	50	106	160	52	79	
16	88	131	48	72	45	78	116	36	54	54	74	110	34	51	
17	68	100	57	84	16	95	140	49	72	49	85	125	39	58	
18	68	100	56	82	18	92	135	48	70	48	78	115	38	56	
19	80	115	42	61	47	70	101	38	55	60	70	101	38	55	
20	84	119	48	68	43	68	96	42	60	38	68	96	38	54	
21	80	110	42	58	48	73	100	30	41	59	60	82	15	21	
22	72	104	48	69	33	70	101	38	55	46	65	94	36	52	
23	76	108	51	72	33	80	113	38	54	53	75	106	35	50	
24	80	115	46	66	58	79	113	29	42	63	68	98	27	39	
25	64	85	30	40	53	67	89	32	43	52	48	64	25	33	
26	76	105	64	89	16	98	136	70	97	29	94	130	68	94	
27	84	116	57	79	32	104	144	50	69	52	86	119	48	66	
28	76	99	60	78	21	98	127	45	59	54	90	117	42	55	
29															
30															
31															
ARITH. MEAN	78	110	52	74	33	83	118	45	64	46	72	103	41	58	
STAT. MEAN		110		74			118		54						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 1965 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Raw Sludge					transfer #1 to #2						sludge near bottom			Temp.		Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol Acids Mg/l	pH #1	°F #1	Produced cu. ft. x 100	Wasted cu. ft.	
1	1768	22	5.9	5.6	78										100	100	41	38	Note — include gallons
2	884	14	5.8	7.3	76											95	42	42	of sludge to beds
3	1105	15	5.7	6.6	72											92	58	13	
4	1105	16	5.8	6.8	73											96	50		
5	884	12	5.7	6.4	74											100	28		
6	1326	15	5.6	5.5	70											100	12		
7	1326	14		4.8	75											97	49		
8	1326	14	5.9	5.1	75											100	55		
9	1326	18	5.7	6.0	78	22542		1.5	63							104	45	43	
10	884	11	6.0	5.7	74											95	70	28	
11	884	14	5.8	7.8	73											102	47	16	
12	1326	22	5.8	7.6	76											103	53	21	
13	1326	19	5.8	6.5	79											100	50	12	
14	2652	37	5.7	6.5	76											100	48	11	
15	1768	31	5.8	7.0	89											100	52		
16	1326	24	5.6	8.2	79											104	28		
17	1326	14	5.7	4.9	76											102	48		
18	1326	19	5.8	6.4	78											106	53		
19	884	9		4.6	76											98	42		
20	1326	17		5.6	79											100	35		
21	884	15		7.7	76											98	44		
22	1326	21	5.5	7.3	78											102	42		
23	1326	20		6.8	78											104	47		
24																105	43		
25	2210	31	5.8	6.4	78											106	41		
26	1326	13	6.4	4.4	80	19006		.86	67							106	45		
27	1326	19	5.8	6.5	77											100	47		
28	1326	17	5.8	5.9	77											98	50		
29																			
30																			
31																			
ARITH. MEAN	1326	18	5.8	6.3	77	20774		1.2	65							101	45	8	
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 1965 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	digested ~~raw sludge~~ to beds: Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Supernatant: Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids x10 Mg/l	5-Day B O D x10 Mg/l	sludge near bottom: Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Temp. pH #2	Temp. °F #2	Gas: Produced cu. ft.	Gas: Wasted cu. ft.	Remarks
1																70			Note — include gallons of sludge to beds
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9						22542	.51	72		96									
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																65			
19																68			
20																70			
21																			
22																			
23																			
24																			
25																			
26						19006	.48	70	284	96									
27																80			
28																84			
29																			
30																			
31																			
ARITH. MEAN						20774	.50	71	284	96						73			
STAT. MEAN																			

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MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH March 1965 MISCELLANEOUS DATA OPERATOR Robert Swalwell

Date	Weather				Raw Sewage			Grit	water	Cl2	Power	AUX. Gas	Remarks
	Precip.	Temp. (°F)		Type*	Temp	Flow							
	Inches	Max.	Min.		°F	MGD	pH	cf/mg	cu. ft.	lbs.	x10 KWH	cu. ft. x 100	
1		46	26	C	50	1.72	7.9		37		16	17	
2	.12	42	28	R	50	1.72	7.9		108		16	18	
3	.16	44	32	R	50	1.74	7.7		47		16	7	
4	.92	40	24	R&S	49	2.08	7.8		53		20	12	
5	.12	36	24	S	49	1.97	7.7		45		20	9	
6		36	30	CL	50	1.93	7.6		38		20	16	
7		40	30	CL	50	1.89	7.9		40		16	15	
8	.04	42	26	S	50	1.98	7.6		66		20	15	
9	.03	40	20	S	50	1.94	7.8		61		16	15	
10		30	20	CL	50	1.94	7.8		56		20	27	
11	.04	36	24	S	50	1.92	7.7		176		20	23	
12		40	28	CL	50	1.93	7.6		435		24	19	
13	.01	40	30	S	50	1.86	7.6		51		20	21	
14		36	28	CL	50	1.81	7.7		37		16	20	
15		42	28	CL	50	1.95	7.6		37		20	24	
16	.02	40	26	S	50	1.82	7.8		38		20	22	
17	.40	38	20	R&S	50	1.88	7.7		41		20	23	
18	.01	24	9	S	50	1.84	7.8		36		20	52	
19	.01	22	10	S		1.88	7.8		53		16	56	
20		22	10	CL	49	1.86	7.7		38		20	53	
21	.12	28	10	S	49	1.81	7.8		37		16	59	
22	.33	38	22	S	50	1.92	7.8		365		20	23	
23	.11	30	-2	S	50	1.82	7.8		288		16	17	
24		30	16	CL	50	1.82	7.7		100		16	54	
25	.18	30	16	S	50	1.81	7.9		33		20	56	
26		32	0	CL	50	1.85	7.8		33		16	53	
27		36	20	CL	50	1.76	7.7		36		20	50	
28	.13	44	26	R	49	1.79	8.1		34		20	47	
29		38	20	CL	49	1.93	7.8		38		16	52	
30		38	18	C	50	1.92	7.7		30		20	32	
31		38	24	C		1.92	7.6		30		20	51	
ARITH MEAN	.09	36	21		50	1.87	7.8		81		18.6	31	
STAT MEAN						1.87							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH March 1965 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x 10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	108	155	84	120	22	89	128	80	115	10	67	96	64	92	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	84	120	54	77	36	100	143	37	53	63	90	129	33	47	
3	72	104	57	83	20	101	147	36	54	64	85	123	31	45	
4	72	125	48	83	33	128	222	56	97	56	116	201	42	73	
5	56	92	45	74	20	104	171	51	84	51	97	159	46	76	
6	72	116	57	92	20	94	151	42	68	55	92	148	52	68	
7	76	120	60	95	211	94	148	49	77	48	83	131	43	68	
8	76	125	51	84	33	108	178	44	73	59	83	137	38	63	
9	64	104	54	87	16	116	188	43	70	63	111	180	84	136	
10	80	129	51	83	37	95	154	41	66	57	86	139	36	58	
11	60	96	54	86	10	146	234	58	93	60	140	224	52	83	
12	88	142	72	116	18	76	122	56	90	26	60	97	42	68	
13	88	136	45	70	49	100	155	48	74	52	96	149	44	68	
14	80	121	45	68	43	88	133	48	72	45	74	112	38	57	
15	120	195	51	83	58	120	195	82	100	32	104	169	80	130	
16	92	140	48	73	48	290	440	40	61	86	278	422	36	55	
17	68	107	54	85	20	72	113	54	85	25	68	107	48	75	
18	64	98	30	46	53	82	126	28	43	66	72	110	26	40	
19	76	119	51	80	33	116	182	46	72	60	108	169	42	66	
20	96	149	60	93	38	108	168	68	105	37	96	149	54	84	
21	64	97	36	54	44	70	106	24	36	66	64	97	24	36	
22	92	147	60	96	34	226	362	50	80	78	208	333	40	64	
23	66	100	51	77	23	94	143	56	85	40	80	121	48	73	
24	84	128	45	68	46	94	143	44	67	53	80	121	38	58	
25	76	115	45	68	41	76	115	34	52	55	76	115	34	51	
26	84	130	60	93	29	70	108	50	77	29	60	93	48	59	
27	92	135	88	129	4	106	156	80	117	26	88	129	72	106	
28	76	113	44	66	42	68	102	30	45	56	64	96	30	45	
29	85	137	56	90	34	182	293	60	97	67	166	267	50	81	
30	72	115	54	86	25	116	186	50	80	57	100	160	36	58	
31	84	135	57	92	32	120	193	46	74	62	98	158	38	61	
ARITH. MEAN	80	124	54	84	32	111	174	48	77	52	100	156	44	69	
STAT. MEAN		123		82			159		77						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs Per 1000 c f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	Supernatant: Susp Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol Acids Mg/l	Temp: pH #1	Temp: °F #1	Gas: Produced cu ft. X 100	Gas: Wasted cu ft	Remarks
1	1326	19	5.9	6.4	78											104	44	0	Note — include gallons
2	884	9	5.7	4.9	74												42	0	of sludge to beds
3	884	13	5.8	7.0	74											100	40	0	
4	2210	27	6.4	6.0	72											100	44	0	Cleaned secondary
5	884	20		9.3	84	No Supernatant										99	50	0	digester during
6	1326	20	5.8	7.3	72	drawn during month.										98	52	0	month. Filled all
7	1326	20	5.8	7.8	69	Cleaned secondary										102	45	0	ten drying beds.
8	1326	27	5.7	8.2	88	digester.										99	45	0	Approx. 83,000
9	1326	18	5.9	6.6	72											102	42	0	gals or 11 inches
10																104	26	21	per bed. 10.5%
11	1326	20	6.0	7.6	69											100	32	32	dry solids and
12																96	33	33	52.3% volatile.
13	884	14	6.0	9.0	62											94	30	30	
14	2652	45	6.2	9.3	64											92	31	31	
15																89	23	23	* Estimated
16																88	21	21	
17	1326	21		8.2	67											86	25	25	
18	1326	22	5.9	9.1	64											79	28	28	
19																92	32	32	
20	1768	22	6.0	6.6	68											98	32	32	
21	1326	14		5.0	73											101	34	34	
22	1768	18	6.1	5.2	69											100	32	36	
23	1326	16	5.9	6.3	67											90	30	30	
24																86	28	28	
25	1326	20	5.8	7.6	71											94	31	31	
26	1326	21	5.8	8.1	77											97	30	30	
27	1768	25	5.8	7.3	69											102	41	41	
28	1768	25	5.7	6.9	72											102	40	40	
29	1326	18	5.7	6.8	70											104	30	30	
30	884	13		6.9	73											106	*35	*35	
31																102	*35	*35	
ARITH MEAN	1400	20	5.9	7.2	71											97	35	22	
STAT MEAN		20																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH April 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~xxxxx~~ water ~~xxxxx~~ cu. ft.	Cls lbs.	Power x10 KWH	AUX. FUEL gas cu. ft. x 100	Remarks
1	.48	34	20	S	49	1.95	7.7		65		20	32	
2		36	14	C	49	1.96	7.7		79		20	50	
3		42	24	C	49	1.96	7.7		81		20	51	
4		44	30	CL	49	1.90	7.8		347		16	39	
5	.32	56	36	R	50	2.08	7.7		80		20	41	
6		72	36	C	50	2.13	7.7		119		20	40	
7		58	32	C	50	2.15	7.7		71		20	15	
8	.08	46	34	R	50	2.14	7.7		66		16	43	
9		58	34	CL	50	2.13	7.6		67		20	47	
10		58	40	CL	50	2.13	7.7		66		20	47	
11	.05	73	43	R	50	2.09	7.7		66		20	45	
12		52	30	CL	50	2.17	7.7		72		20	40	
13		50	28	C	51	2.11	7.7		172		16	44	
14	.35	56	36	R	51	2.13	7.7		363		20	41	
15	.05	48	32	R	51	2.14	8.0		255		20	40	
16	.22	44	32	R	51	2.12	7.7		102		20	57	
17	.04	52	30	R	51	2.04	7.7		65		16	43	
18		50	30	CL	51	1.97	7.8		66		20	52	
19		62	38	C	51	2.12	7.8		90		20	13	
20	.02	58	40	R	50	2.05	7.9		128		20	5	
21		70	42	C	50	2.06	7.8		293		20	4	
22	.09	66	40	R	50	2.10	7.7		223		20	6	
23		64	36	CL	50	2.06	7.7		387		20	3	
24	.03	54	38	R	51	2.04	7.8		416		20	4	
25	.17	49	38	R	51	2.03	7.7		300		20	8	
26		44	36	CL	51	2.10	7.8		84		20	15	
27		60	38	C	51	2.05	7.8		78		20	6	
28		62	28	C	51	2.03	7.9		72		16	4	
29		64	40	C	51	2.06			51		20	3	
30		76	50	C	51	2.05	8.1		148		20	2	
31													
ARITH. MEAN	.063	55	34		50	2.07	7.8		149		19.3	28	
STAT. MEAN						2.07							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH April 1965 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x10	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x10	Remarks
Th 1	72	117	72	117	0	126	205	68	111	46	114	185	56	91	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
F 2	64	105	51	83	13	116	190	46	75	60	108	177	42	69	
SA 3	80	131	48	78	40	118	193	44	72	63	100	164	38	62	
S 4	64	101	57	90	12	118	187	50	79	58	94	149	38	60	
M 5	72	125	56	97	22	90	156	66	115	27	72	125	50	87	
T 6	87	155	55	98	37	80	142	74	131	8	62	110	60	107	
W 7	52	93	33	59	37	70	126	44	79	37	34	61	34	61	
Th 8	56	100	39	70	30	100	179	26	46	74	100	179	26	46	
F 9	56	99	39	69	30	72	128	40	71	45	66	117	40	71	
SA 10	84	149	58	103	31	130	231	38	67	71	116	206	30	53	
S 11	48	84	36	63	25	90	157	28	49	69	82	143	24	42	
M 12	76	138	66	119	13	154	279	50	91	68	132	239	44	80	
T 13	60	106	36	63	40	184	324	24	42	87	172	303	24	42	
W 14	56	99	48	85	14	92	163	40	71	57	78	139	32	57	
Th 15	60	107	42	75	30	78	139	34	61	57	66	118	32	57	
F 16	72	127	39	69	46	96	170	40	71	58	82	145	36	64	
SA 17	88	150	60	102	32	66	112	34	58	49	56	95	30	51	
S 18	72	118	39	64	46	67	110	31	51	54	58	95	24	39	
M 19	65	115	48	85	26	64	113	62	110	3	60	106	56	99	
T 20	60	103	51	87	15	79	135	43	74	46	71	121	41	70	
W 21	78	134	45	77	42	72	124	46	79	36	62	107	37	64	
Th 22	56	98	45	79	20	71	124	45	79	37	58	102	36	63	
23	56	96	27	46	52	68	117	32	55	53	58	100	28	48	
S 24	72	122	48	82	33	80	136	60	103	25	66	112	48	82	
M 25	60	102	33	56	45	59	100	27	46	54	53	90	27	46	
T 26	64	112	51	89	20	147	257	41	72	72	132	231	35	61	
W 27	96	164	54	92	45	82	140	25	43	70	75	128	22	38	
Th 28	48	81	48	81	0	67	113	40	68	40	50	85	33	56	
F 29	78	134	68	117	13	100	172	79	136	21	80	137	68	117	
SA 30	88	150	60	103	32	88	150	74	127	19	78	133	66	113	
S 31															
ARITH. MEAN	68	117	48	83	28	94	162	45	78	49	81	141	39	67	
STAT. MEAN		116		82			153		78						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	Supernatant: Susp. Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp.: pH #1	Temp.: °F #1	Gas: Produced cu. ft. x 100	Gas: Wasted cu. ft. x 100	Remarks
1	1326	19	5.8	8.0	64												35	0	Note — include gallons
2	884	14	5.7	8.2	69											102	30	22	of sludge to beds
3	1326	19	5.7	7.5	69											97	33	33	51
4	1326	16		5.6	75											97	34	34	52
5	1768	33	5.6	8.8	74												42	42	54
6	2210	46	5.7	8.4	88												43	43	57
7	1326	22	5.6	8.4	71											90	35	35	
8	884	10	5.6	5.2	74											96	30	30	
9	1768	28		7.8	72												36	3 3	58
10	1326	19	5.6	6.9	72											93	33	33	60
11	1326	16	5.8	5.4	77											92	33	33	62
12	884	15	5.7	8.1	72	20774		.25	66	90	68				6.9	90	30	30	65
13	1326	24	5.9	9.0	70												28	28	70
14	1326	24		9.2	70											90	40	40	70
15	1326	17	6.1	6.1	73											90	49	49	72
16	1326	11	6.2	4.3	71												41	4 4	72
17	1326	25	5.8	10.0	66											90	40	40	72
18	1105	15		6.5	72											97	38	38	
19	1326	21	5.7	7.9	72											93	42	0	72
20	1105	16	5.8	6.9	73												43	0	74
21	1326	19	5.7	6.9	72											92	43	0	74
22	1326	23	5.8	9.0	69											98	47	0	
23	1768	33	5.7	8.7	75												51	0	75
24	1326	19	5.8	6.7	76											94	52	0	76
25	1326	20	5.7	7.2	73											98	48	0	
26																	38	0	76
27	1989	34	5.5	8.5	71											98	45	0	
28	1105	17		7.2	75											100	40	0	
29	1768	26	5.8	6.9	74	28730		.30	68		42				7.0	102	53	0	
30	1326	16	5.8	5.9	74												54	0	80
31																			
ARITH. MEAN	1372	21	5.8	7.4	72	24752		.27	67	90	55				7.0	95	40	20	66
STAT. MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH May 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		82	50	C	51	2.04	7.8		39		16	1	
2		84	58	C		2.03	7.8		50		20	1	
3		82	54	C	51	2.11	7.9		227		16	1	
4	.51	64	48	R	52	2.05	7.8		326		20	2	
5		76	50	CL	52	2.07	7.8		285		20	2	
6		80	58	C	53	2.11	7.6		173		20	2	
7		86	58	C	53	2.23	7.9		162		16	1	
8		86	62	CL	52	2.15	7.8		64		20	7	
9		86	62	CL	53	2.14	7.7		23		20	6	
10		78	44	CL	54	2.20	7.9		51		20	8	
11		68	44	C	52	2.08	7.7		103		16	4	
12		76	44	C	52	2.09	7.9		66		20	5	
13		74	44	C	52	2.04	7.7		44		16	5	
14		82	54	C	52	2.08	7.7		1303	39	20	5	
15	.07	80	62	R	52	2.08	7.6		1460	145	20	5	
16		79	50	CL	53	2.05	7.7		1547	103	20	6	
17		60	42	CL	54	2.09	7.8		1826	86	20	5	
18	.02	84	50	R	53	2.13	7.8		1565	100	20	5	
19		75	45	C	54	2.02	7.7		1560	87	20	5	
20		76	44	C	54	2.02	7.8		1550	91	20	6	
21	.10	86	62	R	54	2.03			1476	101	20	6	
22		78	52	C	54	2.03	7.7		1538	96	20	5	
23	.28	67	47	R	53	1.89	7.7		1490	101	20	3	
24	.45	84	54	R	53	2.13	7.9		1458	102	20	1	
25		86	60	C	55	2.16	7.8		1530	92	20	1	
26	.23	84	60	R	55	2.10	7.7		1510	93	20	2	
27		68	38	CL	54	2.07	7.9		1750	90	20	1	
28		58	38	C	54	1.99	7.7		1470	116	20	7	
29		62	36	C	53	1.91	7.5		1470	101	16	6	
30		70	44	CL	54	1.88	7.7		1450	103	20	6	
31	.03	78	56	R	54	1.94	7.8		1460	99	20	12	
ARITH MEAN	.055	77	51		53	2.06	7.8		936	96	19.2	4.3	
STAT MEAN						2.06							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1965

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
SA 1	84	143	51	87	39	88	150	32	54	64	86	146	26	44	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
SU 2	68	115	52	88	24	82	139	50	85	39	71	120	40	68	
M 3	52	92	48	84	8	85	150	40	70	53	71	125	32	56	
W 4	68	116	48	82	29	79	135	40	68	49	65	111	33	56	
5	72	124	40	69	32	98	169	33	57	66	92	159	30	52	
6	80	141	45	79	44	113	199	31	55	73	98	172	24	42	
7	84	156	64	119	24	100	186	79	147	21	83	154	62	115	
8	66	118	58	104	12	102	183	40	72	61	82	147	38	68	
9	52	93	39	70	25	65	116	29	52	55	59	105	29	52	
10	96	176	73	134	24	111	204	47	86	58	87	160	36	66	
11	80	139	57	99	29	75	130	29	50	61	59	102	29	50	
12	76	132	54	94	29	78	136	34	59	56	67	117	26	45	
13	83	141	57	97	31	86	146	38	65	56	81	138	32	54	
14	80	139	48	83	40	70	121	38	66	46	60	104	38	66	
15	76	132	39	68	49	74	128	32	56	57	68	118	32	56	
16	52	89	64	109	-22	70	120	33	56	53	58	99	27	46	
17	68	119	68	119	0	72	125	41	71	43	66	115	38	66	
18	60	107	53	94	12	73	130	38	67	48	64	114	33	59	
19	60	101	60	101	0	123	207	42	71	66	111	187	31	52	
20	48	81	52	88	-8	72	121	38	64	47	63	106	34	57	
21	56	95	49	83	13	73	124	35	59	52	65	110	32	54	
22	56	95	54	91	4	92	156	43	73	83	83	141	37	63	
23	56	88	56	88	0	85	134	39	61	54	74	117	37	58	
24	48	85	48	85	0	86	153	43	76	50	80	142	37	66	
25	60	108	60	108	0	77	139	40	72	48	66	119	34	61	
26	64	112	57	100	11	77	135	41	72	47	64	112	33	58	
27	68	117	42	72	38	120	207	31	54	74	102	176	27	47	
28	60	100	60	100	0	68	113	42	70	38	64	106	40	66	
29	64	102	58	92	9	70	112	42	67	40	70	112	32	51	
30	76	119	65	102	14	58	91	38	60	34	50	78	32	50	
31	76	123	68	110	11	65	105	41	66	37	55	89	32	52	
ARITH. MEAN	67	116	54	93	17	83	144	39	68	52	73	126	34	58	
STAT. MEAN		115		94			138		66						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1965 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10					sludge near bottom x10				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH # 1	°F # 1	Produced cu. ft. X 100	Wasted cu ft.	
1	884	8	5.8	4.1	73											96	52	0	Note — include gallons of sludge to beds
2	2210	34		7.1	76												54	0	
3	1768	40	5.4	9.3	87											94	52	0	
4	1326	25	5.5	9.1	75											103	53	0	
5	884	17	5.7	9.9	68												54	0	
6	884	18		10.0	71											98	55	0	
7	1768	37	5.4	8.5	87												50	0	
8	884	14	5.4	7.5	73											106	62	60	
9	1326	17	5.5	6.1	76											102	43	43	
10	1326	20	5.6	7.1	76											98	56	56	
11	1768	34	5.6	9.5	71											95	55	55	
12	1768	25	5.5	6.6	75											92	83	48	
13	1326	23	5.7	8.7	71											97	82	32	
14	884	17		9.3	73											101	61	27	
15	884	13	5.6	6.3	81	16354		.31	62		51					98	69	24	
16	884	12	5.8	6.2	77											107	68	21	
17	884	9		5.0	75												56	13	
18	1105	12	5.8	4.7	81												59	13	
19																99	50	4	
20	1547	27	5.8	7.0	88												51	7	
21	1547	23	5.5	6.8	76											104	51	36	
22	884	13	5.9	7.0	72											101	48	48	
23																98	41	41	
24	1547	25	5.5	7.7	75											96	46	14	
25	884	13	5.6	7.0	74											102	53	0	
26	1768	31	5.9	8.4	74												56	0	
27	1326	25	5.8	9.2	71											106	40	0	
28	884	11	5.9	6.2	74											106	46	36	
29	884	16	5.8	8.7	71											102	44	44	
30	884	12	5.8	6.4	75											100	38	38	
31	1105	17	7.3	7.3	73											96	40	40	
ARITH. MEAN	1242	20	5.7	7.5	75	16354		.31	62		51					100	54	23	
STAT. MEAN		20																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH June 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	[illegible] water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL gas cu. ft. x 100	Remarks
1	1.21	86	60	R	55	2.19	7.7		1600	106	20	5	
2	.03	66	42	R	55	2.08	7.9		1570	102	20	6	
3		72	46	C	54	2.07	8.0		1760	96	20	5	
4		78	50	C	54	2.08	7.7		1840	87	20	5	
5	.05	86	64	R	54	2.06	7.7		1770	106	20	5	
6	.19	88	62	R	55	"2.00	7.7		1770	98	20	5	
7	.06	78	58	R	56	2.11	7.7		1680	111	20	5	
8	.20	88	60	R	55	2.13	7.9		1800	91	16	5	
9		80	54	C	55	2.08	7.7		1870	126	20	5	
10		82	50	C	55	2.11	7.7		1510	105	20	5	
11		84	50	C	55	2.08	7.7		1360	87	20	5	
12		82	46	C	55	1.98	7.7		1510	86	20	6	
13		76	48	C		1.91	7.6		1480	97	20	5	
14		74	48	C	56	1.98	7.7		1640	98	20	5	
15		72	48	C	54	1.96			1480	110	20	5	
16	.04	76	50	R	54	1.94			1480	97	20	1	
17		74	46	CL	54	2.01	7.7		1440	104	20	0	
18		78	48	CL	54	2.03	7.7		1500	111	20	0	
19		84	58	C	55	2.01	7.8		1430	122	20	0	
20	.11	88	62	R	55	1.92	7.7		1450	91	16	4	
21		80	50	CL	56	2.09	7.7		1720	105	20	4	
22	.31	92	66	R	56	2.12	7.6		1530	108	20	5	
23	.01	84	50	R	57	2.09	7.7		1480	104	20	5	
24		78	48	C	56	2.04	7.8		1440	109	20	5	
25		82	50	C	56	2.04	7.7		1500	105	20	7	
26		90	62	C	56	1.98	7.7		1510	92	20	7	
27		84	72	C	56	1.97	7.7		1490	106	16	7	
28	.01	94	60	R	57	2.16	7.8		1460	95	20	8	
29	.17	88	54	R	58	2.09	7.7		1510	87	20	7	
30		80	46	C	56	2.00	7.8		1500	95	20	7	
31													
ARITH. MEAN	.08	82	54		55	2.04	7.7		1569	101	19.6	5	
STAT. MEAN						2.04							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 1965 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem	Inf		Eff		Rem	Inf		Eff.		
	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	%	Mg/l	lbs. x10	Mg/l	lbs. x10	
1	48	88	38	69	21	79	144	55	100	30	68	124	46	84	Samples used are 24 hr. composits collected by automatic samplers. The ~~raw~~ effluent samples contain supernatant while the ~~effluent~~ raw do not.
2	78	135	62	108	21	75	130	39	68	48	63	109	33	57	
3	42	72	62	107	-52	73	126	43	74	55	59	102	36	62	
4	76	132	45	78	41	105	182	42	73	60	92	160	33	57	
5	56	96	51	88	9	88	151	33	57	63	81	139	25	43	
6	88	147	51	85	42	78	127	30	50	62	72	120	30	50	
7	76	134	66	116	13	121	212	36	63	70	100	176	30	53	
8	84	149	50	89	40	93	165	44	78	53	92	163	36	64	
9	60	104	75	130	-25	93	161	39	68	58	81	141	34	59	
10	84	148	75	132	13	78	137	42	74	46	67	118	36	63	
11	72	125	57	99	21	106	184	37	64	65	92	160	36	62	
12	84	139	66	109	21	160	264	48	79	70	142	234	44	73	
13	80	127	51	81	36	129	205	31	49	76	119	190	27	43	
14	82	135	68	112	17	91	150	51	84	44	81	134	44	73	
15	64	105	48	78	25	84	137	44	72	48	74	121	39	64	
16	68	110	56	91	18	96	155	26	42	73	81	131	21	34	
17	104	174	54	91	48	188	315	42	70	78	147	246	30	50	
18	80	135	54	91	33	76	129	39	66	49	63	107	32	54	
19	64	107	63	106	2	130	218	39	65	70	119	199	31	52	
20	52	83	52	83	0	94	150	36	58	62	86	138	33	53	
21	84	146	76	132	10	145	253	53	92	64	127	221	38	66	
22	68	120	60	106	12	106	187	29	51	73	93	164	26	46	
23	60	105	60	105	0	82	143	40	70	51	73	127	33	58	
24	90	153	33	56	63	142	242	57	97	60	112	191	39	66	
25	76	129	66	112	13	111	189	48	82	57	88	150	42	71	
26	96	158	63	104	34	172	284	40	66	77	160	264	37	61	
27	68	112	66	108	3	102	168	41	67	60	86	141	32	53	
28	80	144	66	119	18	107	193	38	68	65	94	169	35	63	
29	72	125	69	120	4	139	242	46	80	67	127	221	42	73	
30	74	123	61	102	18	91	152	44	73	52	78	130	33	55	
31															
ARITH. MEAN	74	125	59	100	17	108	183	41	70	60	94	160	34	59	
STAT. MEAN		126		100			179		70						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH June 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1105	22		10.4	68											94	54	31	Note — include gallons of sludge to beds
2	1326	25	5.9	9.3	72											96	61	28	
3	1326	22	5.0	7.8	75	13702		.24	65	39	16					98	75	29	41990 gals. of sludg
4	1326	21	5.6	7.8	71											96	55	23	transfered from # 1
5	1326	21	5.5	7.5	74											94	45	15	to # 2 during moyth.
6	1326	17	5.4	6.0	74											97	40	34	Average total solids
7	1326	19	5.5	6.8	73												42	28	3.6 % volatile solid
8	1768	25	5.6	7.0	72												38	21	56%. Average Temp. o
9	1768	26	5.6	7.0	74											92	49	8	# 2, 83.
10	1768	29	5.6	7.4	79											95	42	2	
11	884	16	5.5	8.5	73											100	29	15	
12	1326	23	5.9	7.4	71	12376		.24	65		15				7.7	98	63	13	
13	884	10		5.3	77											104	27	21	
14	1326	23	5.0	7.8	79												52	6	
15	884	13		6.6	76											104	46	3	
16	1326	22	5.6	8.0	73												47	4	
17	1326	22	5.6	8.3	70												48	4	
18	1326	21	5.9	7.0	79												46	1	
19	884	13	5.7	7.9	67												60	16	
20	884	13	5.8	7.0	75											104	52	7	
21	1768	33	5.6	7.9	82											108	47	36	
22	2210	30	6.0	6.5	74											104	34	34	
23	1326	23	5.7	8.3	72											100	55	55	
24	1326	18	5.9	6.1	77	15912		.25	66	55					7.3	98	48	48	
25	884	5	5.8	2.8	74											96	51	51	
26	884	4	5.8	2.7	60											94	47	47	
27	1105	15	5.6	6.3	76											93	34	34	
28	884	14	5.8	7.5	75											91	68	28	
29	1326	20		7.0	75											96	66	21	
30	1326	22	5.7	7.7	77												57	15	
31																			
ARITH. MEAN	1282	20	5.6	7.1	74	14000		.24	65	47	15				7.5	98	49	23	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather				Raw Sewage			Grit	[illegible] water cu. ft.	Cl₂	Power	AUX. FUEL	Remarks
	Precip.	Temp. (°F)		Type*	Temp.	Flow							
	Inches	Max.	Min.		°F	MGD	pH	cf/mg		lbs.	KWH x 10	gas cu. ft. x 100	
1		88	54	C		1.98			1500	113	20	8	
2	.82	82	56	R		2.11			1620	92	20	6	
3		78	52	CL		2.01			1490	100	16	5	
4		88	60	C		1.87			1410	104	16	6	
5	.03	80	52	R		1.93			1440	100	20	5	
6	.24	82	62	R		2.02			1490	103	20	3	
7	.23	74	58	R		2.05			1480	95	20	0	
8	.13	88	64	R		2.07			1510	95	20	0	
9		82	54	CL		2.11			1530	96	20	0	
10		84	58	C		1.97			1610	100	16	0	
11		89	56	C		1.93			1330	100	20	0	
12		92	60	C	57	2.02	7.7		1690	95	20	2	
13		92	70	CL	57	2.01	7.7		1480	102	20	3	
14		86	54	CL	59	2.01	7.8		1470	112	20	5	
15		80	50	C	58	1.92	7.8		1490	90	20	2	
16	.11	84	56	R	58	2.01	7.9		1750	96	20	3	
17	.41	86	60	R	58	2.01	7.8		1540	108	16	3	
18		82	56	C	57	1.86	7.7		1650	106	20	3	
19		78	48	C	58	1.95	7.5		1620	109	20	3	
20		80	48	C	57	1.90	7.7		1570	85	16	3	
21		88	64	C	57	1.89	7.6		1480	93	12	3	
22		92	70	C	58	2.02	7.6		1520	86	16	5	
23	.41	98	68	R	59	2.08	7.8		1670	91	16	5	
24	.01	92	60	R	59	2.01	7.7		1510	102	12	5	
25		83	58	C	58	1.82	7.7		1410	105	16	5	
26		88	64	C	58	1.98	7.6		1420	102	16	4	
27		84	52	C	59	1.93	7.8		1490	102	12	3	
28	.03	76	46	R	58	1.89	7.6		1470	108	16	2	
29		76	45	C	58	1.85	7.8		1490	100	16	4	
30		82	62	CL	58	1.92	7.7		1350	116	12	7	
31	.14	82	58	R	57	1.89	7.7		1440	123	16	5	
ARITH MEAN	.083	84	57		58	1.97	7.7		1514	101	17.5	3.5	
STAT MEAN						1.96							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH July 1965 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	
1	52	86	51	84	2	80	132	45	74	44	70	116	34	56	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	85	150	54	95	36	123	216	38	67	69	92	162	36	63	
3	72	121	51	85	29	88	147	22	37	75	83	139	22	37	
4	64	100	60	94	6	70	109	24	37	66	63	98	22	34	
5	90	145	63	101	30	93	150	42	68	55	75	121	29	47	
6	84	142	84	142	0	148	249	56	94	56	129	217	46	78	
7	72	123	69	118	3	190	325	48	82	75	179	306	30	51	
8	75	129	75	129	0	143	247	43	74	70	125	216	33	57	
9	82	144	75	132	9	70	123	44	77	37	62	109	38	67	
10	93	153	71	117	24	102	168	38	62	63	98	161	38	62	
11	68	109	53	85	22	104	167	40	64	62	90	145	31	50	
12	84	142	75	126	11	151	254	39	66	74	137	231	33	56	
13	90	151	53	89	41	108	181	41	69	62	94	158	35	59	
14	69	116	69	116	0	91	153	32	54	65	73	122	28	47	
15	96	154	68	109	29	130	208	38	61	71	115	184	32	51	
16	72	121	59	99	18	83	139	35	59	58	73	122	32	54	
17	87	146	53	89	39	184	308	48	80	74	156	261	42	70	
18	80	124	63	98	21	94	146	38	59	60	82	127	31	48	
19	84	137	65	106	23	146	237	42	68	71	131	213	31	50	
20	60	95	51	81	15	83	132	40	63	52	69	109	36	57	
21	80	126	63	99	21	154	243	33	52	79	141	222	29	46	
22	64	108	60	101	6	62	104	52	88	16	52	88	40	67	
23	80	139	59	102	26	98	170	35	61	64	82	142	32	56	
24	78	131	68	114	13	156	261	48	80	69	150	251	48	80	
25	102	155	62	94	39	87	132	41	62	53	75	114	37	56	
26	90	149	75	124	17	103	170	35	58	66	90	149	27	46	
27	96	155	66	106	31	99	159	33	53	67	82	132	28	45	
28	68	107	60	95	12	79	125	41	65	48	66	104	33	52	
29	76	117	58	89	24	89	137	39	60	56	78	120	32	49	
30	72	115	58	91	21	96	154	47	75	51	83	133	36	58	
31	80	126	54	85	33	69	109	27	43	61	59	93	20	32	
ARITH. MEAN	79	130	62	101	19	109	179	39	65	61	95	157	33	54	
STAT. MEAN		130		102			159		64						

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH July 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant x 10 x10: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol. Solids %	Supernatant: Susp. Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	Temp: pH #1	Temp: °F #1	Gas: Produced cu ft. X 100	Gas: Wasted cu. ft.	Remarks
1	1105	17		7.4	73											100	37	20	Note — include gallons
2																	55	55	of sludge to beds
3	1326	20		6.9	76												45	45	
4	1326	16		5.4	77											95	53	53	Transfer # 1 to # 2
5	1326	17		6.5	72											94	43	43	
6	884	12		6.2	74											92	58	12	Gals. T.S. V.S.
7	1326	19		6.7	76	11934		.25	64	42	45					98	65	0	11934 .51 69
8	884	14		7.3	75												65	0	
9	1326	18		6.4	75											104	64	0	
10																102	52	0	
11	1326	16	5.8	6.0	72											100	56	0	
12	2652	47	5.5	7.8	80											98	59	43	
13	884	12	5.5	6.4	78											96	55	55	
14	884	15	5.5	8.2	71											94	41	41	
15	884	16	5.5	8.5	76											100	56	12	
16	884	12	5.7	7.8	63											100	63	41	
17	1326	23	5.8	9.0	67											98	55	55	
18	1768	27	5.6	6.9	79											92	55	55	
19	2210	26	5.8	5.5	75												44	40	
20						11050		.22	66		32						41	39	11050 1.8 67
21																	41	39	
22	1768	29	5.6	7.8	74												35	33	
23	1326	20	5.7	7.1	74												52	50	
24	884	15	5.6	8.7	71												54	52	
25	884	15	5.8	8.3	73												53	52	
26	1326	21	5.6	7.6	74												45	43	
27	1326	22	5.4	7.8	75												45	43	
28	884	14	5.5	7.7	72												45	43	
29	884	14	5.4	7.6	73												40	38	
30	884	14	5.6	7.5	72	15912		.23	62	109	20						35	34	15912 7.5 56
31	884	13	5.3	7.0	74												32	31	
ARITH. MEAN	1235	19	5.6	7.3	74	12965		.23	64	75	32					98	50	34	12965 3.2 64
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

D-4
MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH August 19 65 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. X 100	Remarks
1	.18	74	55	R	58	1.85	7.8		1440	101	12	7	
2		72	42	CL	58	1.91	7.7		1360	102	16	7	
3	.06	80	58	R	58	1.89	7.6		1430	100	12	4	
4		82	60	C	58	1.98			1710	100	20	5	
5		90	66	C	58	2.01	7.8		1740	100	20	8	
6		92	68	C	60	2.07	7.7		1390	123	20	1	
7		86	66	C	60	1.97	7.7		1430	111	16	0	
8	.23	82	63	R	59	1.87	7.7		1420	115	20	0	
9	.30	72	56	R	59	1.98	7.6		1390	100	20	0	
10		74	48	C	58	1.99			1460	98	20	0	
11		80	54	C	58	1.96	7.7		1510	76	20	0	
12		86	66	C	58	1.98	7.8		1410	117	20	0	
13		88	68	C	58	2.06	7.7		1540	100	20	0	
14		92	68	C	61	1.95	7.7		1450	106	20	0	
15		94	64	C	61	1.86	7.6		1440	115	16	0	
16	.40	94	66	R	62	2.02	7.6		1530	94	20	0	
17	.78	82	64	R	60	2.04	7.6		1480	106	20	1	
18	.46	84	60	R	59	2.05	7.7		1420	99	20	4	
19		76	50	C	59	1.95			1470	104	16	4	
20		78	58	C	58	1.95	7.7		1490	119	20	3	
21		78	60	CL	58	1.91	7.6		1340	116	20	4	
22		78	53	CL	58	1.86	7.7		1430	110	16	4	
23		76	45	C	60	2.00	7.6		1440	109	20	5	
24	.30	78	54	R	59	1.95			1480	103	20	0	
25	.28	72	54	R	58	1.98	7.5		1460	97	16	0	
26	.56	80	60	R	58	2.11	7.6		1750	100	20	0	
27	.08	80	50	R	58	2.09	7.6		1470	107	20	0	
28		60	36	CL	59	1.92	7.7		1370	113	20	0	
29		68	50	CL	58	1.85	7.7		1440	103	20	0	
30	.53	66	54	R	60	1.98	7.7		1610	84	20	3	
31	.04	66	56	R	59	1.97	7.6		1490	108	20	3	
ARITH MEAN	.135	79	57		59	1.97	7.7		1474	104	18.7	2	
STAT MEAN						1.97							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 19 65 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf		Eff.		Rem	Inf.		Eff.		
	Mg/l	lbs. x 10	Mg/l	lbs. x 10	%	Mg/l	lbs. x 10	Mg/l	lbs. x 10	%	Mg/l	lbs. x 10	Mg/l	lbs. x 10	
1	68	105	51	79	25	98	151	28	43	72	91	140	27	42	
2	72	115	64	102	11	110	175	60	96	46	96	153	49	78	
3	76	120	72	113	5	99	154	41	65	58	87	137	35	55	
4	76	125	57	94	25	97	160	43	71	56	85	140	39	64	
5	60	101	54	91	10	75	126	44	74	41	65	109	36	60	
6	68	117	54	93	20	90	155	39	67	57	85	147	39	67	
7	80	131	66	108	18	102	168	30	49	71	96	158	22	36	
8	84	131	74	115	12	82	128	43	67	48	70	109	34	53	
9	82	135	64	106	22	127	210	46	76	64	106	175	33	54	
10	90	149	64	106	29	170	282	43	71	75	150	249	25	42	
11	68	111	60	98	12	108	177	43	70	60	91	149	43	70	
12	64	106	56	92	29	109	180	60	99	45	93	154	52	86	
13	84	144	57	98	31	108	186	54	93	50	86	148	38	65	
14	60	98	56	91	7	84	137	36	59	57	74	120	34	55	
15	81	126	72	112	11	99	154	39	60	61	86	133	33	51	
16	75	126	59	99	21	118	199	47	79	60	106	179	38	64	
17	90	153	68	116	24	175	298	53	90	70	155	264	42	71	
18	78	133	56	96	28	127	217	39	67	69	109	186	35	60	
19	76	124	54	88	29	134	218	48	78	64	114	185	37	60	
20	68	111	51	83	25	152	247	48	78	68	130	211	40	65	
21	78	124	64	102	18	134	213	56	89	58	112	178	50	80	
22	80	124	51	79	36	95	147	30	47	69	86	133	27	42	
23	84	140	60	100	30	100	167	38	63	62	95	158	33	55	
24	88	143	57	93	35	155	252	43	70	76	137	223	33	54	
25	88	145	68	112	23	76	125	53	88	30	64	106	38	63	
26	80	141	64	113	20	99	174	50	88	50	83	146	—	—	
27	52	91	39	68	25	64	112	52	91	22	64	112	52	91	
28	76	122	57	91	25	84	134	38	61	55	72	115	36	58	
29	88	136	52	80	41	83	128	31	48	63	71	110	28	43	
30	90	149	64	106	29	175	289	40	66	77	155	256	33	54	
31	84	138	61	100	27	74	122	49	81	34	63	104	42	69	
ARITH. MEAN	77	126	60	98	22	110	180	44	72	58	96	158	37	60	
STAT. MEAN		126		97			173		67						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1965 DIGESTER AND SLUDGE DATA transfer OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day BOD Mg/l	x10	x10	Digester Total Solids %	Digester Vol. Solids %	Digester Vol. Acids Mg/l	Digester pH #1	Temp. °F #1	Gas Produced cu. ft. X 100	Gas Wasted cu. ft. X 100	Remarks
1	884	16	5.4	8.3	75														28	27	Note — include gallons
2	884	16	5.5	8.3	75														29	27	of sludge to beds
3	884	10	5.6	5.2	80														30	29	Temp. # 2
4																			36	35	
5	884	20		11.1	72													80	7	3	
6	1326	30	5.5	8.9	89													80	62	0	
7	884	9		4.5	77													90	56	0	
8	1326	18	5.6	6.5	75													96	59	0	
9	1768	26	5.7	6.8	77													100	61	0	
10	884	17	5.8	9.1	77													106	61	0	
11	884	13		6.4	78														57	0	82
12	884	17		8.8	77													102	55	0	84
13	1768	28	5.5	7.3	77														63	0	86
14	1326	25	5.5	8.7	76													104	61	0	90
15	1326	17	5.5	5.9	74													102	63	0	92
16																		102	59	0	95
17	884	13		6.5	80														54	31	96
18	884	15	5.5	7.8	75													104	36	34	
19	1326	16		5.5	75													101	30	28	
20	1326	23		8.3	74	15470		.30	66		36			.43	70			100	54	53	
21	884	12	5.5	6.5	76													98	5	3	
22	884	13		6.9	75													95	55	54	
23	1105	19	5.3	7.6	81													94	49	48	
24	1547	37	5.4	10.0	84													92	44	43	
25	884	14		7.0	79													91	49	4	
26	1768	45	5.6	11.3	80													96	61	0	
27	1326	27		9.5	76														60	0	90
28	884	14	5.4	8.6	67													95	50	0	92
29	884	13	5.4	7.0	72													97	46	0	91
30	1326	24	5.6	8.8	71														53	0	92
31	1326	28	5.5	10.2	73														45	30	94
ARITH. MEAN	1143	20	5.5	7.8	76	15470		.30	66		36			.43	70			96	48	14	90
STAT. MEAN		20																			

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Power: Water cu. ft.	Cl2 lbs.	Power KWH x 10	AUX. FUEL gas cu. ft. x 100	Remarks
1	.05	70	44	R	59	1.95	7.6		1540	110	16	13	
2		74	50	C	59	1.93	7.7		1440	100	20	7	
3		76	58	C	58	1.96	7.7		1370	114	16	6	
4	.75	80	66	R	58	2.03	7.6		1480	103	20	6	
5		76	50	C	58	1.92	7.6		1420	117	20	7	
6		76	56	C	58	1.93			1710	104	20	1	
7	.01	78	60	R	58	2.02	7.7		1580	97	20	5	
8	.04	68	60	R	59	1.96	7.6		1440	107	20	6	
9		86	66	C	59	2.03			1430	100	16	7	
10		80	44	C	60	1.99	7.6		1510	100	20	7	
11		64	44	C	59	1.89	7.6		1740	100	16	10	
12		74	52	C	58	1.81	7.6		1420	103	20	7	
13		76	58	CL	59	1.95	7.7		1460	92	20	6	
14	1.05	82	60	R	59	2.08	7.6		1460	100	20	6	
15	.03	66	46	R	59	1.94	7.7		1500	100	16	10	
16	.01	62	48	R	58	1.88			78		16	10	
17		86	60	CL	58	2.04	7.6		250		20	6	
18		86	64	C	59	2.05	7.5		43		16	6	
19		86	66	C	60	1.90	7.6		26		20	7	
20	.45	84	66	R	60	2.13	7.8		72		20	3	
21	.05	82	64	R	59	2.02	7.7		95		20	4	
22	.71	70	52	R	59	2.00			49		16	4	
23	.01	66	48	R	58	1.92	7.8		51		16	5	
24	.01	58	40	R	58	1.91	7.7		44		16	7	
25		60	42	CL	57	1.86	7.6		44		16	7	
26		50	31	CL	57	1.72	7.7		25		20	16	
27		60	36	CL	59	1.86			50		16	5	
28		68	48	C	57	1.85			50		16	4	
29		76	56	C	58	1.86			84		16	4	
30	.60	66	48	R	58	1.96			64		20	6	
31													
ARITH MEAN	.126	73	53		58.5	1.95	7.7		784		18.1	6.6	
STAT MEAN						1.94							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1965

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	%	Mg/l	x 10 lbs.	Mg/l	x10 lbs.	%	Mg/l	x10 lbs.	Mg/l	x10 lbs.	
W 1	68	111	60	98	12	63	102	49	80	22	56	91	44	72	
T 2	88	142	60	97	32	137	221	41	66	70	120	193	36	58	
F 3	80	131	27	44	70	104	170	38	62	64	97	159	36	59	
S 4	84	142	60	102	29	120	203	50	85	58	106	179	48	81	
S 5	80	128	39	62	49	96	154	28	45	71	82	131	26	42	
M 6	60	97	54	87	10	100	161	54	87	46	87	140	44	71	
T 7	80	135	60	101	25	106	179	45	76	58	98	165	39	66	
W 8	81	132	51	83	36	106	173	64	105	40	93	152	55	90	
T 9	80	135	51	86	35	173	293	40	68	77	154	261	31	52	
10	92	153	60	100	36	80	133	40	66	50	64	106	36	60	
11	76	120	60	95	21	86	136	44	69	49	82	129	44	69	
12	88	133	68	103	22	109	165	44	66	60	96	145	37	56	
13	76	123	64	104	16	134	218	42	68	69	118	192	33	54	
14	88	153	64	111	27	104	180	50	87	52	76	132	42	73	
15	84	136	60	97	29	164	265	38	61	74	146	236	28	45	
16	76	119	62	97	14	103	162	62	97	40	91	143	50	78	
17	72	122	68	116	9	116	197	64	109	45	102	174	54	92	
18	72	123	33	56	54	86	147	44	75	49	76	130	40	68	
19						88	139	63	100	28	74	117	50	79	
20	80	142	57	101	29	73	130	49	87	33	62	110	40	71	
21	60	101	39	66	35	75	126	42	71	44	63	106	32	54	
22						61	102	46	77	19	57	95	39	65	
23	64	102	39	62	39	65	104	33	53	49	57	91	28	45	
24						101	161	24	38	76	81	129	22	35	
25															
26						83	119	44	63	47	74	106	38	54	
27															
28	104	160	64	99	38	106	164	45	69	58	94	145	39	60	
29	76	118	54	84	29	102	158	47	73	54	90	140	40	62	
30	80	131	60	98	25	79	129	44	72	44	70	114	35	57	
31															
ARITH. MEAN	79	129	55	90	30	101	164	46	74	52	88	143	39	63	
STAT. MEAN		128		92			162		73						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1965 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10				Transfer x10				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1																96	41	40	Note — include gallons
2	2210	41	5.5	10.0	65											94	35	34	of sludge to beds
3	884	16	5.4	8.5	74	13260		.24	61		33	1.1	63			93	52	50	Filled 2 beds Sept.
4	1326	20		7.2	76											92	48	46	14. 15028 gals.
5	884	15	5.6	8.0	74											90	45	43	9.8 % dry solids
6	1768	23	5.8	6.1	76											89	50	0	49.5 % Volatile
7	1326	23	5.7	8.2	76											96	56	33	
8	1326	16	5.6	5.9	72												45	43	
9	884	14	5.6	8.6	73											94	54	51	Heat-exchanger out
10																92	43	41	of service Sept. 8
11	1326	19	5.6	6.4	81											92	45	44	thru Sept. 30.
12	1768	23	5.7	6.0	78											90	48	47	
13	884	13	5.6	6.4	78											89	46	40	
14																89	39	37	
15	1326	21		7.7	74											88	32	31	
16	884	18	5.7	10.0	71											86	29	29	
17	1326	18	5.4	6.2	76											85	44	43	
18	1326	19	5.6	6.3	79											84	29	28	
19	1768	21	5.6	5.5	77											83	42	40	
20	1768	25		6.5	76											82	41	40	
21	884	13		6.6	76											82	33	31	
22	1326	19	5.7	6.6	78											81	30	28	
23	1326	15	5.6	4.9	79											80	32	30	
24	1326	18	5.5	6.2	77											80	47	44	
25																79	33	32	
26	1768	31	5.4	8.2	77											78	37	36	
27	2210	27	5.6	5.5	79											76	38	37	
28	1326	20		6.9	77											76	40	40	
29	1326	21		7.1	78											76	40	40	
30	1326	21	5.7	7.1	78											76	42	41	
31																			
ARITH. MEAN	1377	20	5.6	7.0	76											86	41	37	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 19 65 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather				Raw Sewage			Grit	Water Cu. Ft	Cl₂	Power	AUX FUEL	Remarks
	Precip.	Temp. (°F)		Type*	Temp	Flow							
	Inches	Max	Min		°F	MGD	pH	cf/mg		lbs.	KWH X10	Gas-Cu.Ft X10	
1	.01	54	36	R	58	1.85	7.6		259		16	7	
2		64	44	C	58	1.84	7.6		26		20	7	
3		54	29	C	57	1.74	7.6		20		16	9	
4		48	26	C	58	1.85	7.7		80		16	10	
5		54	38	C	56	1.81	7.5		134		16	9	
6	.03	64	50	R	57	1.90	7.8		65		20	4	
7	.35	66	48	R	57	1.92	7.7		61		16	3	
8	.32	52	46	R	57	1.90			77		20	7	
9	.01	54	44	R	58	1.80	7.7		18		16	7	
10		56	44	CL	57	1.73	7.6		32		20	6	
11		59	36	CL	58	1.87	7.4		75		16	8	
12	.C1	52	34	R	56	1.87	7.8		65		16	5	
13		60	36	C	56	1.87	7.6		165		16	4	
14	.08	66	52	R	56	1.86	7.7		39		16	4	
15	.01	66	46	R	58	1.83	7.6		46		16	2	
16		66	50	C	57	1.81	7.6		43		20	1	
17		76	52	C	57	1.75	7.6		18		16	5	
18		78	42	C	58	1.86	7.7		61		20	5	
19	.28	68	46	R	57	1.79	7.6		42		16	6	
20	.38	67	54	R	57	1.87	7.7		40		20	11	
21	.C5	60	42	R	57	1.82	7.7		37		16	11	
22	.12	48	40	R	56	1.82	7.6		366		20	9	
23	.C2	50	34	R	57	1.79	7.7		38		16	10	
24		41	29	CL	57	1.71	7.7		18		16	17	
25		58	30	C	57	1.85			85		16	10	
26		56	30	C	56	1.80	7.6		41		20	3	
27		54	26	C	56	1.76			56		16	10	
28		42	20	C	56	1.75	7.7		48		16	9	
29		46	24	C	56	1.75	7.7		50		16	8	
30		64	40	C	56	1.75	7.7		63		20	7	
31		54	29	CL	56	1.67	7.6		16		16	9	
ARITH MEAN	.C54	58	39		57	1.81	7.6		7c.		17.3	7	
STAT MEAN													

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 1965 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day B O D Inf. Mg/l	5-Day B O D Inf. lbs x10	5-Day B O D Eff. Mg/l	5-Day B O D Eff. lbs x10	5-Day B O D Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x10
F 1	64	99	64	99	0	124	191	46	71	63	57	88	21	32
Sa 2	80	123	68	104	15	120	184	46	71	62	55	84	18	28
3	104	151	45	65	59	100	145	31	44	69	89	129	29	42
M 4	102	157	81	125	21	110	170	90	139	18	87	134	66	102
5	80	121	63	95	21	180	272	48	72	74	158	239	37	56
6	64	101	51	81	20	95	151	43	68	55	76	120	33	52
7	78	125	60	96	23	160	256	57	91	62	136	218	51	82
8														
9	112	168	39	59	65	94	141	34	51	64	93	140	34	51
10	90	130	76	110	26	116	167	54	78	53	99	143	45	65
M 11	64	100	64	100	0	79	123	54	84	32	68	106	46	72
T 12	60	94	51	80	15	102	159	45	70	56	90	140	37	58
W 13	124	193	60	94	52	98	153	42	66	57	84	131	33	51
Th 14	132	205	54	84	59	130	201	39	60	70	116	180	38	59
F 15	96	146	64	98	33	108	165	38	58	65	106	162	33	50
Sa 16	84	127	64	97	23	116	175	36	54	69	106	160	36	54
17	76	111	57	83	25	147	215	46	67	69	125	183	38	55
18	80	124	57	88	29	110	171	38	59	65	95	147	33	51
19	84	125	64	96	25	102	152	38	57	63	90	134	33	49
20	69	108	48	75	30	61	95	30	48	51	51	80	26	41
21	88	134	72	109	7	124	188	89	135	28	108	164	76	115
22	128	194	76	115	41	128	194	66	100	48	112	170	62	94
23	80	119	60	90	25	90	134	44	66	51	76	113	40	60
24	76	108	64	91	15	81	116	47	67	42	71	101	40	57
25	84	130	64	99	24	125	193	52	80	58	107	165	42	65
26	88	132	68	102	23	78	117	44	66	44	64	96	35	53
M 27	48	70	39	57	19	64	94	50	73	22	57	84	40	59
28	76	111	76	111	0	91	133	61	89	33	77	112	49	72
29	80	117	68	99	15	129	188	58	85	55	116	169	50	73
30	84	123	66	96	21	108	158	64	93	41	96	140	60	88
31	88	123	76	106	14	96	134	52	72	46	82	114	45	63
ARITH. MEAN	85	129	62	93	25	109	165	49	75	53	92	137	41	62
STAT. MEAN		123		92			162		72					

Remarks

Samples used are 24 hour composits, collected by automatic samplers. The effluent samples contain supernalant while the raw do not.

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH October 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant X10: Gals.	Supernatant X10: pH	Supernatant X10: Total Solids %	Supernatant X10: Vol. Solids %	Supernatant X10: Susp. Solids Mg/l	Supernatant X10: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH # 1	Temp. °F # 1	Gas: Produced cu. ft.	Gas: Wasted cu ft.	Remarks
1																76	34	34	Note — include gallons
2	1326	24	5.7	8.8	72											76	30	30	of sludge to beds
3	1326	19	5.4	6.2	80											75	33	33	39338 gals.
4	884	10	5.6	5.2	74											74	32	31	transferred from
5	884	16	5.7	9.0	73											74	36	36	#1 to #2
6	1768	24	5.5	6.6	74											74	10	2	.88% dry solids
7	884	13	5.6	6.6	77	17680	7.3	.20	66	26	12				7.0	74	51	0	68.1% volatile sol.
8	884	12	5.5	6.7	69											84	53	0	
9	1326	16	5.5	5.5	77											91	54	0	
10	1326	18	5.5	6.1	77											98	54	0	
11	1326	20	5.4	7.5	71												52	0	
12	1768	21	5.5	5.5	77											98	55	0	
13	1326	20	5.6	6.5	81												52	0	
14	884	12	5.5	7.0	66												51	0	
15	1326	22	5.6	7.9	75											91	51	0	
16	1326	15		5.0	78											92	51	0	
17	1326	18	5.7	6.4	75											98	68	59	
18	884	17		8.0	85											96	45	45	
19	884	14	5.5	7.1	76											94	45	45	
20	884	14	5.5	7.3	77											92	47	47	
21	1326	13		5.9	60											92	65	39	
22	884	16	5.8	8.5	76	21658	7.2	.22	72		30				7.0	96	50	0	
23	1326	19		6.9	75											95	51	0	
24	1768	25	5.8	6.4	78											92	53	0	
25	1768	36	5.9	8.2	88											90	50	0	
26	1768	25	5.4	6.2	79											102	53	0	
27	1768	26	5.6	6.9	76											98	52	0	
28	884	16	5.6	8.3	75												52	0	
29	884	12	5.6	6.0	77											96	52	0	
30	1326	18	5.6	6.2	79											96	52	0	
31	884	11	5.6	5.5	81											95	56	56	
ARITH. MEAN	1238	18	5.6	6.8	76	19669	7.2	.21	69	26	22				7.0	89	48	15	
STAT. MEAN		18																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		52	32	C	58	1.77	7.7		67		16	15	
2		58	36	C	56	1.73			74		16	8	
3		68	36	CL	56	1.73	7.8		344		20	8	
4		48	24	C	56	1.73	7.7		344		16	15	
5		58	30	C	56	1.75	7.7		152		16	15	
6	.61	62	50	R	56	1.76	7.6		55		20	13	
7		60	44	CL	56	1.71	7.7		55		16	12	
8	.02	58	30	R		1.84	7.7		116		16	13	
9		38	22	C	55	1.67	7.7		117		20	24	
10		44	24	C	55	1.69			124		16	20	
11		50	38	CL	56	1.68	7.7		99		16	18	
12	.22	56	38	R	56	1.74	7.7		71		16	20	
13		40	22	CL	55	1.71	7.6		57		16	20	
14		38	22	CL	55	1.59	7.7		55		20	18	
15	.23	56	34	R	56	1.74	7.6		315		16	10	
16	.01	58	30	R&S	56	1.75	7.8		286		16	15	
17		36	20	CL	55	1.70	7.8		83		20	12	
18		38	22	CL	55	1.69	7.7		77		16	16	
19		44	26	C	55	1.69	7.7		72		16	14	
20		50	32	CL	55	1.66	7.6		61		16	14	
21		45	30	CL	55	1.63	7.8		60		20	14	
22	.03	46	34	R	55	1.75	7.7		101		16	14	
23		40	28	CL	55	1.72	7.7		130		16	16	
24		44	30	CL	54	1.70	7.7		100		16	16	
25	.07	46	40	R	54	1.57	7.6		90		16	17	
26	.79	58	30	R	55	1.78	7.5		76		20	19	
27	.01	36	22	S	55	1.73	7.8		308		16	19	
28	.05	28	21	S	54	1.60	7.7		60		16	30	
29		32	18	CL	55	1.75	7.8		80		16	25	
30		36	20	C	54	1.71	7.7		76		20	25	
31													
ARITH. MEAN	.068	47	30		55	1.71	7.7		124		17.1	17	
STAT. MEAN						1.71							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH November 1965 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff		Rem	Inf.		Eff.		
	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	
1	88	130	76	112	14	76	112	52	77	32	64	94	47	69	Samples used are 24 hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	100	144	92	133	8	116	167	49	71	58	100	144	38	55	
3	92	133	36	52	61	81	117	39	56	52	73	105	36	52	
4	88	127	76	110	14	94	136	52	75	45	83	120	44	63	
5	68	99	59	86	13	82	120	54	79	34	68	99	48	70	
6	84	123	45	66	46	112	164	46	68	59	104	153	44	65	
7	72	103	64	91	11	94	134	48	68	49	77	110	37	53	
8	57	87	64	98	-12	100	154	54	83	46	89	138	49	75	
9	57	79	57	79	0	161	224	53	74	67	146	203	45	63	
10	88	124	42	59	52	111	156	48	68	57	98	138	37	52	
11	60	84	54	76	10	142	199	48	67	66	134	188	39	55	
12	80	116	45	65	44	192	279	64	93	67	174	252	54	78	
13	80	114	63	90	21	94	134	50	71	47	86	123	48	68	
14	96	127	64	85	33	123	163	53	70	57	108	143	45	60	
15	84	122	68	99	19	139	202	61	89	56	126	183	53	77	
16	112	164	76	111	32	151	220	70	102	54	137	200	61	89	
17	84	119	54	77	36	100	142	45	64	55	91	129	40	57	
18	76	107	54	76	29	94	132	42	59	55	79	111	35	49	
19	72	101	64	90	11	68	96	56	79	18	66	93	56	79	
20	100	138	76	105	24	130	180	50	69	62	124	172	48	66	
21	120	163	80	109	33	107	145	46	63	57	91	124	38	52	
22	84	123	80	117	5	115	168	61	89	47	104	152	55	80	
23	88	126	51	73	42	187	268	33	47	82	166	238	31	44	
24	140	199	51	72	64	93	132	46	65	51	79	112	40	57	
25	80	105	68	89	15	67	88	45	59	33	63	82	44	58	
26	92	137	68	101	25	114	169	56	83	51	110	163	56	83	
27	80	115	40	58	50	76	110	32	46	58	72	104	32	46	
28	80	107	39	52	51	94	125	33	44	65	79	105	29	39	
29	92	134	72	105	22	98	143	44	64	55	93	136	44	64	
30	96	137	68	97	29	94	134	46	66	51	88	125	42	60	
31															
ARITH. MEAN	86	123	62	88	27	110	157	49	70	53	99	141	44	63	
STAT. MEAN		122		88			150		70						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH November 1965 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant x10 Susp. Solids Mg/l	Supernatant x10 5-Day B O D Mg/l	transfer Total Solids %	transfer Vol. Solids %	transfer Vol. Acids Mg/l	Temp. pH #1	Temp. °F #1	Gas Produced cu. ft. x 100	Gas Wasted cu. ft. x 100	Remarks
1	1768	26	5.8	6.7	77											94	42	41	Note — include gallons
2	1768	24	5.5	6.0	81											90	29	16	of sludge to beds
3	884	14		7.0	81											90	37	35	
4	1326	19	5.7	6.4	78											90	40	40	
5	884	16	5.6	8.0	77											87	41	40	
6	884	12	5.5	5.9	82											86	38	38	
7	1326	21	5.5	6.9	82											85	41	40	
8	884	13	5.9	6.5	81	15912	7.4	.23	72	28	7.5	1.8	63		7.1	84	35	35	
9	1326	18	5.6	6.2	76											81	44	14	
10	884	11	5.7	5.8	77											86	41	0	
11	884	15		7.6	79											92	41	0	
12	884	14		7.0	80											96	39	0	
13	884	11	5.6	5.5	83											100	37	0	
14	884	12	5.7	5.7	84											100	35	0	
15	1768	39	5.5	9.1	86											96	43	0	
16	884	15	5.7	7.6	78											100	43	0	
17	1768	27		6.9	79											103	44	0	
18	1326	20	5.5	6.7	80											105	46	28	
19	884	13	5.6	6.3	81											102	43	43	
20	1326	15		5.0	80											99	42	42	
21	1768	22		5.4	80											96	48	47	
22	884	12	5.8	5.8	80	15912	7.3	.30	70	138	30	1.5	67		7.1	92	39	39	
23	1326	16	5.7	5.8	73											89	42	42	
24	884	11	5.9	6.2	73											86	70	14	
25	884	13		6.6	79											99	55	0	
26	1326	18	5.5	6.3	76											101	40	20	
27	1326	16	5.8	5.7	74												75	35	
28	1326	18	5.7	6.1	80											94	53	0	
29	1768	23	5.6	5.8	78											102	56	0	
30	884	16	5.5	7.6	82											98	52	0	
31																			
ARITH. MEAN	1193	17	5.6	6.5	79	15912	7.3	.26	71	83	18.7	1.6	65		7.1	94	44	20	
STAT. MEAN		17																	

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH December 1965 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp (°F) Max.	Weather: Temp (°F) Min	Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff E. Coli water cu. ft.	Cl₂ lbs	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		40	22	C	54	1.71	7.9		107		16	18	
2	.08	42	30	R	54	1.81	7.7		75		16	20	
3	.09	42	30	R&S	54	1.84	7.7		109		20	20	
4		36	24	CL	54	1.73	7.6		61		16	23	
5		42	28	CL	54	1.64	7.9		61		16	21	
6		34	16	CL	55	1.75			78		16	25	
7		36	20	C	53	1.72	7.8		314		20	20	
8		44	22	C	54	1.75	7.7		104		16	8	
9		48	24	C	54	1.73	7.6		80		16	12	
10	.35	44	36	R	54	1.76	7.7		87		16	10	
11	.60	52	42	R	53	1.81	7.6		65		20	11	
12	.39	53	39	R	54	1.80	7.8		63		16	9	
13	.01	40	32	R	54	1.89	7.7		92		16	9	
14		34	30	CL	53	1.85	7.8		65		20	20	
15		33	27	CL	53	1.71	7.9		66		16	20	
16	.01	34	26	S	53	1.86			82		20	22	
17		34	26	CL	53	1.84	7.8		90		16	20	
18		32	22	CL	53	1.78	7.8		88		20	24	
19	.01	33	23	S	52	1.71	7.7		142		20	20	
20		32	22	CL	54	1.83	7.8		211		16	19	
21		36	24	C	53	1.76	7.8		20		16	20	
22		42	26	CL	53	1.78	7.7		79		16	7	
23	.08	50	38	R	53	1.80	7.7		87		20	12	
24	2.31	44	24	R&S	53	2.11	7.6		73		16	12	
25	.06	26	6	S	52	1.98	7.9		95		20	30	
26		28	16	C	52	2.01	7.9		60		16	20	
27		32	20	CL	53	2.10	7.9		72		20	21	
28		32	22	CL	53	2.07	7.8		96		20	18	
29		42	32	CL	52	2.05	7.7		322		16	17	
30		58	40	CL	52	2.13	7.6		120		20	16	
31	.08	58	26	R	53	2.13	7.8		95		20	16	
ARITH. MEAN	.13	40	26		53	1.85	7.8		102		17.7	17	
STAT MEAN						1.82							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 1965

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	%	Mg/l	lbs.	Mg/l	lbs.	
1	76	108	45	64	41	95	135	35	50	63	91	130	34	48	Samples used are 24hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.
2	76	115	51	77	33	121	184	33	50	73	102	154	30	45	
3	68	104	42	64	26	94	144	34	52	64	86	132	34	52	
4	76	110	48	69	37	136	196	38	55	72	112	162	38	55	
5	76	104	51	70	33	122	167	38	52	69	109	149	33	45	
6	80	117	51	74	36	127	185	49	72	62	112	164	42	61	
7	76	109	66	95	13	138	198	47	67	66	124	178	40	57	
8	80	117	51	74	36	109	159	44	64	60	96	140	34	50	
9	80	115	62	89	23	96	139	49	71	49	85	123	42	61	
10	112	164	62	91	45	197	289	49	72	75	178	261	45	66	
11	84	127	68	103	19	162	245	68	103	64	148	223	64	97	
12	87	131	51	77	41	104	156	26	39	75	90	135	26	39	
13	84	132	36	57	57	76	120	38	60	50	75	118	35	55	
14	80	123	62	96	23	74	114	36	56	51	66	102	36	56	
15	84	120	64	91	24	88	125	49	70	44	74	106	46	66	
16	92	143	54	84	41	113	175	40	62	65	97	150	34	53	
17	80	124	45	70	44	110	171	37	57	66	109	169	37	57	
18	88	131	57	85	35	118	175	42	62	65	104	154	32	48	
19	64	91	51	73	20	98	140	42	60	57	87	124	38	54	
20	92	140	72	110	22	114	174	54	82	53	104	159	52	79	
21	88	129	54	79	39	109	160	53	78	51	96	141	45	66	
22	104	154	57	85	45	88	131	46	68	48	71	105	31	46	
23	112	168	72	108	36	107	161	55	83	49	91	137	50	75	
24	68	120	54	95	21	86	151	37	65	57	67	118	32	56	
25	45	74	24	40	47	102	168	23	38	78	102	168	19	31	
26	72	121	54	91	25	77	129	39	65	49	70	117	34	57	
27	72	126	65	114	10	102	179	50	88	51	91	159	42	74	
28	80	138	48	83	40	68	117	42	72	38	60	104	38	66	
29	88	150	72	123	18	145	248	45	77	69	135	231	39	67	
30	100	178	60	107	40	116	206	42	75	65	101	179	37	66	
31	104	185	54	96	58	91	162	48	85	47	81	144	40	71	
ARITH. MEAN	83	128	55	85	33	109	168	43	66	60	97	150	38	59	
STAT. MEAN		126		85			168		66						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 1965 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10						sludge near bottom x10			Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft
1	884	13		6.9	78									# 1		106	48	28	Note — include gallons
2	2652	36	5.7	6.0	79												53	52	of sludge to beds
3	1326	19	5.6	6.1	81											98	41	41	41327 gals. transfere
4	884	10	5.8	5.4	76											94	52	41	from # 1 to # 2 durin
5	1326	14	6.0	5.0	77											92	96	42	month. 1.6% dry solid
6																100	47	6	67% volatile solids.
7	1326	20		6.9	78											106	45	0	PH 7.1
8	1326	23	5.6	7.7	80	12818	7.2	.30	72	100	60				7.1		52	0	
9	884	14	5.8	7.2	79												25	0	
10	884	12	6.0	6.0	79												39	0	
11	1326	18	5.8	6.2	79											102	48	0	
12	2210	26	5.8	5.1	80											105	47	0	
13																101	45	0	
14	2210	33	5.7	6.7	78											107	53	0	
15	884	22	5.7	11.4	76											110	59	41	
16	884	15	5.8	7.4	81											106	38	38	
17	1326	21		7.3	77											102	48	35	
18	1326	20	5.8	6.9	76	12376	7.2	.32	65	52	52				7.1	100	58	37	
19	884	13		6.5	78											96	46	38	
20	1768	23	5.7	6.0	76											96	40	11	
21	884	16	5.6	8.2	76											98	22	0	
22	884	14	5.5	8.0	71									730		98	51	36	
23	884	16	5.6	8.6	73											96	37	37	
24	2210	35	5.7	7.5	74											94	59	30	
25	1326	17		5.6	80											96	64	30	
26	884	11	5.7	5.6	81											97	54	31	
27	1768	20	5.7	5.8	70											96	52	28	
28	1105	14		5.7	81									480		96	36	35	
29	1326	20	5.8	6.7	79											91	54	28	
30	884	14	6.0	7.0	82	16133	7.4	.35	74		48				7.1	94	58	33	
31	884	11	5.8	5.2	82											95	36	34	
ARITH. MEAN	1288	19	5.8	6.7	78	13774	7.3	.32	70	76	53			605	7.1	99	49	24	
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~Power~~ water ~~Meter~~ cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		37	25	CL	52	1.90	7.5		26		16	40	
2		34	26	CL	52	2.05	7.6		16		20	10	
3		36	18	CL	51	2.09	7.6		33		20	46	/////
4		26	10	CL	51	2.02	7.7		272		20	67	
5		30	10	CL	51	1.98	7.5		190		16	62	
6	.20	40	22	R	51	2.01	7.6		142		20	0	
7		38	22	CL	52	2.00	7.6		133		20	40	
8	.01	30	15	S	51	1.92	7.5		131		16	54	
9		30	18	CL	52	2.02	7.6		59		20	60	
10	.01	32	22	S	52	1.97	7.7		72		16	54	
11		30	22	C	51	1.96	7.8		54		20	66	
12		36	26	C	52	1.96	7.6		14		20	51	
13		44	26	C	51	1.98	7.6		30		20	47	
14		36	22	CL	51	1.99			53		16	21	
15		34	4	CL	52	1.91	7.6		260		20	26	
16		32	10	CL	51	2.02	7.8		271		20	70	
17	.01	18	-6	S	51	1.96	7.8		552		16	67	
18		14	4	C	51	1.96	7.7		530		20	65	
19		22	10	C	51	1.96	7.8		244		20	60	
20		40	18	C	51	1.97	7.6		238		20	23	
21		42	30	CL	51	2.00	7.6		272		16	43	
22		54	36	CL	52	1.98	7.6		230		20	6	
23		58	42	C	52	2.11	7.7		244		20	6	
24	.17	56	38	R	52	2.10	7.6		254		16	15	
25		38	26	C	51	2.06	7.7		307		20	6	
26	1.13	29	21	S	51	2.05	7.6		312		20	43	
27	.12	28	19	S	51	2.04	7.8		250		20	43	
28		30	10	C	51	1.90	7.7		217		16	43	
29		28	8	C	50	1.97	7.7		240		20	23	
30		28	10	C	51	2.07	7.8		457		20	3	
31		36	24	CL	50	2.05	7.7		243		20	7	
ARITH. MEAN	.053	34	19		51	2.00	7.7		205		18.8	38	
STAT MEAN						2.00							

*C—Clear CL—Cloudy R—Rain S—Snow W—Windy CA—Calm **Indicate Unit

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 19 67 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x10	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x10
Su 1	63	100	41	65	35	73	116	27	43	63	66	105	24	38
M 2	66	113	63	108	5	103	176	52	89	50	90	154	44	75
Tu 3	69	120	57	99	17	145	145	62	108	25	76	132	62	108
W 4	55	93	50	84	9	62	104	43	72	31	57	96	39	66
Th 5	57	94	44	73	23	93	154	42	69	55	90	149	40	66
F 6	60	101	43	72	28	87	146	47	79	46	83	139	44	74
Sa 7	61	102	44	73	28	84	140	48	80	43	79	132	45	75
Su 8	78	125	45	72	42	85	136	38	61	55	74	118	33	53
M 9	68	115	58	98	15	81	136	51	86	37	72	121	47	79
Tu 10	72	118	40	66	44	117	192	39	64	67	104	171	33	54
W 11	53	87	51	83	4	88	144	42	69	52	85	139	42	69
Th 12	67	110	41	67	39	102	167	43	70	58	94	154	40	65
F 13	54	89	39	64	28	121	200	52	86	57	114	188	50	83
Sa 14														
Su 15	79	126	50	80	37	80	127	40	64	50	65	104	33	53
M 16	71	120	54	91	24	125	211	48	81	62	117	197	43	72
Tu 17	83	136	45	74	46	123	201	44	72	64	112	183	44	72
W 18	67	110	53	87	21	115	188	51	83	56	106	173	43	70
Th 19	60	98	57	93	5	63	103	50	82	20	51	883	42	69
F 20	109	179	53	87	51	127	209	43	71	66	118	194	37	61
Sa 21	58	97	49	82	17	84	140	45	75	46	77	128	40	67
Su 22	68	112	63	104	7	96	158	47	78	51	82	135	38	63
M 23	60	106	47	83	22	88	155	42	69	52	68	120	35	62
Tu 24	65	114	50	88	23	127	222	48	84	62	107	187	37	65
W 25	63	108	48	82	24	122	210	51	88	58	103	177	37	64
Th 26	80	137	45	77	44	104	178	31	53	70	93	159	20	34
F 27	69	117	39	66	43	96	163	39	66	59	95	162	39	66
Sa 28	53	92	40	63	31	86	136	57	90	34	86	136	57	90
Su 29	58	95	36	59	38	96	158	47	77	51	80	141	40	66
M 30	54	93	42	72	22	90	155	45	78	50	81	140	41	71
Tu 31	64	109	42	72	34	154	263	38	65	75	142	243	34	58
ARITH. MEAN	66	111	48	79	27	99	164	45	76	52	89	148	40	67
STAT. MEAN		108		79			166		75					

Remarks

Samples used are 24hr. composits collected by automatic samplers. The effluent samples contain supernatant while the raw do not.

B.O. content of composit used.

Raw -- Average 5.4 mg/L
Eff -- " 13 mg/L

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH January 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x 10						sludge near bottom			Temp.		Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. x 100	Wasted cu. ft.	
1	1768	22	6.0	5.9	76											94	28	28	Note — include gallons of sludge to beds
2	1326	17	5.9	6.1	75											96	26	26	
3						15028	7.0	.35	57	265	72					94	29	29	
4	1326	15	5.8	5.2	78											92	29	29	Transfered 38896
5	1326	16	6.0	5.3	79										5.9	89	28	28	gals. during month.
6	1326	16	5.5	5.5	77											92	32	32	average .72% dry
7	2210	33	5.6	7.2	73											90	27	27	solids & 73.9 %
8	1326	25	5.6	9.2	73											92	28	28	volatile solids.
9	1768	18	6.0	5.2	71											90	27	27	
10	1326	17	5.8	5.7	78										5.9	90	32	32	
11	1326	14	5.9	4.7	78											92	37	37	
12	1326	19	5.7	6.7	74											96	39	39	
13	1326	20	5.6	7.2	74											93	38	38	
14	884	13	5.7	6.4	79											97	40	40	
15	1768	25	6.0	6.3	80											95	33	33	
16	1326	16	5.9	5.3	78											91	25	25	
17	2210	29	6.1	5.8	79											96	26	26	
18						10166	7.1	.39	63	250					6.0	98	23	23	
19	1768	26	5.9	6.7	78											97	30	30	
20	884	18	5.6	9.6	75										6.2		55	8	
21	884	13	5.9	6.3	81											98	11		
22	884	15	5.8	8.2	74											96	54		
23	1326	17	5.6	5.5	80											98	3		
24	1768	23	5.6	5.7	80											95	36		
25	884	12	5.6	5.9	83												30		
26	884	11	6.1	5.5	78											92	0		
27	884	12	6.0	6.0	77											95	35		
28	1326	18	6.1	6.0	79											95	2		
29	1326	21	6.0	7.9	72											98	31		
30	1326	18	6.1	6.2	77	13702	7.1	.35	64	212	54				6.1	96	24		
31	2210	31	6.0	6.2	80											95	1		
ARITH. MEAN	1387	19	5.8	6.3	77	12965	7.1	.36	61	242	63				6.0	94	28	29	
STAT. MEAN		18																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH D-4

MONTH February 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather				Raw Sewage			Grit	~~XXXXX~~ water ~~XXXXXX~~ cu. ft.	Cl₂	Power	AUX. FUEL	Remarks
	Precip.	Temp. (°F)		Type*	Temp.	Flow							
	Inches	Max.	Min.		°F	MGD	pH	cf/mg		lbs	KWH x10	**	
1	.56	38	24	S	50	2.03	7.9		241		20	9	Recieved your letter regarding the new
2		28	0	C	50	2.02	7.6		227		20	70	policy on chlorination and ordered chlorine
3		30	2	CL	50	2.03	7.8		244		20	13	the next day. Recieved Chlorine March 1 and
4	.04	38	16	S	50	2.01			276		16	10	started chlorination on March 2.
5	.14	26	-5	S	50	1.96	7.4		228		20	20	We would like to have our basin engineer
6		10	-8	C	51	1.97	7.7		230		20	70	drop in as soon as it is convenient for him.
7		12	-14	C	50	1.97	7.7		227		16	30	Would like to discuss with him,, the program
8		26	14	C	51	1.98	7.8		231		20	48	of disinfection and the possible added tests
9		36	22	C	50	1.97	7.7		472		16	31	that may be required. As of now we are
10	.05	40	18	S	50	2.03	7.6		337		20	20	chlorinating as instructed before. A .5
11		24	-16	C	50	1.96	7.7		277		20	17	residual through the entire plant with samples
12	.05	21	10	S	50	1.90	7.6		269		20	65	being taken from the effluent channel.
13		34	20	C	50	2.00	7.6		270		16	6	
14		46	28	C	50	2.04	7.7		312		20	5	
15	.10	48	12	S&R	50	2.12	7.7		297		20	5	
16		26	8	C	50	2.13	7.6		275		16	46	
17		28	6	C	49	2.16	7.7		302		20	49	
18	.03	32	8	S	49	2.18	7.6		277		20	65	
19		41	25	CL	50	2.09			270		20	5	
20	.02	30	14	S		2.19	7.7		247		16	25	
21		26	12	CL	50	2.13	7.7		272		20	35	
22	.02	36	12	S	50	2.13	7.6		633		16	31	
23	.03	26	-2	S	50	2.12	7.7		386		20	51	
24		14	-3	C	49	2.08	7.7		267		20	58	
25		18	0	C	50	2.06	7.6		266		16	63	
26		28	3	CL	50	2.04	7.7		265		20	55	
27	.11	36	18	R&S	50	2.09	7.7		265		20	18	
28		28	-8	C	50	2.06	7.7		295		20	43	
29													
30													
31													
ARITH MEAN	.041	30	8		50	2.05	7.7		291		18.9	35	
STAT MEAN						2.06							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH February 1967 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x10	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs x10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs x10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x10	Remarks
W 1	77	130	54	91	30	97	164	41	69	58	89	151	39	66	Samples used are 24hr. composits collected
Th 2	59	99	39	66	34	148	249	46	78	69	134	226	39	66	by automatic samplers. The effluent samples
F 3	60	102	54	91	10	59	100	48	81	19	50	85	40	68	contain supernatant while the raw do not.
Sa 4															
Su 5	76	124	39	64	49	91	149	21	34	77	83	136	21	34	Average dissloved oxygen content of composit
M 6	68	112	45	74	34	127	209	41	67	68	117	192	33	54	samples used.
Tu 7	71	117	38	62	47	100	164	30	49	70	98	161	29	48	Raw---- 6.0 mg/l
W 8	75	124	47	78	37	78	129	42	69	46	73	121	37	61	Eff.--- 1.7 mg/l
Th 9	54	89	54	89	0	86	141	41	67	52	79	130	36	59	
10	45	76	45	76	0	63	107	38	64	40	57	97	48	81	
S 11	88	144	46	75	48	82	134	42	69	49	68	111	31	51	
Su 12	60	95	54	86	10	94	149	45	71	52	86	136	39	52	
M 13	82	137	58	97	29	152	254	50	83	67	143	239	46	77	
Tu 14	86	146	51	87	41	139	236	45	77	68	120	204	34	58	
W 15	56	99	36	64	46	101	179	46	81	55	86	152	38	67	
Th 16	71	126	38	67	36	114	202	43	76	62	108	192	39	69	
F 17	68	122	60	108	12	70	126	44	79	37	65	117	44	79	
S 18	83	151	49	89	38	57	104	37	67	35	54	98	36	65	
Su 19															
M 20	63	115	48	88	24	114	208	40	73	65	103	188	34	62	
Tu 21	68	121	50	89	26	105	186	52	92	51	93	165	44	78	
W 22	60	107	45	80	25	79	140	40	71	49	68	121	32	57	
Th 23	74	131	25	44	66	83	147	34	60	59	79	140	30	53	
24	68	118	51	88	25	60	104	46	80	23	51	88	39	68	
25	59	101	30	52	43	77	132	26	45	66	76	131	24	41	
26	74	126	53	90	28	86	146	53	90	38	72	122	43	73	
27	70	122	57	99	19	76	132	53	92	30	69	120	45	78	
28	66	113	59	101	11	86	148	48	82	44	79	136	46	79	
29															
30															
31															
ARITH. MEAN	68	117	47	81	29	93	159	42	72	52	85	145	37	64	
STAT. MEAN		117		80			156		72						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH February 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant: Gals.	Supernatant: pH #1	Supernatant x10: Total Solids %	Supernatant x10: Vol. Solids %	Supernatant x10: Susp. Solids Mg/l	Supernatant x10: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH #1	Temp. °F #1	Gas: Produced cu. ft. X 100	Gas: Wasted cu. ft.	Remarks
1	1326	18	5.9	6.3	78		7.1								6.1	92	35		Note — Include gallons
2	1989	23	6.2	5.3	77											92	2		of sludge to beds
3	1989	34	6.0	8.0	76											95	39		
4	1326	19	6.0	6.3	80											96	1		Transfered 20774
5	1326	18	5.9	6.1	80											92	1		gals. from #1 to
6	884	14	5.7	7.7	75											90	2		#2. Averaged 5.3%
7	1326	18	6.1	5.9	79		7.1								6.0	94	27		dry solids and
8	1326	17	6.0	5.9	78	7514		.33	61	125	83					94	1		68.1% volatile.
9	1326	16	5.9	5.3	80											96	15		
10	884	14	5.8	7.3	76		7.1								6.0		22		
11	1326	14	5.9	5.5	70											94	33		
12	1326	19	6.0	6.5	77											94	2		
13	1768	23	5.8	5.8	79		7.1								6.0	97	45		
14	884	17	5.6	8.6	77											98	1		
15	1326	20	5.8	7.1	76											94	30		
16	884	14	5.8	7.4	78											94	25	17	
17	1326	22	5.9	7.8	76											95	27	27	
18	1326	16	5.8	5.3	78		7.1								6.0	98	26	26	
19	1326	18		6.5	74											100	23	23	
20																96	18	18	
21	1326	22	5.5	7.5	77											95	17	17	
22	1326	18		6.1	78											96	16	16	
23	1326	17	6.0	5.8	77												15	15	
24	1768	30	5.8	8.0	75											96	14	14	
25	2210	31	5.8	6.3	79											97	15	15	
26	2210	28	5.9	5.9	76											98	16	16	
27	1547	27	5.7	7.5	81		7.2								6.0	99	15	15	
28	1547	22		6.2	80	13260		.38	65	250	63					94	21	21	
29																			
30																			
31																			
ARITH. MEAN	1424	20	5.9	6.6	77	10387	7.1	.35	63	188	73				6.0	95	18	18	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH

MONTH March 19 67 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather				Raw Sewage			Grit	[redacted] water cu. ft.	Cl₂	Power	AUX. FUEL	Remarks
	Precip.	Temp. (°F)		Type*	Temp.	Flow							
	Inches	Max.	Min.		°F	MGD	pH	cf/mg		lbs.	KWH x10	Gas cu. ft. x 100	
1		30	18	C	50	2.05	7.7		280		20	50	*Both 1750 g.p.m. pump motors kicked out their
2		45	23	C	50	2.06	7.8		2176	84	16	69	overload protection during the night. Both
3		40	20	C	50	2.11	7.8		1880	100	20	64	started in the morning and no reason could be
4	.03	36	20	S	50	2.08	7.7		2060	108	24	55	found for the failure.
5	.01	36	22	S	50	2.05	7.5		2000	107	20	61	
6		38	12	C	50	2.11	7.7		2220	96	20	59	
7		36	8	C	49	*1.64			2250	101	16	60	
8		26	12	C	49	2.07	7.7		2020	102	20	65	
9		40	16	C	49	2.08	7.9		2020	112	20	57	
10		56	38	C	50	2.09	7.7		2060	115	20	8	
11		44	24	C	50	2.15	7.6		2040	105	20	5	
12		42	26	CL	49	2.13	7.5		2010	107	20	6	
13		50	32	Cl	50	2.25	7.6		2060	97	20	24	
14		42	28	CL	50	2.23	7.6		1950	107	24	11	
15	.04	34	12	S	50	2.25	7.6		2010	110	20	17	
16	.08	36	6	S	50	2.28	7.6		2010	142	24	20	
17		22	4	C	49	2.23	7.8		2070	112	20	22	
18		26	12	C	49	2.21	7.8		2000	107	24	12	
19	.07	41	22	S	49	2.18	7.5		2150	104	24	11	
20	.71	36	22	R&S	50	2.28	7.6		2230	84	24	14	
21	.01	36	30	R&S	49	2.29	7.8		2060	100	24	12	
22		43	30	CL	49	2.37	7.7		2110	105	24	11	
23		40	24	C	49	2.22	7.7		1920	98	20	8	
24		44	30	CL	49	2.31	7.9		2060	131	24	8	
25		68	38	C	50	2.35	7.7		2060	98	20	7	
26	.05	74	46	R	50	2.30			2050	97	20	7	
27		46	40	CL	50	2.41	7.6		1980	123	24	9	
28		56	32	C	50	2.32	7.7		1480	93	20	6	
29		60	36	C	50	2.32	7.8		1640	102	24	5	
30		74	44	C	50	2.34	7.9		1950	100	24	5	
31	.12	74	56	R	51	2.35	7.6		1940	107	20	4	
ARITH. MEAN	.036	44	25		50	2.20	7.7		1960	105	21.3	25	
STAT MEAN						2.21							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH March 19 67 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. x 10 lbs.	5-Day BOD Eff. Mg/l	5-Day BOD Eff. x 10 lbs.	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. x 10 lbs.	Suspended Solids Eff. Mg/l	Suspended Solids Eff. x 10 lbs.	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. x 10 lbs.	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. x 10 lbs.	Remarks
W 1	45	77	45	77	0	96	164	43	74	55	87	149	35	60	
Th 2	61	105	42	72	31	68	117	38	65	44	57	98	32	55	
F 3	72	127	51	90	29	97	171	33	58	66	80	141	26	46	
S 4	62	108	52	90	16	80	139	30	52	63	70	121	25	43	
S 5	80	137	55	94	31	96	164	45	77	53	74	127	35	60	
M 6	64	113	50	88	22	72	127	42	74	42	61	107	26	46	
T 7															
W 8	80	138	63	109	21	161	278	36	62	78	147	254	36	62	
Th 9	72	125	68	118	6	95	165	50	87	47	84	146	39	68	
F 10	60	105	68	119	-13	72	125	53	92	26	64	112	44	77	
S 11						51	91	44	79	14	50	90	41	74	
S 12	81	144	62	110	23	83	147	32	57	61	71	126	27	48	
M 13	60	113	68	128	-13	65	122	43	81	34	54	101	34	64	
T 14	66	123	57	106	14	74	138	37	69	50	66	123	31	58	
W 15	63	118	51	96	19	77	145	40	75	48	67	126	32	60	
Th 16	60	114	72	137	-20	80	152	58	110	28	64	122	49	93	
F 17	68	126	63	117	7	72	134	50	93	31	64	119	47	87	
S 18	51	94	66	122	-29	63	116	53	98	16	57	105	52	96	
S 19						72	131	61	111	15	56	102	44	80	
M 20	60	114	72	137	-20	79	150	58	110	27	68	129	48	91	
T 21						64	122	56	107	13	55	105	42	80	
W 22	45	89	56	111	-24	100	198	43	85	57	88	174	32	63	
T 23	60	111	60	111	0	72	133	50	93	31	59	109	36	67	
F 24	64	123	42	81	33	62	119	42	81	32	54	104	34	66	
S 25	68	133	51	100	25	59	116	31	61	47	51	100	29	57	
S 26															
M 27	63	127	48	96	24	75	151	50	101	33	65	131	42	84	
T 28	76	147	64	124	16	99	192	46	89	54	90	174	43	83	
W 29	68	132	57	110	16	94	182	45	87	52	76	147	33	64	
Th 30	63	123	60	117	5	126	246	35	68	72	114	223	31	61	
F 31	76	149	57	112	25	80	157	44	86	45	76	149	44	86	
ARITH. MEAN	65	120	58	107	9	82	151	44	82	43	71	138	37	68	
STAT. MEAN		121		106			147		83						

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH March 19 67 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH #2	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH #1	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1560	30	5.8	8.6	79											97	21	21	Note — Include gallons
2	910	18	5.8	8.8	78											100	24	24	of sludge to beds
3																	23	21	Transfered 3027
4	975	20	5.5	9.4	76											103	21	21	gals. From #1 to #2
5	1170	16	5.7	6.0	80											100	21	21	3.0% dry solids
6	1820	29	5.8	7.1	80		6.9								6.0	96	20	19	70.2% volatile.
7	1040	17	5.7	7.0	81												21	21	
8	1950	34	5.8	8.0	78		6.6								6.5	88	26	26	
9	1300	18	5.8	6.3	78		6.7								6.4	92	26	26	Pumped 7060 gals.
10	1300	18	6.0	6.0	81	10166			.54	66						95	62	2	to beds 8.2% dry
11	1040	16	5.7	6.9	79											97	58	0	solids 53.9%
12	1040	23	5.7	9.7	79											99	58	0	volatile.
13	1560	24	5.7	6.9	78		7.0								6.3	96	53	0	
14	2015	34	5.7	7.5	81											90	61	0	
15	1170	18	5.7	6.7	81		7.0								6.7	92	63	0	
16	1170	19	5.9	7.4	79	11050		1.0	68							95	45	22	
17																92	78	27	
18	1040	18	5.8	8.4	75											94	50	0	
19	1040	19	5.8	8.3	79											94	46	0	
20	1950	30	5.7	7.4	75											94	11	0	
21	1625	31	5.7	8.4	80											92	36	0	
22	520	10		8.4	80											92	39	0	
23	1495	21	5.7	6.4	76		7.0								6.9	93	40	0	
24	2340	37	5.9	7.0	81											92	52	0	
25	1300	22	5.9	7.9	75											94	47	0	
26	1040	14	5.9	6.5	76											96	49	0	
27																97	0	0	
28	1950	31	5.8	6.5	78											94	0	0	
29																90	35	28	
30																88	38	38	
31	1300	23	5.7	8.6	73											87	39	39	
ARITH MEAN	1370	23	5.8	7.5	78	10608	6.9	.77	67						6.5	94	38	11	
STAT. MEAN		25																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	[illegible] water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL Gas cu. ft. x 100	Remarks
1	.79	62	54	R	51	2.45	7.6		1600	111	20	5	
2	.48	75	35	R	51	2.43	7.6		1620	97	24	8	
3		44	22	C	50	2.47			1520	113	24	3	
4		56	28	C	50	2.43	7.7		1640	100	24	5	
5	.39	70	46	R	50	2.48			1620	100	20	4	
6	.03	56	34	R	51	2.45	7.6		1560	120	24	8	
7		46	26	C	51	2.44	7.7		1640	113	24	12	
8	.14	56	36	R	51	2.48	7.6		1430	92	24	10	
9	.13	74	34	R	51	2.48	7.7		1720	66	24	4	
10		48	26	C		2.49	7.6		1560	106	20	6	
11		46	24	C	51	2.43	7.7		1620	100	24	10	
12	.05	54	28	R	50	2.43	7.6		1560	123	24	9	
13	.09	62	44	R	51	2.47	7.6		1770	110	24	6	
14	.05	72	50	R	52	2.54	7.6		1900	110	24	5	
15		66	44	C	52	2.42	7.7		1560	110	24	4	
16	.13	74	57	R	51	2.40	7.6		1600	114	20	5	
17		72	36	CL	52	2.49	7.6		1550	100	24	5	
18		48	30	CL	51	2.37	7.7		1590	110	24	9	
19		56	32	C	51	2.39	7.6		1560	113	24	7	
20	.51	64	40	R	52	2.42	7.5		1640	114	28	6	
21	.29	72	46	R	52	2.49	7.6		1580	112	24	1	
22		52	30	CL	52	2.47	7.6		1630	107	24	5	
23	.40	48	26	S	52	2.41	7.7		1580	110	24	9	
24		40	22	CL	52	2.46	7.6		1540	100	24	13	
25		54	32	C	51	2.46	7.8		1590	106	20	11	
26		48	26	CL	51	2.43	7.7		1830	112	24	5	
27		56	28	C	52	2.44			2170	70	24	5	
28		64	42	C	52	2.44	7.6		1520	100	20	8	
29	.12	58	48	R	52	2.42	7.6		1600	124	20	9	
30		68	53	CL	52	2.40	7.5		1520	120	24	7	
31													
ARITH MEAN	.12	59	36		51	2.45	7.6		1627	106	23.2	6.8	
STAT MEAN						2.45							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH April 19 67 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x 10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x 10	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. lbs x 10	Suspended Solids Eff. Mg/l	Suspended Solids Eff. lbs x 10	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. lbs x 10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x 10	Remarks
S 1	72	147	66	135	8	73	149	44	90	40	65	133	43	88	We now have all the equipment needed to
S 2	56	114	56	114	0	75	152	32	65	57	66	134	24	49	run coliform tests using the membrane
M 3	63	130	58	119	8	85	175	47	97	45	65	134	34	70	filter method and we are doing so at the
T 4	54	109	54	109	0	63	128	39	79	38	49	99	30	61	present time. We are following the procedure
W 5	54	112	30	62	44										as outlined in standard methods, however
T 6						70	143	35	72	50	70	143	35	72	we would like to have someone from your
7	64	130	49	100	23	72	147	39	79	46	58	118	30	61	dept. come down and run over the test with
8	76	157	57	118	25	59	122	45	93	24	52	108	41	85	us to be sure we are doing it as you would
F 9	57	118	48	99	16	84	174	35	72	58	73	151	31	64	like it done.
S 10	76	158	54	112	29	92	191	32	66	65	82	170	29	60	
S 11	50	101	45	91	10	72	146	40	81	45	60	122	29	59	
M 12	76	154	45	91	41	64	140	26	53	59	58	118	24	49	
T 13						51	105	29	60	43	48	99	26	54	
W 14	60	127	54	114	10	61	129	25	53	59	57	121	24	51	
T 15	57	115	57	115	0	62	125	32	65	48	55	111	27	54	
F 16	60	120	60	120	0	72	144	33	66	54	65	130	31	62	
S 17	36	75	40	83	-10	65	135	36	75	45	59	123	33	69	
S 18	67	132	54	107	19	74	146	37	73	50	64	127	33	65	
M 19	80	159	57	114	29	121	241	32	64	74	115	229	30	60	
T 20	63	127	48	97	24	67	135	32	65	52	60	121	30	61	
W 21	50	104	62	129	-24	89	185	37	77	58	78	162	31	64	
T 22	72	148	60	124	17	67	138	37	76	45	61	126	35	72	
F 23	60	121	54	109	10	89	179	26	52	71	78	157	20	40	
S 24	75	154	55	113	27										
S 25	72	148	57	117	21	70	144	25	51	64	65	133	25	51	
M 26	60	122	60	122	0	68	138	34	69	50	68	138	34	69	
T 27	57	116	42	85	26	70	142	28	57	60	62	126	26	53	
W 28	40	81	36	73	10	91	185	30	61	67	86	175	26	53	
T 29	54	109	51	103	6	67	135	34	69	49	127	127	31	63	
F 30	68	136	54	108	21	120	240	47	94	61	106	212	40	80	
S 31															
ARITH. MEAN	62	126	52	107	14	75	154	35	70	53	67	137	30	62	
STAT. MEAN		125		105			144		70						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH April 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1200	19	5.5	7.3	77											86	35	35	Note — include gallons of sludge to beds
2	1200	20	5.8	7.7	75											84	30	30	
3	1500	25	5.7	7.9	73											82	22	22	
4	600	10		7.9	73											80	58	19	
5	1200	19	5.8	7.6	74											83	65	4	
6	1200	21		8.6	71											86	104	42	
7	900	22	5.8	12.4	71											90	106	37	
8	2100	28	6.0	6.4	73											93	33	12	
9	1500	24	5.9	7.6	74											92	27	27	
10	1680	26	5.7	7.6	73												76	14	
11	1800	27	5.8	7.0	75											93	109	53	
12	1740	23	5.8	6.0	79											96	115	61	
13	1800	25	5.7	6.6	73											98	124	64	
14	1500	23	5.4	7.3	74												126	65	
15	1440	8	5.9	3.7	56												120	60	
16	2100	27	6.1	6.1	74											98	119	64	
17	1380	18	6.0	6.6	70											95	119	60	
18	1500	19	6.0	5.6	81												107	55	
19	2700	45	5.7	8.5	71											94	95	49	
20	1560	23	5.7	7.9	67											96	101	56	
21	1920	34	5.7	9.1	69											94	90	57	
22	1200	19	5.8	8.8	64											96	95	53	
23	1500	18		6.5	67											97	76	52	
24	1680	25	5.8	7.2	72											96	83	50	
25	1680	26	6.0	7.9	68											96	66	50	
26	1680	33	5.9	10.0	69											95	84	51	
27	600	12		10.0	69											96	70	54	
28																94	96	49	
29	2400	27	5.8	8.1	67											97	81	45	
30	1200	17	6.0	6.9	74											98	58	53	
31																			
ARITH. MEAN	1533	23	5.8	7.6	71											92	83	45	
STAT. MEAN		23																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Water cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL cu. ft. x 100 gas	Remarks
1	.20	78	46	R	52	2.54	7.6		1540	121	20	5	
2		50	28	CL	52	2.46	7.7		1600	110	20	5	
3	.11	56	38	R	51	2.42			1580	115	24	5	
4	.04	44	34	R	52	2.42	7.6		1680	110	20	8	
5		58	34	C	51	2.42	7.6		1780	100	24	10	
6		60	40	CL	52	2.40	7.8		1660	118	24	9	
7	.21	61	34	R	52	2.36	7.7		1720	116	24	9	
8		56	40	C	53	2.43			1680	100	20	4	
9		50	32	C	52	2.40	7.6		1850	110	24	4	
10	.32	64	40	R	52	2.41	7.8		1630	111	24	2	
11	.04	56	36	R	52	2.41	7.7		1640	108	20	6	
12		62	42	C	52	2.43	7.6		1660	108	20	4	
13		68	46	C	52	2.39	7.6		1580	117	24	1	
14	.01	58	44	R	52	2.35	7.5		1620	112	24	3	
15		58	31	C	53	2.41	7.5		1740	100	24	8	
16		63	40	C	52	2.38	7.6		1560	125	20	4	
17		70	46	C	52	2.37	7.5		1660	104	24	3	
18		78	56	C	52	2.44	7.6		1530	136	20	3	
19		68	38	C	53	2.41	7.6		1680	117	24	0	
20		56	34	C	53	2.35	7.6		1660	104	20	1	
21		68	38	CL	52	2.28	7.5		1620	105	20	4	
22		65	34	C	53	2.38	7.6		1570	111	24	10	
23	.05	62	46	R	52	2.35	7.6		1630	100	20	6	
24		82	50	C	52	2.35	7.7		1620	102	24	5	
25	.85	85	48	R	53	2.44	7.6		1640	100	20	5	
26		76	50	C	54	2.40	7.6		1620	111	20	5	
27		80	52	C	54	2.39	7.6		1570	117	20	5	
28		75	48	CL	53	2.33	7.7		1650	101	24	6	
29		70	44	C	54	2.40	7.7		1610	111	20	2	
30		72	46	C	54	2.27	7.8		1600	100	20	3	
31		67	44	CL	53	2.37	7.7		1890	114	24	4	
ARITH. MEAN	.06	65	42		52	2.39	7.6		1647	110	21.9	5	
STAT MEAN						2.39							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH May 19 67

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	%	Mg/l	lbs x 10	Mg/l	lbs x 10	
M 1	57	121	57	121	0	104	220	49	104	53	88	186	38	80	
T 2	58	119	46	94	21	66	135	27	55	59	57	117	27	55	
W 3	72	145	63	127	13	100	202	46	93	54	87	176	36	73	
Th 4	69	140	55	111	20	139	282	42	85	70	137	278	42	85	
F 5	64	129	54	109	16	79	159	40	81	49	68	137	28	57	
S 6	45	90	45	90	0	101	202	35	70	65	97	194	32	64	
S 7	68	134	48	94	29	101	199	47	92	51	87	171	40	79	
M 8	68	138	57	116	16	130	264	46	93	65	114	231	37	75	
T 9	84	168	60	120	29	97	194	39	78	60	88	176	32	64	
W 10	66	133	66	133	0	84	169	28	56	67	79	159	26	52	
Th 11	90	181	82	165	9	96	193	57	115	41	87	175	50	101	
F 12	66	134	66	134	0	76	154	39	79	49	74	150	37	75	
S 13	69	138	69	138	0	78	155	40	80	49	74	147	38	76	
S 14	68	133	39	76	57	92	180	22	43	76	82	161	20	39	
M 15	80	161	54	109	33	110	221	23	46	79	103	207	23	46	
T 16	72	143	54	107	25	91	181	49	97	46	81	161	40	79	
W 17	68	134	47	93	31	100	198	42	83	58	91	180	33	65	
Th 18	72	147	64	130	11	86	175	36	73	58	82	167	33	67	
F 19	54	109	54	109	0	62	125	37	74	40	58	117	32	64	
S 20	80	157	51	100	36	80	157	43	84	46	68	133	40	78	
S 21	63	120	51	97	19	99	188	39	74	61	89	169	34	65	
M 22	64	127	60	119	6	88	175	43	85	51	72	143	33	66	
T 23	61	120	51	100	16	100	196	39	76	61	92	180	37	73	
W 24	68	133	57	112	16	130	255	35	69	73	113	221	31	61	
Th 25	66	134	54	110	18	113	230	40	81	65	100	204	38	77	
F 26	51	102	57	114	-12	75	170	36	72	52	70	140	32	64	
S 27	60	120	60	120	0	52	102	42	84	19	43	86	40	80	
S 28	48	93	45	87	6	90	175	35	68	61	77	150	28	54	
M 29	60	120	68	136	-13	62	124	49	98	21	57	114	46	92	
T 30	48	91	45	85	6	52	98	37	70	29	38	72	28	53	
W 31	64	127	54	107	16	110	217	39	77	64	98	194	29	57	
ARITH. MEAN	65	130	56	112	14	92	183	39	79	55	82	164	34	68	
STAT. MEAN		130		111			182		78						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH May 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1326	14	5.9	5.1	73											96	59	59	Note — Include gallons
2	1105	19		9.1	68											94	81	51	of sludge to beds
3	990	15	5.8	7.4	75											95	59	47	
4																94	52	52	
5	1989	33	5.4	8.1	73											92	61	40	
6	1105	17		7.4	72											92	51	31	
7	1326	20	5.4	7.0	76											92	63	34	
8	1326	31	5.7	7.7	74											92	52	52	
9																91	50	50	
10	1989	34	5.8	8.2	73											90	51	0	
11	1326	21	5.9	7.7	71											92	49	30	
12	1768	26	5.9	7.1	74											92	54	54	
13	1768	24	6.0	6.5	75											89	58	0	
14	884	14	6.0	7.9	73											92	55	0	
15																94	51	38	
16	1989	37	5.7	9.0	73											92	54	14	
17	2210	40	5.8	8.7	74											94	60	0	
18						15470		.3	61		400					96	57	0	
19	1105	19	5.7	8.5	72											100	60	0	
20	2210	26	5.8	5.0	82											102	54	0	
21	1768	29	5.6	8.0	72											102	43	43	
22	1547	21	6.0	6.3	77											98	42	42	
23																97	42	42	
24	1650	24	5.8	7.0	73											96	63	42	
25	1326	24	5.5	8.8	74											96	43	43	
26	1326	23	5.7	8.8	70											94	43	43	
27	1547	20	5.9	5.7	80											92	74	32	
28	1989	33	5.8	7.4	78											94	66	28	
29																95	41	41	
30	1326	18	5.9	6.3	78											94	40	40	
31	884	19	5.8	12.1	61											92	53	38	
ARITH MEAN	1511	25	5.8	7.6	74	15470		.3	61		400					94	54	32	
STAT. MEAN		23																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 19 67

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	Plant Eff. E. Coli. water cu. ft.	Cl₂ lbs.	Power x10 KWH	AUX. FUEL Gas cu. ft. x 100	Remarks
1		87	45	C	54	2.37	7.4		1750	109	20	5	
2		84	52	C	54	2.37	7.4		1640	109	24	3	
3		86	52	C		2.38	7.5		1630	90	20	3	
4		88	59	C	54	2.29	7.6		1660	100	20	3	
5		90	66	C	56	2.42	7.7		1550	119	20	4	
6	.03	84	66	R	56	2.41	7.6		1680	114	20	3	
7	.58	84	64	R	56	2.45	7.6		1610	113	20	2	
8	.01	86	68	R	56	2.44	7.6		1620	112	24	3	
9	.18	88	64	R	56	2.50	7.6		1640	116	20	3	
10	.08	88	68	68	57	2.42	7.7		1670	110	20	3	
11	.10	86	63	R	56	2.34	7.4		1630	111	20	2	
12		96	64	CL	56	2.48	7.6		1880	105	20	3	
13	.87	94	64	R	56	2.45	7.4		1620	116	20	2	
14		94	68	C	56	2.48	7.6		1630	110	24	3	
15		94	72	C	57	2.49	7.6		1660	108	24	2	
16	1.20	96	64	R	57	2.62	7.8		1660	113	24	2	
17	.15	76	56	R	59	2.50	7.6		1640	108	20	2	
18		80	50	C	56	2.36	7.8		1630	108	20	3	
19		82	56	C	56	2.47	7.6		1560	124	20	3	
20		86	56	C	56	2.45	7.5		1610	147	20	2	
21	.57	74	56	R	56	2.48	7.6		1630	114	24	2	
22		80	56	C	55	2.44	7.5		1930	111	20	2	
23		84	64	C	56	2.46	7.6		1710	126	20	3	
24	.73	90	50	R	56	2.56	7.6		1630	109	24	4	
25		70	48	CL	55	2.34	7.5		1650	107	20	3	
26		84	54	C	56	2.43	7.6		1560	112	24	2	
27	.01	86	60	R	56	2.40	7.6		1640	111	20	2	
28	.12	72	58	R	56	2.39	7.6		1620	110	20	3	
29		78	56	CL	56	2.43	7.6		1650	110	24	3	
30		86	64	C	56	2.51	7.5		1570	152	24	2	
31													
ARITH MEAN	.155	85	59		56	2.44	7.6		1652	113	21.3	2.7	
STAT MEAN						2.44							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH June 1967

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	%	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	%	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	
1	56	111	45	89	20	101	200	60	119	41	89	176	52	103	
2	63	125	48	95	24	69	136	28	55	59	55	109	20	40	
3	75	149	72	143	4	84	167	42	83	50	74	147	40	79	
4	60	115	51	97	15	108	206	34	65	69	95	181	27	52	
5	60	121	52	105	13	135	272	45	91	67	122	246	38	77	
6	56	113	53	107	5	116	233	36	72	69	107	215	31	62	
7	72	147	56	114	22	84	172	35	72	58	72	147	25	51	
8	69	140	60	122	13	92	187	42	85	55	71	144	35	71	
9	64	133	60	125	6	112	234	36	75	68	100	209	33	69	
10	78	157	60	121	23	121	244	54	109	55	109	220	38	77	
11	64	125	36	70	44	137	267	31	61	77	127	248	28	55	
12	69	143	57	118	18	96	199	51	105	47	73	151	33	68	
13	66	135	58	118	12	134	274	41	84	69	112	229	32	65	
14	69	143	63	130	9	114	236	37	77	68	103	213	31	64	
15	45	93	54	112	-20	86	179	44	91	49	76	158	41	85	
16	52	114	52	114	0	85	186	43	94	49	72	157	34	74	
17	57	119	60	125	-5	63	131	37	77	41	57	119	36	75	
18	68	134	54	106	21	82	161	28	55	66	71	140	23	54	
19	96	198	68	140	29	82	169	40	82	51	77	159	37	76	
20	64	131	54	110	16	84	172	37	76	56	76	155	32	65	
21						88	182	40	83	55	81	168	36	74	
22	63	128	60	122	5	120	244	36	73	70	112	228	28	57	
23	72	148	64	131	11	80	164	37	76	54	72	148	30	62	
24	57	122	57	122	0	99	211	40	85	60	78	167	27	58	
25	63	123	51	100	19	70	137	30	66	57	63	123	23	45	
26	84	170	64	130	24	118	239	39	79	67	108	219	34	69	
27	72	144	54	108	25	108	216	21	42	81	98	196	19	38	
28	54	107	51	102	6	112	223	34	68	70	105	209	30	60	
29	76	154	54	109	16	95	193	42	85	56	83	168	35	71	
30	80	167	60	126	25	73	153	50	105	32	69	144	46	96	
31															
ARITH. MEAN	66	135	56	114	14	98	206	39	82	59	87	183	32	66	
STAT. MEAN		133		114			198		79						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH June 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10 x10					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1																92	42	42	Note — include gallons
2	1326	15	5.9	5.0	81											91	36	0	of sludge to beds
3																92	54	0	
4	1326	19	5.7	6.4	78											96	51	0	
5	1326	17	5.4	5.9	79											97	26	26	
6	1547	24	5.4	8.3	66	11050		.34	66	50	35					95	44	44	
7	1326	22	5.4	7.5	77											93	42	42	
8	1326	19	5.6	6.6	79											92	42	42	
9	1105	23	5.7	9.8	75											92	64	34	
10	1326	17		6.2	75											93	49	0	
11	1326	24	5.9	8.6	76											95	50	0	
12	1105	16	5.4	6.4	79											96	34	34	
13	1105	19	5.3	8.7	71											95	34	34	
14	1326	18	5.5	6.4	75											94	37	37	
15	1105	16	5.4	6.6	77											92	56	35	
16	1105	8	5.6	3.8	65											94	35	35	
17	1326	18	5.4	6.6	74											92	39	39	
18	1326	20	5.3	7.0	75											90	50	0	
19	1326	19	5.8	6.7	76	11050		.37	53	105	51					94	27	27	
20																92	37	37	
21	1768	33	5.6	8.9	73											92	37	37	
22	1326	26	5.6	9.3	74											90	51	0	
23	1768	27	5.6	7.3	74											94	46	0	
24	1326	18	5.7	6.5	74											95	34	34	
25	1326	22	5.6	8.1	73											93	32	32	
26	1105	12	5.7	5.3	75											92	30	30	
27	1105	17	5.8	7.4	72											90	31	31	
28	1326	20		7.4	72											90	31	31	
29	1326	23	5.6	7.8	80											89	31	31	
30	1768	28	5.5	7.0	81	21216		.37	60		51					88	16	16	
31																			
ARITH MEAN	1330	20	5.6	7.1	75	14439		.36	59	~~46~~	46					93	40	25	
STAT MEAN		20								78									

MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH July 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~xxxxx~~ water ~~xxxxx~~ cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1	.01	90	62	R	57	2.46	7.6		1630	100	20	3	
2	.07	80	51	R	57	2.24	7.6		1610	108	20	4	
3		74	50	C	56	2.35	7.6		1840	120	24	2	
4		70	48	CL	56	2.12	7.5		1680	85	20	2	
5		77	50	C	56	2.30	7.5		1630	110	24	3	
6		83	54	C	56	2.33	7.7		1790	110	20	2	
7		84	60	CL	56	2.41	7.6		1620	117	24	3	
8		88	69	CL	58	2.35	7.6		1750	88	20	2	
9		90	70	CL	58	2.27			1630	104	20	3	
10	.30	82	66	R	58	2.45	7.6		1500	100	24	2	
11		86	58	CL	58	2.40	7.7		1610	111	20	2	
12		80	56	C	57	2.32	7.6		1600	113	20	3	
13		72	48	CL	57	2.23	7.7		1630	102	24	3	
14		68	54	CL	56	2.24	7.6		2000	116	24	2	
15		68	48	CL	56	2.18	7.6		1670	100	20	3	
16		82	51	CL	56	2.17	7.4		1620	106	20	3	
17		89	59	CL	57	2.30	7.8		1530	121	20	2	
18	.01	86	58	R	57	2.28	7.6		1640	107	24	3	
19		85	57	C	56	2.25	7.8		1600	115	20	3	
20		86	56	C	57	2.02			1680	104	20	3	
21		88	61	C		2.35	7.5		1600	114	24	2	
22		92	70	C	56	2.31	7.5		1690	106	20	3	
23	.10	86	67	R	57	2.22	7.5		1690	88	20	4	
24		86	60	C	57	2.33	7.8		1640	107	20	3	
25		82	56	C	57	2.23			1700	105	20	2	
26	.41	84	62	R	57	2.27	7.6		1670	96	16	3	
27	.01	86	62	R	58	2.26	7.6		1960	85	20	3	
28		80	50	C	58	2.27	7.6		2080	112	24	3	
29		82	62	C	57	2.24	7.6		1740	100	20	3	
30	.07	86	60	R	57	2.14	7.5		1630	100	16	3	
31		86	58	C		2.28	7.6		1680	110	20	3	
TOTAL	.032	83	58		57	2.28	7.6		1688	105	20.9	2.7	
AVG						2.27							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH July 1967

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	x10 lbs.	Mg/l	x10 lbs.	%	Mg/l	x10 lbs.	Mg/l	x10 lbs.	%	Mg/l	x10 lbs.	Mg/l	x10 lbs.	
Sat 1	69	142	59	121	15	64	131	35	72	45	58	119	29	60	Samples used are 24hr. composits cpllected by automatic samplers. The effluent samples contain supernatant while the raw do not.
Sun 2	76	142	57	106	25	53	99	30	56	43	46	86	26	49	
M 3	64	125	68	133	-6	83	163	25	49	70	70	137	23	45	
Tu 4	68	120	54	95	21	66	117	23	41	65	57	101	22	39	
W 5	76	146	57	109	25	83	159	30	58	64	73	140	27	52	
Th 6	57	111	48	93	16	93	181	37	72	60	82	159	33	64	
7	57	115	54	109	5	63	127	34	68	46	54	109	30	60	
Sat 8	72	141	65	127	10	84	165	43	84	49	78	153	39	76	
Sun 9	51	97	39	74	24	80	151	38	72	53	71	134	35	66	
M 10	64	131	51	104	20	63	129	24	49	62	59	121	24	49	
Tu 11	68	136	57	114	16	133	266	38	76	71	121	242	31	62	
W 12	72	139	68	132	6	135	261	43	83	68	119	230	37	72	
13	57	106	60	112	-5	87	162	43	80	51	78	145	40	74	
14	64	120	60	112	6	99	185	38	71	62	85	159	33	62	
15	72	131	60	109	17	115	209	35	64	70	105	191	35	64	
16	80	145	68	123	15	90	163	34	62	62	77	139	26	47	
W 17	96	184	76	146	21	103	198	44	84	57	90	173	36	69	
Th 18	88	167	64	122	27	97	184	34	65	65	88	167	30	57	
F 19	76	143	63	118	17	90	169	40	75	56	76	143	30	56	
20															
21	68	133	64	125	3	84	165	42	82	50	72	141	31	61	
22	60	116	57	110	5	65	125	30	58	54	57	110	30	58	
23	76	141	54	100	29	69	128	28	52	59	59	109	22	41	
24	60	117	57	111	5	110	214	41	80	63	98	190	35	68	
25	80	149	56	104	30	125	233	38	71	69	110	205	33	61	
26	76	144	54	102	29	76	144	36	68	52	62	117	28	53	
Th 27						93	175	36	68	61	78	147	29	55	
28	76	144	72	136	5	75	142	39	74	48	58	110	32	61	
29	108	202	39	73	64	102	191	33	43	77	97	181	22	41	
30	68	121	57	102	16	67	120	36	64	46	49	87	24	43	
Sat 31	80	152	57	108	29	87	165	36	68	59	76	145	32	61	
ARITH MEAN	72	137	57	111	17	88	167	35	67	59	77	146	30	58	
STAT. MEAN		133		112			165		68						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF HEALTH

MONTH July 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals.	Raw Sludge: Lbs. Per 1000 c.f. Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol. Solids %	Supernatant x10: Gals.	Supernatant x10: pH	Supernatant x10: Total Solids %	Supernatant x10: Vol. Solids %	Supernatant x10: Susp. Solids Mg/l	Supernatant x10: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol. Solids %	sludge near bottom: Vol. Acids Mg/l	sludge near bottom: pH	Temp. °F #1	Gas: Produced cu. ft. * X 100	Gas: Wasted cu. ft.	Remarks
1	1326	24		8.4	76											86	47	0	Note — include gallons
2	1326	15		5.0	82											91	38	0	of sludge to beds
3	1768	18	5.6	4.4	81											92	39	0	Transfered 13260
4	1326	22	5.8	7.8	76											94	35	0	gals. from #1 to
5																94	32	0	#2 during month.
6																96	15	0	2.1% dry solids
7	1326	20	5.4	7.1	75											96	14	14	57.9% volatile.
8	884	14	5.6	8.0	71											94	16	16	
9	1768	31		8.5	72											92	16	16	Filled bed #1
10	1768	26		7.1	72											91	15	15	July 28. 7500
11	1326	23	5.6	8.5	72											90	14	14	gals. 11.8% dry
12	1326	17	5.6	5.8	78											89	18	18	solids 49.4%
13	1326	20		7.3	72											88	60	14	volatile.
14	884	18	5.7	10.0	70											92	43	0	
15	884	15	5.7	8.6	70											94	42	0	Filled bed #5
16	1326	22	5.8	7.9	73											95	44	0	July 28. 8250
17	2652	37	5.7	6.3	78											96	44	0	gals. 11.3% dry
18	884	15	5.7	7.9	74											98	57	45	solids 52.0%
19	884	12	5.8	7.6	66	13260		.37	52	100	57					96	54	54	volatile.
20	1326	21	5.6	7.9	70											94	39	39	
21																93	41	41	*All gas produced
22	1326	21	5.7	8.1	69											93	40	40	not metered.
23	1768	29	5.5	8.2	72											92	41	41	
24	1326	19	5.5	7.1	72											91	42	42	
25																90	36	36	
26	884	13		7.6	70											90	34	34	
27	1326	25	5.2	9.3	72											89	32	32	
28																89	0	0	
29	1326	19	5.4	6.9	75											88	0	0	
30	1326	15	5.7	5.2	77											87	0	0	
31	1326	21	5.6	7.3	76											87	0	0	
ARITH. MEAN	1343	20	5.6	7.5	73	13260		.37	52	100	57					92	31	16	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

MICHIGAN DEPARTMENT OF HEALTH

Marshall, MICHIGAN

MONTH August 1967

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Weather: Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	Raw Sewage: pH	Grit cf/mg	~~Index~~ Water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1		88	66	C	57	2.23			1670	107	20	36	
2	.04	88	60	R	58	2.23	7.7		1680	105	20	42	
3	.02	86	56	R	58	2.26	7.6		1690	106	20	40	
4		80	48	C	58	2.28	7.5		1680	108	24	37	
5		78	50	C	58	2.15			1620	104	20	41	
6	.01	86	60	R	58	2.14	7.6		1760	106	16	40	
7		82	52	C		2.24	7.8		1600	105	20	50	
8	.01	84	56	R	58	2.25	7.6		1700	106	20	3	
9		84	54	CL	59	2.23	7.7		1640	108	20	5	
10		72	42	CL	58	2.12	7.7		2070	106	20	1	
11		72	42	C	57	2.13	7.7		1730	117	20	3	
12		76	46	C	57	2.11	7.7		1670	100	20	4	
13		82	50	C	57	2.08	7.6		1680	100	20	3	
14		82	52	C	59	2.20	7.7		1700	116	20	4	
15		86	56	C	59	2.17	7.6		1650	84	16	51	
16		86	58	C	59	2.18	7.6		1650	100	20	53	
17	.01	88	62	R	59	2.18	7.6		1660	110	20	50	
18	.72	84	60	R	59	2.29	7.7		1700	110	20	23	
19	.21	66	56	R	58	2.14	7.6		1640	100	20	3	
20		74	50	CL	58	2.16	7.7		1630	105	20	3	
21	.01	78	50	R	58	1.92	7.8		1950	110	20	2	
22		72	46	C	57	1.77	7.8		1940	110	16	1	
23		7474	48	C	57	2.18	7.7		1630	110	20	0	
24		82	52	C	57	2.20	7.7		1650	110	20	0	
25		82	58	C	57	2.25	7.6		1640	120	20	0	
26	.31	84	50	R	57	2.25	7.6		1650	105	20	0	
27	.01	66	54	R	57	2.01	7.6		1640	105	20	0	
28		76	50	C	58	2.22	7.7		1530	130	20	0	
29	.58	79	54	R	58	2.20	7.6		1640	115	20	0	
30	.39	68	42	R	60	2.28	7.6		1630	113	20	0	
31		68	40	C	57	2.19	7.5		1630	117	20	0	
ARITH MEAN	.075	79	52		58	2.17	7.7		1701	108	19.7	16	
STAT MEAN						2.18							

*C—Clear CL—Cloudy R—Rain **Indicate Unit

W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH August 1967 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. x10 lbs.	5-Day BOD Eff. Mg/l	5-Day BOD Eff. x10 lbs.	5-Day BOD Rem. %	Suspended Solids Inf. Mg/l	Suspended Solids Inf. x10 lbs.	Suspended Solids Eff. Mg/l	Suspended Solids Eff. x10 lbs.	Suspended Solids Rem. %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. x10 lbs.	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. x10 lbs.	Remarks
1	72	134	42	78	42	79	147	30	56	62	71	132	25	47	
2	57	106	30	56	47	87	162	24	45	72	77	143	20	37	
3	68	128	48	90	29	71	134	28	53	61	62	117	20	38	
4	60	114	42	80	30	80	152	37	70	54	75	143	36	68	
5															
6	72	134	60	112	17	77	144	42	78	45	71	133	39	73	
7	57	102	27	48	53	85	152	40	71	53	74	132	32	57	
8	84	158	60	113	29	56	105	32	60	43	49	92	29	54	
9	68	126	64	119	6	87	162	40	74	54	72	134	35	65	
10	64	113	57	101	11	93	164	39	69	58	85	150	31	55	
11	108	192	68	121	37	93	165	46	82	51	80	142	40	71	
12	72	127	63	111	13	77	136	34	60	56	64	113	27	48	
13	76	132	68	118	11	92	160	36	62	61	80	139	30	52	
14	68	125	68	125	0	78	143	56	103	28	68	125	50	92	
15	68	123	57	103	16	71	129	32	58	55	61	110	28	51	
16	72	131	60	109	17	103	187	27	49	74	85	155	20	36	
17	76	138	60	109	21	85	155	37	67	57	79	144	37	67	
18	68	130	60	115	12	81	155	42	80	48	61	117	29	55	
19	104	186	60	107	42	118	211	39	70	67	107	191	34	61	
20	84	151	54	97	36	95	171	26	47	73	82	148	24	43	
21	120	192	51	82	58	77	123	35	56	55	67	107	28	45	
22	72	106	57	84	21	85	125	30	44	65	79	117	30	44	
23	84	153	60	109	29	128	233	38	69	70	113	205	31	56	
24	64	117	64	117	0	133	244	51	94	62	107	196	42	77	
25	60	113	57	107	5	88	165	41	77	53	83	156	40	75	
26	64	120	57	107	11	121	227	42	79	65	112	210	40	75	
27	63	106	48	80	24	73	122	34	57	53	64	107	28	47	
28	84	155	55	102	35	124	230	67	124	46	113	209	56	104	
29	64	117	57	105	11	82	150	52	95	37	62	114	32	59	
30	57	108	54	103	5	72	137	41	78	43	66	126	39	74	
31	81	148	76	139	6	89	163	56	102	37	72	131	43	79	
ARITH. MEAN	74	133	56	102	22	89	162	39	71	55	78	141	33	60	
STAT. MEAN		128		105			155		69						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH August 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft.	Wasted cu. ft.	
1																86	0	0	Note — include gallons
2	2210	36	5.5	8.0	72											92	38	38	of sludge to beds
3	884	13	5.6	6.9	77											97	44	44	
4	884	15	5.5	8.5	71											97	43	43	Filled bed # 2 Aug.
5	1768	25	5.5	6.6	75												49	49	1. 8250 gals. 10.9%
6	1768	28	5.4	7.7	73											100	47	47	dry solids. 51.9 %
7	1326	17	5.5	5.9	74											97	46	46	voltaile.
8	2210	36	5.7	7.8	74												50	50	
9	1326	20	5.6	7.3	73											96	47	47	filled bed # 10 Aug.
10	884	16	5.5	9.2	70											95	45	45	29. 7500 gals. 11.9%
11	2210	34	5.8	7.3	75											93	47	47	dry solids. 50.0%
12	1326	22	5.7	8.7	67											92	46	46	volatile.
13	1326	19	5.6	6.9	75											91	44	44	
14	1326	21	5.7	7.5	73											90	36	36	Avg. temp. of #2
15	1326	21	5.7	7.2	77											89	42	42	digester - 87
16	1326	18	5.6	6.2	76											95	52	52	
17	1326	18	5.6	6.5	76											100	47	47	
18	884	15	5.6	8.0	73												51	51	
19	884	15	5.5	7.5	78											99	37	37	
20	884	11	5.6	6.2	74											98	40	40	
21	1768	27	5.6	7.3	73											95	37	37	
22																95	32	32	
23	1768	26	5.5	7.3	71											94	40	9	
24	884	13	5.6	6.8	75											96	44	0	
25	1326	22	5.7	8.3	72											98	53	0	
26	1326	20	5.6	7.5	70												56	0	
27	1326	22	5.6	8.0	73											99	43	0	
28	1326	19	5.7	6.8	75											97	39	0	
29	1105	18		8.2	70											98	32	0	
30	1547	27	5.8	9.0	69											99	36	26	
31	1326	21	5.9	8.2	69											98	39	39	
ARITH MEAN	1372	21	5.6	7.2	73											95	42	42	
STAT MEAN		21																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1967 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather				Raw Sewage			Grit	~~Sewage~~ Water cu. ft.	Cl₂	Power	AUX. FUEL Gas	Remarks
	Precip.	Temp. (°F)		Type*	Temp.	Flow							
	Inches	Max.	Min.		°F	MGD	pH	cf/mg		lbs.	KWH x 10	cu. ft. x 100	
1		72	42	C	57	2.24	7.6		1680	124	20	3	
2		74	46	C	57	2.16	7.5		1680	106	20	4	
3		76	46	C	57	2.10	7.4		1480	102	20	3	
4		80	50	C	56	2.12	7.6		2140	115	16	3	
5		81	47	C	58	2.23	7.5		1850	129	20	3	
6		78	48	C	57	2.17	7.6		1710	112	20	4	
7		80	50	C	58	2.16	7.6		1650	107	20	30	
8		82	52	C	57	2.21	7.6		1690	117	20	44	
9	.05	74	40	R	58	2.15	7.6		1690	103	20	40	
10		64	38	C	57	2.04	7.6		1680	104	20	10	
11		70	38	C	58	2.14	7.6		1580	128	16	3	
12		84	40	C	57	2.12	7.7		1610	117	20	3	
13		80	52	C	57	2.12	7.6		1940	143	20	3	
14		80	48	C	57	2.15	7.5		2030	123	20	4	
15		82	50	C	58	2.12	7.5		1720	123	20	3	
16		86	56	C	58	2.14	7.6		1690	100	16	3	
17		78	47	CL	58	2.09	7.6		1700	109	20	4	
18		82	52	C	59	2.15	7.5		1690	131	20	4	
19	.09	76	56	R	59	2.12			1560	137	20	6	
20	.85	80	62	R	58	2.25			1640	110	20	4	
21	.05	72	42	R	58	2.16			1850	110	20	3	
22		56	35	C	58	2.17			1650	122	20	4	
23		64	40	C	57	2.11			1720	108	20	6	
24		58	35	C	57	2.05			1710	106	16	8	
25		66	40	C	58	2.12			2010	110	20	3	
26	.24	79	44	R	58	2.13			1680	132	20	7	
27	.31	46	36	R	57	2.12			1660	112	20	8	
28	.06	48	36	R	57	2.12			1700	112	20	15	
29	.38	42	34	R&S	57	2.17			1750	108	20	20	
30	.01	54	34	R	57	2.11			1750	94	16	16	
31													
ARITH MEAN	.068	71	45		58	2.14	7.6		1730	115	19.3	9	
STAT MEAN						2.14							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 19 67 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. lbs x 10	5-Day BOD Eff. Mg/l	5-Day BOD Eff. lbs x 10	5-Day BOD Rem %	Suspended Solids Inf Mg/l	Suspended Solids Inf lbs x 10	Suspended Solids Eff Mg/l	Suspended Solids Eff lbs x 10	Suspended Solids Rem %	Suspended Volatile Solids Inf Mg/l	Suspended Volatile Solids Inf lbs x 10	Suspended Volatile Solids Eff. Mg/l	Suspended Volatile Solids Eff. lbs x 10	Remarks
F 1	68	127	60	112	12	94	176	50	93	47	84	157	46	86	
S 2	76	137	57	103	25	154	277	38	68	75	130	334	38	68	
S 3	54	95	45	79	17	73	128	31	54	58	64	112	26	46	
M 4	72	127	64	113	11	113	200	47	83	58	85	150	37	65	
T 5	84	156	76	141	10	79	147	44	82	44	60	112	31	58	
W 6	72	130	56	101	22	96	174	51	92	47	78	141	39	71	
T 7	72	130	72	130	0	78	140	46	83	41	64	115	34	61	
F 8	76	140	68	125	11	98	181	49	90	50	83	153	42	77	
S 9	66	118	60	108	9	109	195	39	70	64	99	178	30	54	
S 10	72	122	57	97	21	92	156	36	61	61	77	131	29	49	
M 11	100	178	92	164	8	89	159	42	75	53	79	141	41	73	
T 12	76	134	64	113	16	160	283	37	65	77	140	248	29	51	
W 13	64	113	57	101	11	157	278	47	83	70	134	237	34	60	
T 14	72	129	68	122	6	114	204	48	86	58	101	181	37	66	
F 15	60	106	57	101	5	92	163	36	64	61	78	138	29	51	
S 16	100	179	72	129	28	98	175	44	79	55	86	154	43	77	
S 17	71	124	62	108	13	96	167	53	92	45	84	146	42	73	
M 18	84	151	76	136	10	120	215	62	111	48	107	192	54	97	
T 19	88	156	36	64	59	118	209	33	58	72	88	156	21	37	
W 20	63	118	63	118	0	168	315	27	51	84	152	285	30	56	
T 21	66	119	66	119	0	82	148	55	99	33	68	122	41	74	
F 22	68	123	64	116	6	111	201	52	94	53	96	174	43	78	
S 23	76	134	63	111	17	151	266	43	76	72	138	243	35	62	
S 24	72	123	64	109	11	111	190	36	62	68	98	168	33	56	
M 25	64	113	60	106	6	126	223	45	80	64	103	182	40	71	
T 26	68	121	60	107	12	93	165	43	76	54	73	130	31	55	
W 27	76	134	33	58	57	69	122	28	50	59	59	104	26	46	
T 28	88	156	64	113	27	92	163	39	69	58	78	138	31	55	
F 29	72	130	54	98	25	78	141	47	85	40	68	123	41	74	
S 30	68	120	57	100	16	66	116	36	63	45	63	111	36	63	
31															
ARITH MEAN	74	131	62	110	16	106	189	43	76	57	91	162	36	64	
STAT. MEAN		129		110			184		78						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF HEALTH

MONTH September 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant x10					sludge near bottom x10				Temp	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu ft. X 100	Wasted cu. ft.	
1	1326	21	5.8	8.0	70											96	45	45	Note — include gallons
2	884	14	5.8	7.7	70											95	39	39	of sludge to beds
3	884	17		9.9	67											94	34	34	
4	1326	24	5.6	9.8	65											92	40	40	
5						10166		.27	68	72	40					92	37	37	
6	2210	33	5.8	7.7	67											92	34	34	
7	1326	20	5.9	7.5	71											90	44	44	
8	1326	20	5.8	8.0	68											94	57	57	
9	1326	21	5.7	8.1	69											98	50	50	
10	884	15	5.8	10.3	60											101	41	41	
11	1326	20	5.6	7.3	72											99	38	38	
12	1768	29	5.7	8.3	70											97	36	36	
13	1326	17	5.9	6.1	75											96	47	8	
14	1768	35	5.8	11.2	63											97	71	30	
15	884	15	5.7	9.7	64											99	46	34	
16	884	16	5.6	10.3	64	12376		.27	59	52	20					98	35	35	
17	1326	22	5.8	8.1	71											97	36	36	
18	1768	35	5.6	10.0	69											95	35	35	
19	1326	21		8.3	68											94	63	32	
20	1768	33		9.8	68											95	45	29	
21	1768	30		9.0	67											95	61	34	
22	1768	34		10.3	66	14144		.28	60	60	60					96	62	61	
23	1326	25		9.8	68											94	57	57	
24	1326	19		7.1	71											92	52	52	
25	1768	23		6.7	68											91	31	0	
26	884	14		8.2	67											93	69	37	
27	2210	33		8.0	67											94	52	52	
28	1768	27		7.9	67											92	53	53	
29	1768	28		8.5	67											90	64	35	
30	1326	21		8.1	69											92	60	23	
31																			
ARITH MEAN	1433	24	5.7	8.6	68	12229		.27	62	61	40					95	48	38	
STAT MEAN		25																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN
DEPARTMENT OF PUBLIC HEALTH
D-4 12M 5-66

MONTH October 19 67

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	[illegible] water [illegible] cu. ft.	Cl₂ lbs.	Power KWH	AUX. FUEL Gas cu. ft. x 100	Remarks
1		70	36	C	57	2.08			1700	105	20	5	What happened to the form of this sheet?
2		78	54	C		2.23			1600	127	20	9	It is hard enough to get the figures in
3		75	56	C	57	2.19			1720	98	20	7	some of the columns without having them
4		82	56	C	58	2.20			1690	121	20	8	any smaller. Wouldn't it be better to have
5		74	44	C	58	2.04			1710	113	20	7	a smaller area for remarks and leave ample
6		56	36	C	57	2.03			2090	110	20	8	space for the figures? Anyone having more
7	.01	62	36	R	56	2.04			1620	102	20	9	comments thanwould fit the space provided
8	.61	67	63	R	57	2.09			1620	118	20	8	could use an attached sheet of plain white
9	.02	48	40	R	58	2.07			1620	108	16	39	paper.
10		50	36	CL	57	2.06			1650	120	20	19	
11		50	40	CL	57	2.05			1670	132	20	10	
12		52	40	C	56	2.08			1810	102	20	11	
13		60	42	CL	56	2.08			1670	112	20	9	
14	.20	64	44	R	57	2.09			1720	100	20	9	
15	.75	62	49	R		2.15			1690	103	20	8	
16	.40	58	48	R	58	2.22			1630	105	20	8	
17	.35	52	36	R	57	2.21			1660	118	20	7	
18		52	34	CL	56	2.16			1930	112	20	8	
19		48	28	C	56	2.12			1640	107	20	19	
20		56	30	C	56	2.11			1710	112	20	8	
21		50	26	C	56	2.05			1620	104	16	10	
22		59	37	C	56	2.06			1740	105	20	8	
23		67	40	C		2.12			1630	122	20	5	
24	.54	68	38	R	56	2.16			1630	120	20	5	
25	.01	42	34	R	56	2.08			1630	107	16	5	
26	.50	41	32	R&S	56	2.09			1700	93	20	7	
27	.42	36	30	R&S	55	2.16			1630	100	20	16	
28		42	26	C	56	2.15			1580	105	20	17	
29	.09	52	32	R	55	2.09			1950	113	20	14	
30		64	48	C	57	2.13			2000	100	20	12	
31		58	50	CL	56	2.09			1730	107	20	10	
ARITH MEAN	.13	58	39		57	2.11			1709	110	19.6	10.5	
STAT MEAN						2.11							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH October 1967

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day B O D					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	X10 lbs.	Mg/l	X10 lbs.	%	Mg/l	X10 lbs.	Mg/l	X10 lbs.	%	Mg/l	X10 lbs.	Mg/l	X10 lbs.	
1	88	164	76	141	14	93	173	46	86	51	80	149	41	76	
2															
3	68	124	64	117	6	75	137	49	89	35	40	73	23	42	
4	56	103	56	103	0	77	141	40	73	48	71	130	34	62	
5	64	109	56	95	13	63	107	44	75	30	59	100	39	66	
6	54	91	57	97	-6	69	117	49	83	29	61	103	35	59	
7	180	306	60	102	67	101	172	30	51	70	91	155	26	44	
8	64	112	56	98	13	80	139	54	94	33	70	122	44	76	
9	84	145	63	109	23	81	140	48	83	41	63	109	34	59	
10	60	103	60	103	0	117	201	61	105	48	106	182	44	76	
11	72	123	64	109	11	108	185	59	101	45	97	166	54	92	
12	60	104	60	104	0	97	168	41	71	58	87	151	33	57	
13	78	135	72	125	8	116	201	44	76	62	90	156	38	66	
14	64	112	68	119	-6	66	115	46	80	30	58	101	39	68	
15	90	162	68	122	24	134	240	53	95	61	108	194	43	77	
16	45	83	40	74	11	96	178	48	89	50	96	178	42	78	
17	60	111	60	111	0	113	208	44	81	61	108	199	43	79	
18	65	117	62	112	5	58	104	45	81	22	55	99	41	74	
19	76	134	63	111	17	101	179	44	78	57	93	164	40	71	
20	56	99	52	92	7	65	114	38	67	42	61	107	37	65	
21	80	137	60	103	25	96	164	78	133	19	91	156	69	118	
22	80	137	68	117	23	135	232	40	69	70	111	191	28	48	
23	60	106	68	120	-13	84	149	56	101	33	74	131	48	85	
24	60	108	60	108	0	88	158	39	70	56	83	149	37	67	
25	68	118	57	99	16	100	174	43	75	57	90	156	38	66	
26	84	146	63	110	25	201	350	44	77	78	189	329	44	77	
27	92	166	60	108	35	126	227	46	83	64	118	213	41	74	
28	69	124	64	115	7	90	161	68	122	24	44	79	30	54	
29	72	125	63	110	12	75	131	34	59	55	63	110	34	59	
30	60	107	64	114	-7	104	185	53	94	49	91	162	48	85	
31	80	139	57	99	29	73	127	55	96	25	68	119	52	91	
ARITH. MEAN	73	128	61	108	12	96	169	48	85	47	84	148	40	70	
STAT. MEAN		123		108			163		84						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH October 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant X10					sludge near bottom X10				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F # 1	Produced cu. ft.	Wasted cu. ft.	
1	1326	16	P	6.2	68											92	40	0	Note — include gallons
2	1326	20	H	7.6	72	11934		.26	68	23	20					94	64	64	of sludge to beds
3	1326	19		7.4	70											92	51	51	
4	1326	22	M	8.5	68											91	45	45	Transfered 44642
5			E													90	56	32	gals. during month.
6	1326	25	T	9.7	68												37	5	Averaged 1.7% dry
7	884	11	E	7.3	63											92	32	0	solids and 55.9%
8	884	16	R	9.8	67											93	29	0	volatile.
9	3094	48		8.1	67											93	75	69	
10	884	16	O	10.4	61											94	64	8	
11	3536	58	U	10.1	58	18122		.29	61	60	30					97	77	39	
12			T													97	53	41	
13	1768	26		8.7	60											96	73	28	
14	1326	9	O	6.0	40											98	57	10	
15	1768	36	F	12.0	61											100	59	18	
16	1326	14		6.0	64											100	47	47	
17	1326	19	S	8.3	62											98	57	22	
18	1326	18	E	7.4	64												57	5	
19	1326	18	R	7.7	62												48	0	
20	1768	19	V	5.8	64											98	50	0	
21	884	7	I	5.1	56											99	41	0	
22	1768	21	C	6.4	66											100	37	0	
23	1105	12	E	6.0	65	14586		.27	63	44	14					100	43	0	
24																	45	0	
25	2210	30		7.3	65												41	0	
26	1326	17		6.6	69											100	43	0	
27	1326	20		8.1	65												46	0	
28	1547	27		9.2	67												34	0	
29	1105	13		6.1	68											98	54	54	
30	1326	23		8.7	70											96	41	41	
31	1326	17		6.5	71											94	48	48	
ARITH MEAN	1492	21		7.8	64	14881		.27	64	42	21					96	80	20	
STAT. MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN
DEPARTMENT OF PUBLIC HEALTH
D-4 12M 5-66

MONTH November 1967

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~Excess~~ water ~~cu. ft.~~ cu. ft.	Cl₂ lbs.	Power KWH x 10	AUX. FUEL ~~Gas~~ cu. ft. x 100	Remarks
1	.85	58	40	R	57	2.23			1650	105	20	4	Flow for the 3rd is 2.24
2	.08	48	38	R	56	2.20	7.6		1760	100	20	10	
3	.48	38	28	R&S	56	7.6	7.6		1730	105	20	23	
4	.18	38	26	S	57	2.18	7.6		1720	100	20	23	
5	.03	34	23	S	56	2.14	7.5		1720	100	20	19	
6		34	22	CL	56	2.20	7.8		1610	112	20	19	
7		36	18	CL	56	2.18	7.8		1720	100	20	21	
8		42	22	C	55	2.17	7.8		1930	106	20	14	
9		50	28	C	56	2.15			1800	111	20	14	
10	.14	56	36	R	56	1.90	7.7		1980	111	16	11	
11	.22	50	44	R	56	2.19	7.6		1710	100	20	11	
12		48	34	CL	55	2.12	7.7		1770	96	20	13	
13	.02	40	30	R	56	2.19	7.7		1630	108	20	17	
14	.13	38	16	S	55	2.14	7.7		1700	100	20	17	
15		26	16	C	54	2.12	7.7		1700	104	20	17	
16	.22	38	24	R	54	2.14	7.8		1770	100	20	13	
17	.06	46	34	R&S	54	2.16	7.7		1750	128	20	13	
18	.04	40	32	R&S	54	2.11	7.5		1740	102	16	15	
19		40	22	CL	54	2.04	7.7		1680	106	20	18	
20		38	26	CL	55	2.17	7.6		1940	109	20	16	
21	.01	38	30	R	54	2.16	7.5		1720	109	20	8	
22	.07	38	30	R	54	2.15	7.6		1710	105	20	16	
23		34	26	CL	54	2.02	7.5		1660	100	20	14	
24		44	30	C	54	2.11	7.4		1660	121	16	16	
25		52	28	C	54	2.06	7.5		1660	100	20	11	
26		44	24	CL	54	2.04	7.4		1720	100	20	13	
27	.01	28	17	S	54	2.12	7.5		1620	120	20	19	
28		28	12	C		2.08	7.4		1740	104	20	19	
29	.01	32	20	S	54	2.05	7.7		1650	100	20	17	
30		34	18	CL		2.03	7.7		1670	100	20	30	
31													
ARITH. MEAN		40	26		55	2.13	7.6		1727	105	19.6	16	
STAT MEAN						2.13							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MONTH November 19 67 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	%	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	%	Mg/l	x 10 lbs.	Mg/l	x 10 lbs.	
1	69	119	60	112	6	124	231	55	102	56	112	208	45	84	
2	68	125	56	103	18	121	222	47	86	61	113	207	42	77	
3	68	127	61	114	10	111	207	55	103	50	102	191	47	88	
4	76	138	64	116	16	129	235	43	78	67	118	215	39	71	
5	69	123	64	114	7	98	175	37	66	62	83	148	29	52	
6	76	139	39	72	49	128	235	36	66	72	113	207	35	64	
7	68	124	54	98	21	96	175	35	64	64	85	155	33	60	
8	51	92	58	87	6	78	141	40	72	49	70	127	34	62	
9	66	118	18	32	73	95	170	34	61	64	83	149	32	57	
10	63	100	57	90	10	121	192	33	52	73	106	168	27	43	
11	92	168	68	124	26	93	170	47	86	50	84	153	43	79	
12	54	95	51	90	6	102	180	35	62	66	90	159	29	51	
13	68	124	64	117	6	58	106	32	58	45	54	99	32	58	
14	84	150	54	96	36	65	116	35	62	46	63	112	33	59	
15	76	134	30	53	61	157	278	34	60	78	143	253	29	51	
16	63	112	54	96	14	123	220	31	55	75	100	179	25	45	
17	60	108	60	108	0	100	180	31	56	69	96	173	30	54	
18	112	197	57	100	49	142	250	35	62	75	133	234	33	58	
19	60	102	45	77	25	112	191	27	46	76	100	170	23	39	
20	72	130	57	103	21	127	230	34	62	73	110	199	30	54	
21	68	122	57	103	16	77	139	35	63	55	71	128	31	56	
22	72	129	60	108	17	56	100	27	48	52	54	97	22	39	
23	64	108	72	121	-13	68	115	41	69	40	64	108	41	69	
24	100	176	54	95	46	87	153	29	51	67	76	134	28	49	
25	75	129	75	129	0	82	141	56	96	32	69	119	48	82	
26	76	129	72	122	5	77	131	47	80	39	68	116	37	63	
27	76	134	64	113	16	73	129	49	87	33	63	111	43	76	
28						84	146	33	57	61	74	128	30	52	
29	76	130	66	113	13	118	202	36	62	70	108	185	30	51	
30	74	125	59	100	21	101	171	31	52	69	91	154	29	49	
31															
ARITH. MEAN	72	128	57	100	20	100	178	38	67	60	90	160	34	60	
STAT. MEAN		126		103			174		68						

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH November 1967 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals	Raw Sludge: Lbs Per 1000 c.f Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Supernatant x10: Gals.	Supernatant x10: pH	Supernatant x10: Total Solids %	Supernatant x10: Vol Solids %	Supernatant x10: Susp Solids Mg/l	Supernatant x10: 5-Day B O D Mg/l	sludge near bottom x10: Total Solids %	sludge near bottom x10: Vol Solids %	sludge near bottom x10: Vol Acids Mg/l	Temp: pH #1	Temp: °F #1	Gas: Produced cu ft X 100	Gas: Wasted cu ft	Remarks
1	1326	17		6.4	69											93	43	43	Note — include gallons
2	884	11	6.1	6.4	68	10608	7.1	.23	58	40	27				7.0	92	39	9	of sludge to beds
3	1768	20	6.2	6.0	68											93	33	20	
4	1768	26	6.1	7.9	65											92	54	3	Transfered 31603 gals.
5	884	13	6.0	7.2	72											94	37	0	from #1 to #2 during
6	884	11	6.4	6.5	66											95	36	36	month. Averaged 1.1%
7	884	11	6.0	6.3	68											94	38	38	dry solids and 57.4%
8	884	15	5.9	9.0	65											92	64	38	volatile.
9																90	27	0	
10	1326	16	5.9	6.2	67											92	6	0	
11	884	12	5.9	6.5	71											92	30	0	
12	884	12		7.1	70											90	29	0	
13	1326	13	6.3	5.0	72											94	34	0	
14	884	10	5.9	5.5	71											94	36	0	
15	884	12	6.0	7.1	65											95	39	0	
16	884	11		6.3	72		7.1								7.1	96	33	0	
17						8398		.25	62	16	34					96	33	0	
18	1326	18	5.9	6.0	78											97	33	33	
19	1326	17	5.6	6.5	71											94	38	38	
20	1105	10	6.0	4.6	69											92	30	0	
21																94	30	0	
22	1105	16	5.9	7.6	67											94	31	24	
23																92	30	30	
24	1768	29	5.6	8.2	72											91	32	32	
25	1326	18	5.7	6.9	71											90	42	42	
26	1547	19	5.7	5.9	72											88	40	0	
27	1547	23	5.8	7.0	73	12597	7.1	.26	51	35	39				7.1	90	35	0	
28																90	33	21	
29	2210	26	5.8	5.4	76											90	30	0	
30	1326	16	5.9	5.7	77											90	38	26	
31																			
ARITH MEAN	1238	16	5.9	6.5	70	10534	7.1	.25	57	30	33				7.1	93	35	14	
STAT MEAN		16																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN
DEPARTMENT OF PUBLIC HEALTH
D-4 12M 5-66

MONTH December 19 67 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather Precip. Inches	Weather Temp. (°F) Max.	Weather Temp. (°F) Min.	Type*	Raw Sewage Temp. °F	Raw Sewage Flow MGD	pH	Grit cf/mg	~~XXXXX~~ water ~~XXXXX~~ cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL Gas cu. ft. x 100	Remarks
1	.01	36	20	R	53	2.08	7.6		1700	105	20	58	
2	.23	32	26	R&S	53	2.05	7.6		1660	100	20	50	
3		37	24	CL	54	2.04	7.7		1780	100	16	77	
4	.01	42	26	R	55	2.09	7.7		2110	135	20	56	
5	.04	42	36	R	54	2.06	7.6		1660	105	20	51	
6	.07	46	38	R	54	2.07	7.6		1630	105	20	50	
7	.17	52	36	R	54	2.12	7.7		1660	100	20	11	
8		40	30	CL	54	2.10	7.7		1660	120	20	11	
9	.30	34	28	R&S	54	2.09	7.6		1750	90	20	11	
10	.86	36	30	R	53	2.18	7.6		1650	90	16	12	
11	.44	48	34	R	54	2.29	7.7		1640	105	20	12	
12	.02	38	30	R	53	2.30	7.7		2150	100	20	12	
13		38	24	C	52	2.29	7.3		1900	100	20	12	
14		32	20	CL	53	2.27	7.7		2020	107	24	16	
15		28	20	C	53	2.29	7.6		1640	103	20	79	
16		36	22	C	53	2.22	7.6		1640	93	20	14	
17	.09	41	29	R	53	2.19	7.7		1730	93	20	14	
18		46	28	C	53	2.26	7.6		1610	104	20	11	
19		42	24	C	53	2.22	7.7		1670	105	20	10	
20	1.00	54	30	R	53	2.33	7.8		1670	105	20	15	
21	.57	60	22	R	53	2.49	7.7		1630	105	20	19	
22	.02	22	6	S	52	2.45	7.7		1670	100	24	11	
23		26	16	CL	52	2.40	7.4		1720	100	20	11	
24	.06	34	24	R&S	52	2.30			1650	101	20	13	
25	.09	24	12	S	52	2.27	7.7		2100	94	16	14	
26	.03	20	3	S	51	2.39	7.6		1820	107	20	25	
27		24	8	CL	52	2.38	7.8		1570	105	24	25	
28		26	6	C	52	2.35	7.7		1690	105	20	16	
29		30	8	C	52	2.37	7.6		1720	110	20	18	
30	.04	32	16	S	52	2.32	7.6		1750	100	20	14	
31		18	-8	C	52	2.23	7.6		1620	100	20	23	
ARITH. MEAN	.13	36	22		53	2.24	7.6		1738	103	20	25	
STAT MEAN						2.25							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF HEALTH

MONTH December 19 67

PRIMARY TREATMENT DATA

OPERATOR Robert J. Swalwell

Date	5-Day BOD					Suspended Solids					Suspended Volatile Solids				Remarks
	Inf.		Eff.		Rem.	Inf.		Eff.		Rem.	Inf.		Eff.		
	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	%	Mg/l	lbs x10	Mg/l	lbs x10	
F 1	63	109	57	99	10	91	158	33	57	64	90	156	32	56	Samples used are 24hr. composits collected
S 2	66	113	60	103	9	72	123	50	86	31	68	116	45	77	by automatic samplers. The effluent samples
S 3	57	97	45	77	21	73	124	24	51	67	63	107	21	36	contain supernatant while the raw do not.
M 4	68	119	54	94	21	98	171	27	47	72	88	153	24	42	
T 5	88	151	57	98	35	89	153	30	52	66	78	134	25	43	
W 6	64	110	64	110	0	55	95	42	72	24	45	78	31	54	
T 7	84	149	57	101	32	83	147	32	57	61	68	120	23	41	
F 8	72	126	63	110	13	76	133	40	70	47	68	119	39	68	
S 9	74	129	63	110	15	127	221	38	66	70	115	200	35	61	
S 10	80	145	42	76	48	107	195	30	55	72	86	156	23	42	
M 11	84	160	60	115	29	153	292	46	88	70	127	243	33	63	
T 12	63	121	51	98	19	64	123	30	58	53	55	105	25	48	
W 13	57	109	45	86	21	106	202	30	57	72	96	183	26	50	
T 14	72	136	57	108	21	68	129	23	44	66	60	114	21	40	
F 15	72	138	60	115	17	58	111	37	71	36	55	105	36	69	
S 16	68	126	63	117	7	64	118	35	65	45	58	107	32	59	
S 17	72	131	54	99	25	88	161	31	57	65	78	142	27	49	
M 18	68	128	64	121	6	100	189	39	74	61	90	170	36	68	
T 19	76	141	64	118	16	79	146	34	63	57	70	130	28	52	
W 20	72	140	60	117	17	100	194	40	78	60	65	126	31	60	
T 21	60	125	51	106	15	82	170	46	96	44	70	145	41	85	
F 22	84	172	51	104	39	80	163	34	69	58	67	137	34	69	
S 23	56	112	51	102	9	57	114	32	64	44	51	102	32	64	
S 24	51	98	42	81	18	51	98	18	35	65	38	73	15	29	
M 25	48	91	39	74	19	53	100	29	55	45	48	91	29	55	
T 26	100	199	57	114	43	126	251	31	62	75	107	213	31	62	
W 27	76	151	63	125	17	104	206	33	66	68	94	187	28	56	
T 28	72	141	54	106	25	61	120	36	71	41	55	108	32	63	
F 29	92	182	54	107	41	151	299	45	69	77	143	283	35	69	
S 30	64	124	57	110	11	65	126	37	72	43	62	120	32	62	
S 31	68	126	63	117	7	62	115	35	65	44	55	102	31	58	
ARITH. MEAN	71	132	56	104	20	85	160	34	64	57	75	140	30	56	
STAT. MEAN		136		104			152		63						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH December 1967 DIGESTER AND SLUDGE DATA OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant X10					sludge near bottom X10			Temp	Gas		Remarks
	Gals	Lbs Per 1000 c.f Digester	pH	Total Solids %	Vol Solids %	Gals.	pH	Total Solids %	Vol Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol Solids %	Vol Acids Mg/l	pH	°F #1	Produced cu ft X 100	Wasted cu ft	
1																92	35	35	Note — include gallons
2	1989	27	5.7	6.2	76											93	41	41	of sludge to beds
3	884	12	5.8	6.0	78											94	39	39	
4	1105	12	5.9	5.0	76												37	37	
5	1989	22	6.1	5.0	78											91	43	43	
6	884	11	5.9	5.7	75											94	0	0	
7	1326	28	5.5	10.6	71											96	60	0	
8	1768	21		6.1	70	10622		.26	63	18	20					98	41	0	
9	1326	19	5.7	6.4	79											95	43	0	
10	2210	26	5.8	5.2	79											93	42	0	
11	1768	23	5.8	6.0	78											95	41	0	
12	1768	26	5.8	7.0	74											96	42	0	
13	884	11		5.8	74											97	40	0	
14	884	14	5.6	8.3	67											98	33	0	
15																95	28	0	
16	1547	23	5.7	7.2	72											97	35	0	
17	1326	15	5.8	5.5	74											97	39	0	
18	1326	15	5.8	4.9	81											98	36	0	
19	1768	20	5.9	5.1	77											98	37	0	
20	1326	17	5.8	6.5	70	12376		.24	59	40	40					99	41	30	
21	1768	28	5.8	7.6	73											96	46	46	
22	884	15	5.7	8.2	73											94	35	35	
23	1768	17	5.8	4.7	74											92	4	0	
24	1326	18	5.8	6.7	73											90	50	0	
25																92	12	0	
26	2210	47	5.5	9.2	82											92	47	0	
27	1768	28		7.2	77											94	43	0	
28	2210	31		6.5	75											95	53	0	
29	1326	18	5.7	6.4	76	9282		.24	46	24	30					95	59	0	
30	884	10	5.6	5.5	75											98	32	0	
31	1326	17		6.0	76											98	51	0	
ARITH MEAN	1484	20	5.8	6.2	75	10760		.25	56	27	30					95	38	10	
STAT MEAN		20																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN
DEPARTMENT OF PUBLIC HEALTH
D-4 12M 5-66

MONTH January 19 69 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

Date	Weather Precip. Inches	Weather Temp. (°F) Max.	Weather Temp. (°F) Min.	Type*	Raw Sewage Temp. °F	Raw Sewage Flow MGD	pH	Grit cf/mg	water cu. ft.	Cl₂ lbs.	Power KWH X10	AUX. FUEL Gas cu. ft. X 100	Remarks
1	.04	14	-2	S		2.33	*		1730	100	24	74	* PH meter in for repair.
2		22	4	CL		2.45			1670	118	24	31	
3	.06	20	2	S		2.43			2260	130	28	32	
4		8	-5	C		2.45			1690	121	24	32	
5	.14	24	0	S		2.29			1610	114	24	29	
6	.22	34	20	S		2.43			1640	170	24	30	
7		24	4	CL		2.37			1560	123	28	38	
8	.12	26	12	R&S		2.32			1640	114	24	30	
9	.13	18	12	S		2.30			1650	113	28	30	
10		22	14	CL		2.31			1680	116	24	28	
11	.01	24	14	S		2.24			1680	100	28	28	
12		26	16	CL		2.24			1710	105	24	30	
13		28	18	CL		2.32			1610	113	28	30	
14		32	8	CL		2.31			1570	124	24	28	
15		34	18	CL	51	2.28			2240	112	28	44	
16	.04	38	28	R	51	2.30			1680	108	28	21	
17	.41	40	34	R	51	2.43			1670	113	24	20	
18		36	28	CL	52	2.41			1680	104	24	19	
19		36	20	CL	51	2.37			1700	108	28	67	
20		40	22	C	51	2.41			1630	110	24	67	
21		44	34	CL	50	2.43			1660	109	28	37	
22		44	36	CL	51	2.47			1660	110	24	37	
23	.06	48	24	R	51	2.52			1650	111	28	40	
24	.06	26	2	S	51	2.58			1620	107	24	47	
25	.15	16	2	S	50	2.54			1670	112	28	47	
26		24	1	C	50	2.46			1660	112	28	33	
27	.32	26	6	R&S	51	2.55			1610	116	28	33	
28	.11	40	26	R	51	2.54			1660	113	24	33	
29	.55	50	38	R	51	2.77			1650	117	28	35	
30		42	26	CL	51	2.79			2340	114	28	20	
31		34	26	CL	51	2.77			1720	116	32	20	
ARITH. MEAN	.08	30	16		51	2.43			1716	115	26.2	35	
STAT MEAN						2.43							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

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OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.1
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH January 19 69 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. x10 lbs.	5-Day BOD Eff Mg/l	5-Day BOD Eff x10 lbs.	5-Day BOD Rem %	Suspended Solids Inf Mg/l	Suspended Solids Inf x10 lbs.	Suspended Solids Eff Mg/l	Suspended Solids Eff x10 lbs.	Suspended Solids Rem %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. x10 lbs.	Suspended Volatile Solids Eff Mg/l	Suspended Volatile Solids Eff x10 lbs.	Total Phosphate Inf. mg/l	Total Phosphate Inf. lbs.	Total Phosphate Eff. mg/l	Total Phosphate Eff. lbs.	Remarks
1	76	148	57	111	25	56	109	24	47	57	50	97	22	43					
2	56	114	48	98	14	51	104	31	63	39	43	88	28	57					
3	52	105	42	85	19	57	116	29	59	49	52	105	26	53					
4	57	116	57	116	0	139	284	43	88	69	132	270	40	82					
5	54	103	54	103	0	79	151	30	57	62	67	128	22	42					
6	57	116	57	116	0	68	138	27	55	60	65	132	27	55					
7	68	134	54	107	21	58	115	31	61	47	56	111	31	61					
8						104	201	34	66	67	92	178	32	62					
9	64	123	54	104	16	95	182	36	69	62	84	161	33	63					
10	72	139	63	121	13	83	160	43	83	48	77	148	36	69					
11	60	112	60	112	0	47	88	36	67	23	44	82	36	67					
12	68	127	60	112	12	91	170	34	64	63	80	149	26	49					
13	60	116	60	116	0	58	112	37	72	36	49	95	30	58	16.0	310	16.0	310	
14	57	110	57	110	0	60	116	34	66	43	52	100	29	56					
15	56	107	56	107	0	71	135	32	61	55	59	112	25	48					
16																			
17	66	134	42	85	36	76	154	40	81	47	71	144	37	75					
18						75	151	30	60	60	70	141	29	58					
19	60	119	51	101	15	87	172	34	67	61	70	138	29	57					
20	54	109	48	96	11	156	314	30	60	81	151	304	28	56	17.7	356	15.0	302	
21	68	138	64	130	6	47	95	36	73	23	39	79	29	59					
22	42	87	48	99	-14	52	107	34	70	35	46	95	27	56					
23	48	101	51	107	-6	86	181	37	78	57	73	153	28	59	10.0	210	12.0	252	
24	64	136	51	108	20														
25	36	77	36	77	0	81	174	34	73	58	73	157	28	60					
26	48	98	54	111	-11	66	135	30	62	55	55	113	23	47					
27	72	153	36	77	50	61	130	42	89	31	56	119	42	89					
28	68	144	51	108	25	70	148	41	87	41	65	138	34	72	11.5	244	10.7	227	
29	61	148	57	132	11	88	203	45	104	49	76	176	27	62					
30	57	133	38	65	51	78	182	28	65	64	74	172	28	65					
31	51	118	39	90	24	57	132	34	79	40	49	113	29	67					
ARITH. MEAN	59	120	51	104	12	76	159	34	72	51	70	143	31	62	13.8	280	13.4	272	
STAT. MEAN		120		103			145		69										

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH January 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F # 1	Produced cu. ft.	Wasted cu. ft.	
1			*														**		Note — include gallons
2	2210	34		7.9	69											100			of sludge to beds
3																97			* PH meter out of
4	1768	33		9.7	69											97			service.
5	1326	23		6.8	89											92			
6																94			** Gas meters out of
7																93			service. Gas production
8	2652	39		7.4	71											93			estimated at 3000
9						11934										93			cu. ft. per day.
10	1768	28		8.6	66											90			
11	1768	28		7.8	72											90			49062 gals. transfered
12	2210	23		4.8	78											88			during month. Averaged
13	2210	32		7.8	66											88			.43% dry solids and
14	1768	26		7.5	68	19006		.17	46	440	360					90			57.3% volatile.
15	2210	48		12.9	60											88			
16	884	14		8.1	71											91			
17	884	14		8.1	71											92			
18	1768	36		10.7	60											89			
19	3094	37		6.2	69											85			
20	2210	27		6.0	72											92			
21	1768	26		7.9	65											96			
22	1768	28		8.4	67											98			
23	1768	27		7.8	69											96			
24	1768	28		8.4	66	9282		.17	49	480	240					92			
25																93			
26	2210	38		8.4	73											99			
27	2210	32		7.6	67											101			
28	2210	37		8.8	68											95			
29	1768	38		10.0	65	8840		.16	64	440	260					95			
30																96			
31	2210	41		9.9	67											93			
ARITH MEAN	1934	31		8.2	69	12265		.17	53	453	287					93			
STAT. MEAN		32																	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR

Marshall, MICHIGAN

MICHIGAN
DEPARTMENT OF PUBLIC HEALTH
D 4 12M 5 66

MONTH February 1969

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

Date	Weather: Precip. Inches	Weather: Temp. (°F) Max.	Weather: Temp. (°F) Min.	Type*	Raw Sewage: Temp. °F	Raw Sewage: Flow MGD	pH	Grit cf/mg	~~Water~~ water cu. ft.	Cl₂ lbs.	Power KWH x10	AUX. FUEL ~~Gas~~ cu. ft. x 100	Remarks
1		30	26	C	51	2.66	**		1690	100	24	35	** PH meter still in for repair
2	.16	40	18	R	50	2.63			1700	104	28	29	
3		24	14	CL	51	2.67			1580	115	28	29	
4		32	14	C	50	2.56			1650	117	28	28	
5		28	14	C	50	2.55			1620	116	24	37	
6	.01	30	18	S	50	2.51			1690	111	28	37	
7		38	26	CL	50	2.55			1610	124	28	25	
8		34	24	CL	50	2.50			1710	100	24	25	
9		33	13	C	51	2.45			1700	100	28	25	
10		34	18	CL	51	2.54			2230	109	24	26	
11	.04	32	20	S	50	2.51			1780	104	28	24	
12		28	12	CL	50	2.47			1640	114	28	35	
13		28	8	CL	50	2.45			1680	109	28	30	
14		26	8	C	50	2.47			1700	122	28	30	
15		30	16	C	51	2.41			1640	106	24	31	
16		37	19	CL	50	2.40			1670	109	24	25	
17		38	18	C	51	2.46			1660	108	28	25	
18		40	18	C	50	2.42			1640	108	28	22	
19		36	18	C	50	2.41			1650	110	28	30	
20		38	20	C	50	2.44			1650	113	24	37	
21		44	24	C	50	2.46			1650	111	28	20	
22	.08	42	30	R&S	50	2.42			2510	100	28	21	
23		40	28	CL	50	2.40			1600	105	24	21	
24		40	30	CD	50	2.48			1540	108	28	23	
25		34	24	CL	50	2.42			1560	112	28	28	
26		38	20	C	50	2.43			1680	121	28	20	
27		38	18	C	50	2.41			1520	112	28	24	
28		40	20	C	50	2.39			1470	110	28	22	
29													
30													
31													
ARITH MEAN	.01	35	19		50	2.48			1694	110	26.9	27	
STAT MEAN						2.47							

*C—Clear CL—Cloudy R—Rain **Indicate Unit
W—Windy CA—Calm S—Snow

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH February 19 69 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

Date	5-Day BOD Inf. Mg/l	5-Day BOD Inf. X10 lbs	5-Day BOD Eff. Mg/l	5-Day BOD Eff. X10 lbs	5-Day BOD Rem %	Suspended Solids Inf Mg/l	Suspended Solids Inf X10 lbs	Suspended Solids Eff Mg/l	Suspended Solids Eff X10 lbs	Suspended Solids Rem %	Suspended Volatile Solids Inf. Mg/l	Suspended Volatile Solids Inf. X10 lbs	Suspended Volatile Solids Eff Mg/l	Suspended Volatile Solids Eff X10 lbs	TOTAL PHOSPHATE Inf. mg/l	TOTAL PHOSPHATE Inf. lbs.	TOTAL PHOSPHATE Eff. mg/l	TOTAL PHOSPHATE Eff. lbs.	Remarks
1	63	140	61	135	3	52	115	26	58	50	52	115	26	58					
2	57	125	51	112	11	134	294	26	57	81	117	257	22	48					
3	68	151	57	127	16	133	296	36	80	73	127	283	31	69	15.0	334	14.5	323	
4	54	115	54	115	0	68	145	30	64	56	61	130	28	60					
5	60	128	48	102	20	112	238	22	47	80	96	204	22	47					
6																			
7	54	115	52	111	-4	88	187	38	81	57	83	177	36	77					
8	75	156	68	142	9	55	115	41	85	25	46	96	36	75					
9	63	129	56	114	11	89	182	34	69	62	70	143	28	57					
10	60	127	60	127	0	54	114	30	64	44	46	97	26	55	16.5	349	15.0	318	
11																			
12	74	152	54	111	27	74	152	32	66	57	66	136	29	60					
13	64	131	51	104	20	80	163	29	59	64	70	143	24	49					
14	66	136	53	109	20	68	140	29	60	57	64	132	26	54					
15	51	103	54	109	-6	74	149	37	74	50	64	129	35	70					
16	80	160	57	114	29	70	140	32	64	54	60	120	25	50					
17	76	156	57	117	25	74	152	34	70	54	68	140	32	66					
18	60	121	54	109	10	76	153	27	54	65	70	141	24	48					
19	59	119	47	94	20	77	155	32	64	58	63	127	22	44	12.5	251	12.0	241	
20	57	116	51	104	11	47	96	29	59	38	35	71	20	41	13.5	275	10.5	214	
21	78	160	54	111	31	72	148	30	62	58	67	137	25	51					
22	67	135	57	115	15	91	184	24	48	74	81	163	20	40					
23	72	144	60	120	17	82	164	44	88	46	73	146	38	76					
24	68	141	60	124	12	96	199	49	101	49	84	174	42	84	14.0	215	17.0	352	
25	68	137	68	137	0	77	155	36	77	53	64	129	29	59					
26	62	126	59	120	5	88	178	42	85	52	79	160	31	63	13.5	274	11.5	233	
27																			
28	54	108	48	96	11	75	149	32	64	57	69	138	31	62					
29																			
30																			
31																			
ARITH. MEAN	64	133	56	115	13	80	166	33	68	56	71	147	28	58	14.2	283	13.4	280	
STAT. MEAN		133		115			156		68										

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OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH February 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1768	34		10.1	68											91	*	*	Note — include gallons
2	1326	20		7.4	71											92			of sludge to beds
3																90			
4	2210	31		8.5	59											90			* Still waiting for
5	2210	42		10.1	66											93			gas meter parts. Gas
6	884	15		8.7	71											94			production estimated
7	884	15		8.9	68	12326		.16	62	400	240					94			at 3000 cu. ft./day.
8	1326	19		7.2	69											95			
9	1326	23		7.6	71											93			Transfered 50780 gals.
10	2210	26		5.9	71											94			from digester #1 to #2
11	884	15		9.4	62											92			during month. Averaged
12	1768	25		7.3	69											90			1.2% dry solids and
13	1768	34		10.3	66											92			56.5% volatile.
14	1326	21		8.6	66	10608		.17	47	580						91			
15	1326	13		5.1	68											92			
16	1326	24		9.1	70											89			
17																90			
18	1326	26		10.4	68											90			
19	1326	19		7.9	64											88			
20	1326	20		7.6	70	11934		.17	48	576	250					91			
21	1326	19		7.5	69											92			
22	1326	15		5.6	74											94			
23	1768	31		8.9	70											92			
24	2210	29		6.4	72											93			
25	1326	21		7.2	77											94			
26	884	15		9.1	67	15912		.17	50	960	320					91			
27																95			
28	1768	29		8.2	70											95			
29																			
30																			
31																			
ARITH MEAN	1428	23		7.8	69	12695		.17	52	824	270					92	30		
STAT. MEAN		23																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH March 19 69

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					xxx water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			**										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/x	lbs.	KWH	*						
1		42	18	C	50	2.37				1680	100	240	26						* Gas - cu. ft. X 100
2		42	20	C	50	2.37				1550	86	280	24						
3		44	18	C	51	2.41				1590	112	280	24						** PH meter in for
4		38	14	C	50	2.40				2240	110	280	25						repair.
5		40	16	C	50	2.40				2580	113	280	10						
6		38	22	CL	50	2.38	3.00	1.60		2990	113	280	10						consulting engineer
7		34	20	CL	50	2.38	3.00	1.70		1870	114	280	25						has flow charts for
8		40	18	C	49	2.33	2.90	1.60		1920	119	20 0	26						the first 5 days of
9	.05	37	18	S	50	2.29	2.90	1.00		1960	108	200	25						the month.
10		34	8	CL		2.36	3.00	0.70		1890	113	240	25						
11		26	8	CL	49	2.34	3.00	1.00		1910	112	200	26						
12		34	10	C	49	2.30	2.80	0.80		1910	114	240	59						
13		38	14	C	50	2.31	2.80	0.80		1920	108	280	61						
14		30	16	CL	50	2.32	2.90	0.80		1940	119	240	40						
15		38	18	C	50	2.29	2.90	0.80		2700	100	280	30						
16		46	24	C		2.27	2.80	1.80		1150	104	240	24						
17		60	32	C	50	2.34	3.00	1.00		1800	118	240	21						
18		66	35	C	50	2.32	2.90	1.10		2790	113	200	9						
19		64	42	C	50	2.31	2.90	1.80		1920	109	240	34						
20	.23	60	30	R&S	51	2.35	2.90	1.90		1930	107	240	35						
21		38	18	CL	50	2.34	3.00	1.80		1860	120	280	71						
22		52	26	C	50	2.30	2.70	1.10		1980	102	280	24						
23	.15	64	40	R	51	2.28	2.90	0.70		1960	107	240	15						
24	.86	44	30	R&S	51	2.44	3.00	1.60		1640	110	280	20						
25	.37	34	22	S		2.45	2.90	1.50		1720	115	240	53						
26	.07	32	10	S	50	2.43	3.10	2.00		1690	108	280	61						
27		38	18	C		2.43	2.90	1.80		1690	115	240	36						
28		45	20	C	50	2.42	3.00	1.80		1720	113	280	26						
29		30	14	C	50	2.39	2.90	1.80		1700	110	280	25						
30		26	10	C	50	2.34	2.80	1.80		1720	108	240	27						
31		38	18	CL	50	2.45	3.00	1.90		2530	114	240	68						
TOTAL	1.73										3414	253	32						
ARITH. MEAN						2.36				1950	110								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH March 1969 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	60	119	57	113	5	104	206	35	69	66	93	184	30	59						
2	48	95	51	101	-6	56	111	33	65	41	44	87	28	55						
3	104	209	51	103	51	62	125	30	60	52	58	117	26	52	6.5	131	4.9	98	25.0	
4	84	168	48	96	43	80	160	29	58	64	75	150	29	58						
5	72	144	54	108	25	70	140	29	58	59	61	122	21	42	3.7	74	3.9	78	-5.4	
6	60	119	48	95	20	101	200	30	60	70	94	187	27	54						
7	60	119	48	95	20	60	119	32	64	45	52	103	30	60						
8	56	109	51	99	9	73	142	27	52	63	68	132	25	49						
9	68	130	48	92	29	92	176	35	67	62	79	151	27	52	4.9	94	4.6	88	6.1	
10	72	142	64	126	11	84	165	34	67	60	78	154	34	67						
11	96	187	66	129	31	60	117	34	66	43	50	98	27	53	4.6	90	4.1	80	11.0	
12	76	146	60	115	21	132	253	32	61	76	127	244	30	58						
13	80	154	63	121	21	73	141	34	66	53	67	129	30	58						
14	60	116	39	75	35	158	306	30	58	81	149	288	28	54						
15	92	176	64	122	30	82	195	47	90	43	80	153	40	76						
16	80	151	60	114	25	108	204	37	70	66	93	176	32	61						
17	68	133	61	119	10	86	168	39	76	55	77	150	34	66	5.4	105	5.2	101	4.7	
18	72	139	54	104	25	65	126	28	54	57	57	110	22	43						
19	64	123	60	116	6	70	135	39	75	44	68	131	31	60	4.0	77	3.9	75	2.5	
20	76	149	51	100	33	93	182	35	69	62	77	151	25	49	3.9	76	3.7	72	5.1	
21																				
22	136	261	68	130	50	137	263	23	44	83	121	232	22	42						
23																				
24	76	155	57	116	25	104	212	30	61	71	91	185	24	49	5.4	110	5.4	110	0.0	
25	64	131	45	92	30	85	174	30	61	65	74	151	27	55	3.9	80	3.9	80	0.0	
26	72	146	57	116	21	64	130	27	55	58	61	124	26	53						
27	64	130	52	105	19	101	205	31	63	69	93	189	26	53						
28	57	115	48	97	16	48	97	26	62	46	46	93	26	52						
29	68	136	57	114	16	103	205	26	52	75	95	189	24	48						
30	64	125	51	100	20	70	137	27	53	61	61	119	21	41						
31	84	172	54	110	36	118	241	25	51	79	103	210	20	41						
TOTAL		4199		3123			5035		1797			4509		1560		837		782		
ARITH. MEAN	74	145	55	108	23	88	174	32	62	61	78	155	27	54	4.7	93	4.4	87	5.3	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH March 19 69 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals	Raw Sludge: Lbs Per 1000 c f Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol Solids %	Supernatant: Susp Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol Acids Mg/l	Temp: pH	Temp: °F #1	Gas: Produced cu ft	Gas: Wasted cu ft	Remarks
1	1326	16	*	5.7	73											96	**		Note — include gallons
2	884	9		4.8	72											94			of sludge to beds
3																96			* PH meter in for
4	1326	15		5.9	66											95			repair.
5	2210	35		9.4	59											95			
6	1326	20		7.6	71											92			transfered 10608 gals.
7	884	12		6.8	69											96			during month. Averaged
8	1768	23		6.6	70											94			.39% dry solids and
9	884	14		7.7	72														58.1% volatile.
10																			
11	1326	23		9.2	65														** Gas meters still
12	1326	25		11.3	60														without parts. Gas
13	1768	19		6.5	60											93			production estimated
14	884	11		6.6	69											96			at 3000 cu. ft./ day.
15	1326	21		7.9	71											96			
16	1326	18		6.7	72											92			
17																90			
18	1547	16		5.3	69											91			
19																89			
20	1326	19		8.8	5x9											91			
21	1768	32		9.4	68	10608		.17	53	700	280					94			
22	884	16		9.0	69											98			
23	1326	8		3.1	69											96			
24																93			
25	1326	23		8.9	69											91			
26	1326	24		9.5	68											94			
27	1326	17		6.4	71											99			
28	884	14		8.1	67											97			
29	884	12		6.7	69											94			
30	1326	24		9.4	69											91			
31																88			
ARITH MEAN	1299	19		7.5	68	10608		.17	53	700	280					94	3000		
STAT MEAN		19																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH April 1969 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					xxx water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/xx	lbs.	KWH	*						
1	.65	54	36	R	50	2.47	2.90	1.90		1700	113	240	31						* Gas cu. ft. X 100
2		42	24	CL	50	2.44	2.90	1.90		1690	112	240	24						
3		52	32	C	50	2.45	3.00	1.80		1740	118	240	43						
4	1.17	58	42	R	51	2.63	3.20	2.10		1720	115	240	22						
5		50	28	C	51	2.67	3.00	2.10		1680	104	240	28						
6		56	32	C	50	2.63	3.00	2.10		1740	107	240	3						
7		66	38	C		2.78	3.30	2.10		1680	97	280	4						
8		76	46	C	50	2.71	3.10	2.00		1710	119	240	32						
9	.25	66	46	R	51	2.69	3.10	2.10		1700	113	280	30						
10		62	28	CL	51	2.69	3.00	2.00		2610	118	280	48						
11		52	30	C	50	2.62	3.00	2.00		1830	112	280	11						
12		60	30	C	50	2.58	3.00	2.00		1710	112	280	11						
13		68	40	C	50	2.45	2.90	2.00		1740	116	280	8						
14	.14	70	52	R	52	2.62	3.10	2.00		1680	110	240	5						
15	.03	64	50	R	52	2.57	3.20	1.90		1780	117	240	7						
16	.06	74	54	R	52	2.60	3.00	1.80		1810	113	240	5						
17	1.17	76	38	R	52	2.69	3.10	1.60		1680	115	280	7						
18	.36	40	30	R&S	52	2.70	3.00	2.10		1690	113	280	20						
19		48	26	C	51	2.66	3.20	2.00		1690	102	320	21						
20		60	38	CL	52	2.64	3.00	2.10		1750	103	280	11						
21	.12	58	40	R	52	2.70	3.10	2.10		2350	114	280	11						
22	.10	42	36	R	52	2.65	3.00	2.00		1880	117	280	12						
23		48	30	C	52	2.61	3.00	2.00		1710	116	320	10						
24		58	30	C	52	2.62	3.10	2.00		1710	117	240	19						
25		66	40	C	52	2.59	3.00	2.10		1720	110	240	11						
26		76	54	C	53	2.59	3.10	2.10		1680	113	200	10						
27	.37	77	49	R	52	2.57	3.00	2.20		1750	105	200	9						
28	.29	60	36	R	52	2.68	3.10	2.10		1650	113	240	9						
29	.01	52	28	R		2.60	3.00	2.10		1690	113	240	10						
30		64	38	C		2.61	3.10	2.10		1690	116	240	15						
31																			
TOTAL	4.72										3363	257	16						
ARITH. MEAN						2.62				1772	112								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH April 19 69 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P				REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	80	165	54	111	32	75	155	31	64	59	61	126	25	52	4.0	82	3.7	76	7.5	
2	54	110	42	85	22	51	104	26	53	49	47	96	24	49						
3	48	98	45	92	6	128	262	34	69	73	121	247	32	65						
4	62	136	44	96	29	63	138	30	66	52	57	125	27	59						
5						56	125	26	58	49	54	120	26	58						
6	76	167	51	112	33	84	184	28	61	67	71	156	22	48						
7	54	125	54	125	0	100	232	28	65	72	94	218	28	65	5.5	128	4.9	114	11.0	
8	60	136	45	102	25	112	253	29	66	74	97	219	27	61						
9	63	141	45	101	29	55	123	26	58	53	48	108	23	52						
10	48	108	48	108	0	71	159	33	74	54	64	144	28	63	3.9	87	3.9	87	0.0	
11	64	140	51	111	20	127	277	32	70	75	119	260	29	63						
12	64	138	57	123	11	72	155	32	69	56	67	144	29	62						
13	63	129	57	116	10	70	143	30	61	57	58	118	22	45						
14	57	125	51	111	11	87	190	38	83	56	78	170	32	70						
15	63	135	48	103	24	67	144	37	79	45	52	111	26	56						
16	51	111	42	91	18	52	113	29	63	44	46	100	25	54						
17	68	153	44	99	35	83	186	29	65	65	70	157	20	45	3.3	74	3.3	74	0.0	
18	61	137	54	122	11	63	142	34	77	46	57	128	32	72						
19	80	177	51	113	36	65	144	22	49	66	56	124	22	49						
20	72	145	60	132	17	77	170	22	48	71	154	154	314	47						
21	68	153	51	115	25	110	248	35	79	68	87	196	21	47						
22	76	168	48	106	37	70	155	33	73	53	60	133	27	60	3.6	80	3.6	80	0.0	
23	80	174	51	111	36	102	222	35	76	66	85	185	23	50						
24	70	153	45	98	36	123	269	44	96	64	109	238	30	66						
25	63	136	51	110	19	84	181	32	69	62	73	158	28	60						
26	72	156	57	123	21	92	199	27	58	71	84	181	25	54						
27	72	154	57	122	21	104	223	28	60	73	94	201	23	49						
28	76	170	48	107	37	83	186	30	67	64	73	163	26	58						
29	74	160	47	102	36	92	199	33	72	64	78	169	26	56	3.6	78	3.6	78	0.0	
30	92	200	63	137	32	95	207	39	85	59	79	172	29	63						
31																				
TOTAL		4200		3134			5488		2033			4821		1682		529		509		
ARITH. MEAN	67	145	50	110	23	84	183	31	68	61	74	161	26	56	4.0	88	3.8	85	3.1	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH April 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals	Raw Sludge Lbs Per 1000 c f Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol Solids %	Supernatant Gals	Supernatant pH	Supernatant Total Solids %	Supernatant Vol Solids %	Supernatant Susp Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol Solids %	sludge near bottom Vol Acids Mg/l	sludge near bottom pH	Temp °F #1	Gas Produced cu ft X 100	Gas Wasted cu ft	Remarks
1																95	22	22	Note — include gallons
2	1326	29		12.1	63											95	21	21	of sludge to beds
3	1768	27		8.1	67	12818		.14	52	570	450						35	35	
4	1326	21		8.2	67											96	41	41	
5	884	12		6.5	71											95	36	36	
6	1326	20		7.4	72											92	31	31	
7																	23	23	
8	2210	32		7.1	72											88	26	26	
9	1768	24		6.8	72											92	41	41	
10	884	14		8.0	70											97	40	40	
11	1326	21		8.0	69											96	33	33	
12	1326	18		6.8	72											93	28	28	
13	884	13		7.2	74											92	30	30	
14																90	22	22	
15	884	19		11.0	69	11050		.18	51	670	250					89	34	2	
16	1326	20		7.6	71											92	11	0	
17	1326	25		9.3	72											90	54	0	
18	884	14		8.0	71											94	42	0	
19	1326	20		7.6	70											96	40	0	
20	1326	17		6.2	75											98	37	0	
21																99	11	0	
22	1768	29		8.0	73											98	48	0	
23																100	31	0	
24	1326	20		7.8	69											101	29	28	
25	1326	19		7.5	67											96	25	25	
26	1326	20		7.5	70											94	31	31	
27	1326	21		7.4	74											91	37	37	
28																89	23	0	
29	1326	19		7.7	67											92	20	0	
30	1326	22		8.2	73											92	30	22	
31																			
ARITH MEAN	1326	21		7.9	70	11934		.16	52	620	350					94	31	19	
STAT MEAN		21																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH May 1969 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~water~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED	REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH						
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~xx~~	lbs.	KWH	*		
1		68	44	C	53	2.62	3.00	2.10		1690	117	240	10		* Gas cu. ft. X 100
2		80	58	C	53	2.66	3.00	2.10		1700	116	240	2		
3		80	50	C	53	2.64	3.00	2.10		1680	114	200	2		
4		80	64	C	53	2.59	3.00	2.00		1900	107	200	5		
5	.01	82	56	R	53	2.68	3.20	1.80		1670	117	240	4		
6	.17	84	60	R	54	2.70	3.00	2.10		1690	115	200	5		
7	.80	84	60	R	54	2.80	3.00	2.20		1710	114	280	6		
8	.43	66	38	R	55	2.76	3.20	2.10		1700	126	200	7		
9	.10	54	40	R	53	2.77	3.20	2.10		1700	116	240	7		
10	.54	52	30	R	53	2.78	3.30	2.20	7.4	1690	113	280	10		
11	.01	55	36	R	53	2.76	3.00	2.20	7.3	1730	102	240	6		
12		56	36	C	53	2.81	3.50	2.20	7.2	1660	78	240	7		
13	.14	68	40	R	53	2.79	3.10	2.20	7.5	1690	116	240	15		
14		74	42	C	53	2.75	3.10	2.10	7.4	1710	118	240	6		
15		78	52	C	53	2.75	3.30	2.10	7.5	1940	116	200	18		
16		86	62	C	55	2.82	3.30	2.10	7.4	1950	120	280	15		
17	.90	74	40	R	54	2.85	3.50	2.20	7.5	1710	112	240	8		
18	.26	54	42	R	52	2.85	3.20	2.40	7.4	1740	115	240	9		
19		60	42	C	54	2.62	3.40	2.20	7.3	1710	114	240	10		
20		68	36	CL	54	2.65	3.20	2.10	7.6	1610	117	240	20		
21	.28	64	40	R	53	2.63	3.10	2.10	7.4	1620	115	240	26		
22		56	36	CL	54	2.62	3.00	2.10	7.5	1600	114	240	34		
23		68	44	C	53	2.62	3.80	2.10	7.7	1640	120	240	45		
24	.05	72	50	R	54	2.62	3.00	2.10	7.4	1610	138	240	46		
25		72	38	C	53	2.52	3.00	2.10	7.5	1600	113	240	46		
26		74	48	C	54	2.63	3.20	2.00	7.4	1560	123	~~240~~	44		
27		80	60	C	54	2.61	3.00	2.00	7.4	2250	116	240	46		
28		86	58	C		2.67	3.00	1.60	7.4	2240	115	240	38		
29		84	50	C	54	2.70	3.20	1.90	7.4	1960	118	240	43		
30		84	52	C	54	2.56	3.00	1.80	7.4	1980	117	240	4		
31	.85	86	62	R	54	2.66	3.20	2.30	7.4	1930	116	240	4		
TOTAL	4.54										3568	7360	548		
ARITH. MEAN						2.69				1760	115				

MDPH
D-4.1

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MONTH May 1969 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	56	122	51	111	9	108	236	39	85	64	92	201	26	57						
2	66	146	60	133	9	80	177	31	69	61	73	162	29	64						
3	72	159	54	119	25	106	233	22	48	79	94	207	19	42						
4	64	138	54	117	16	78	168	32	69	59	67	145	26	26						
5	64	143	57	127	11	123	275	39	87	68	110	246	30	67						
6	68	153	54	122	21	122	275	39	88	68	103	232	28	63						
7	96	224	51	119	47	90	210	36	84	60	74	173	28	65						
8	42	97	42	97	0	67	154	30	69	55	61	140	29	67						
9	68	157	51	118	25	51	118	30	69	41	43	99	28	65						
10	65	151	57	132	12	109	253	41	95	62	97	225	36	83						
11	76	175	53	122	30	84	193	29	67	65	72	166	20	46						
12	57	134	52	122	5	62	145	29	68	47	53	124	20	47						
13	72	168	54	126	25	62	144	33	77	47	41	95	31	72						
14	80	184	57	131	29	108	248	25	57	77	90	206	15	34						
15	60	138	48	110	20	99	227	38	87	62	82	188	28	64						
16	60	141	51	120	15	95	223	31	73	67	74	174	25	59						
17	64	152	51	121	20	94	223	39	93	60	83	197	33	78						
18	72	171	42	100	42	86	204	20	48	77	77	183	18	43						
19	62	135	48	105	23	66	144	28	61	58	62	135	23	50						
20	80	177	40	88	50	109	241	27	60	75	90	199	18	40						
21	72	158	51	112	29	89	195	41	90	54	77	169	32	70						
22	66	144	42	92	36	132	288	45	98	66	101	221	24	52						
23	80	175	60	131	25	101	221	36	79	64	83	181	33	72						
24	63	138	51	111	19	80	175	35	76	56	72	157	33	72						
25	66	139	44	92	33	80	126	23	48	62	50	105	18	38						
26	60	132	51	112	9	102	224	30	66	71	92	202	27	59						
27	42	91	45	98	-7	91	198	30	65	67	78	170	25	54						
28	60	134	48	107	20	68	151	33	73	52	60	134	27	60						
29	60	135	45	101	25	133	300	40	90	70	122	275	38	86						
30	45	96	24	51	47	88	188	30	64	66	81	173	30	64						
31	42	93	42	93	0	71	157	30	67	58	68	151	30	67						
TOTAL		4500		3440			6314		2270			5434		1856						
ARITH. MEAN	65	145	49	111	22	91	204	33	73	63	78	175	27	60						

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH May 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge Gals	Raw Sludge Lbs Per 1000 c f Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol Solids %	Supernatant Gals	Supernatant pH	Supernatant Total Solids %	Supernatant Vol Solids %	Supernatant Susp Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol Solids %	sludge near bottom Vol Acids Mg/l	pH	Temp °F #1	Gas Produced cu ft X 100	Gas Wasted cu ft	Remarks
1	1326	21		8.1	68											91	33	33	Note — include gallons
2																89	26	5	of sludge to beds
3	1326	18		6.3	76											92	4	0	
4	884	7		3.8	77											90	47	0	Filled 2 beds from
5																95	28	0	primary digester on
6																98	22	13	May 21.
7	1326	15		5.1	76											97	24	24	
8	1326	21		8.1	68											94	23	23	Bed # 1N - 7500 gals.
9																92	21	21	averaged 13.8% dry
10	1768	25		7.1	71											90	24	24	42.6% volatile.
11	884	14		7.7	71											88	27	27	
12																87	14	0	Bed # 1S - 7960 gals.
13	884	13		8.7	62											88	10	0	averaged 9.1% dry
14	1326	20		8.7	62											89	20	0	48.5% volatile.
15	1326	22		8.1	71											90	35	21	
16	1326	19		7.3	71											95	37	37	
17	1326	19	5.8	7.3	71											94	33	33	
18	884	17	5.7	9.0	75											92	34	34	
19																90	16	0	
20																92	14	13	
21	2210	29	6.0	6.6	70												16	16	
22	1326	20	6.0	7.5	71											95	11	0	
23	1326	25	5.7	9.8	69											93	33	27	
24	1326	21	5.9	9.0	62											94	39	39	
25	1326	22	5.7	8.3	71											93	27	27	
26	1768	21	6.0	6.2	68											92	30	30	
27	1326	20	5.8	7.6	71											92	35	35	
28	1768	25	5.9	6.7	73											92	38	38	
29	884	11	5.9	6.3	69											94	40	40	
30	884	10	5.8	5.4	73											94	35	35	
31	1326	16	5.7	6.3	69											94	34	34	
ARITH MEAN	1308	19	5.8	7.3	70											92	27	20	
STAT MEAN		18																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH June 19 69

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					xxxx water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/xx	lbs.	KWH	*						
1	.57	84	46	R	55	2.70	3.50	2.30	7.3	1950	117	240	5						* Gas cu. ft. X 100.
2	.05	62	44	R		2.75	3.20	2.30	7.4	1540	113	280	6						
3		58	40	C	54	2.67	3.20	1.80	7.5	1570	116	240	6						
4	.76	72	46	R	54	2.71	3.70	2.30	7.6	1560	126	280	7						
5		68	48	C	54	2.72	3.40	2.30	7.5	1720	124	240	5						
6	.03	70	52	R	54	2.75	3.30	2.30	7.4	1800	118	280	5						
7	.97	78	52	R	54	2.73	3.30	2.40	7.4	1760	123	280	5						
8	.56	60	38	R	55	2.89	3.40	2.40	7.4	1800	103	200	9						
9		78	44	C	55	2.93	3.50	2.40	7.6	2010	121	280	10						
10		82	52	C	55	2.90	3.50	2.40	7.6	1680	116	280	5						
11		86	68	C	55	2.90	3.40	2.30	7.6	1650	117	240	5						
12	.04	90	54	R	55	2.92	3.50	2.40	7.4	1660	125	200	5						
13	.04	76	52	R	55	2.83	3.20	2.30	7.4	1670	121	200	5						
14	.09	68	48	R	55	2.77	3.30	2.20	7.4	1690	118	200	5						
15		70	42	C	54	2.65	3.10	2.20	7.5	1660	100	200	6						
16		80	54	C	55	2.80	3.40	2.20	7.4	1640	78	200	9						
17	.10	78	58	R	55	2.74	3.20	2.20	7.3	1770	124	200	6						
18		76	60	CL	55	2.77	3.40	2.20	7.4	1600	115	200	5						
19	.86	80	52	R	55	2.85	3.30	2.30	7.4	1630	119	240	6						
20		72	46	C	55	2.79	3.20	2.20	7.5	1960	129	280	7						
21		74	52	CL	54	2.70	3.20	2.20	7.4	1670	112	280	7						
22	.22	68	55	R	55	2.69	3.10	2.10	7.6	1650	113	280	9						
23	.01	64	58	R	55	2.76	3.30	2.00	7.5	1540	116	320	9						
24	.03	68	58	R	55	2.72	3.30	2.20	7.4	1560	119	280	8						
25		86	64	CL	56	2.75	3.20	2.20	7.4	1570	114	320	4						
26	.04	94	74	R	57	2.80	3.20	2.40	7.4	1580	117	320	4						
27		92	64	C	58	2.80	3.40	2.20		2120	118	280	5						
28	.38	88	66	R	56	2.70	3.00	2.20	7.5	2030	113	240	4						
29		82	58	C	57	2.74	3.80	2.20	7.4	2030	119	240	4						
30		80	56	C	56	2.80	3.40	2.20	7.4	1680	122	240	4						
31																			
TOTAL	4.75										3486	7560	180						
ARITH. MEAN						2.77				1725	116								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH June 19 69 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	45	102	45	102	0	102	230	32	72	69	89	200	24	54						
2	76	174	42	96	45	73	167	34	78	53	62	142	31	71						
3	72	160	45	100	38	78	174	28	62	64	70	156	25	56						
4	76	172	66	149	13	84	190	30	68	64	78	176	24	54						
5	57	129	51	116	11	120	272	31	70	74	110	249	29	66						
6	66	151	45	103	32	133	305	28	64	79	125	287	26	60						
7	75	171	48	109	36	110	250	26	59	76	101	230	26	59						
8	60	145	52	125	13	85	205	30	72	65	67	161	23	55						
9	64	156	54	132	16	68	166	31	76	54	54	132	27	66						
10	48	116	40	97	17	70	169	33	80	53	61	148	28	68						
11	60	145	45	109	25	79	191	29	70	63	71	172	29	70						
12	60	146	39	95	35	67	163	23	56	66	61	149	23	56						
13	77	182	48	113	38	135	319	31	73	77	123	290	30	71						
14	69	159	57	132	17	89	206	53	122	41	81	187	45	104						
15	59	130	51	113	14	96	212	41	91	57	90	199	35	77						
16	57	133	42	98	26	69	161	36	84	48	58	135	30	70						
17	57	130	54	123	5	123	281	41	94	67	104	238	36	82						
18	72	166	51	118	29	100	231	36	83	64	76	176	29	67						
19	45	107	45	107	0	64	152	39	93	39	53	126	34	81						
20	63	147	42	98	33	105	244	36	84	66	94	219	30	70						
21	66	149	45	101	32	90	203	40	90	55	82	185	39	86						
22	60	135	42	94	30	75	168	31	70	59	65	146	26	58						
23	63	145	48	110	24	101	233	35	81	65	86	198	29	67						
24	72	163	54	122	25	100	227	41	93	59	88	200	28	64						
25	68	156	51	117	25	95	218	35	80	63	81	186	31	71						
26	52	121	45	105	13	70	163	35	82	50	63	147	31	72						
27																				
28	63	144	57	130	10	120	274	52	119	57	102	233	48	110						
29	72	162	45	101	38	96	216	31	70	68	83	187	28	63						
30	57	133	48	112	16	110	257	39	91	65	84	196	28	65						
31																				
TOTAL		4229		3227			6247		2327			5450		2013						
ARITH. MEAN	63	146	48	111	23	93	215	35	80	61	81	191	30	69						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH June 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft. X 100	
1	1326	30		12.1	66											92	32	32	Note — include gallons
2	1326	17	5.9	6.2	72											90	33	0	of sludge to beds
3	1326	20	5.8	8.0	67											93	39	0	
4	884	12	5.7	7.4	67											94	44	0	Transfered 42432 gals.
5						12376		.19			240					96	36	0	from #1 to #2 during
6	884	12	5.9	7.6	65											100	37	23	month. Averaged 1.5%
7	884	13		8.1	64											97	27	27	dry Solids and 56.6%
8	1768	20	5.7	5.8	69											94	34	34	volatile.
9	1768	23	6.0	6.4	70											92	22	0	
10	1768	25	5.8	7.0	72											95	41	0	* Circulating pump out
11	1326	21		7.9	70											97	40	40	of service from 12th
12	1326	21	5.9	7.9	70											*	36	36	thru 20th.
13	1326	22		8.9	67												25	25	
14	1326	18	5.7	6.8	72												30	30	
15	884	8	5.9	3.7	88												33	33	
16	1326	23	5.7	8.9	68												33	33	
17	884	15	5.7	9.8	61												26	26	
18	1326	16	5.8	5.8	73												26	26	
19	1326	19		7.3	71	4420											28	28	
20	884	13	5.9	7.3	69												21	21	
21	884	6	5.9	3.8	68											85	49	0	
22	884	13	6.0	7.5	70											89	39	0	
23	1768	23	5.9	6.4	73											91	41	0	
24	1768	22	6.0	6.2	71											94	50	0	
25	1326	17	6.0	6.5	70	8840		.19			240					96	65	0	
26	1768	19		5.4	70												62	0	
27	1768	25	5.9	7.0	70											98	55	0	
28	884	13		7.5	69											97	51	0	
29	1768	32	5.7	9.3	68												48	0	
30						12376		.21			240					94	41	0	
31																			
ARITH. MEAN	1310	18	5.8	7.2	70	10608		.20			240					94	38	14	
STAT. MEAN		18																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH July 19 69 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf~~XX~~	lbs.	KWH	*						
1		82	50	C	56	2.70	3.20	2.20	7.3	1730	123	240	5						* Gas - cu. ft. X 100
2		84	56	C	56	2.69	3.10	2.20	7.3	2040	108	280	6						
3		86	62	C	56	2.72	3.20	2.10	7.4	2070	114	240	5						
4	.89	86	58	R	56	2.71	3.80	2.20	7.6	1720	100	240	5						
5		84	60	C	57	2.72	3.40	2.10	7.5	1600	107	240	5						
6	.10	74	52	R	56	2.63	3.30	2.20	7.4	1840	112	240	4						
7		80	56	CL	56	2.69	3.40	2.10	7.5	1880	111	280	4						
8		86	58	C	56	2.67	3.30	2.10	7.5	2030	109	240	2						
9		90	64	C	57	2.72	3.10	2.10	7.5	2060	106	280	2						
10		90	62	CL	57	2.76	3.20	2.20	7.7	2040	127	280	2						
11		89	61	C	57	2.80	3.50	2.20	7.5	2100	118	320	1						
12		88	60	C	58	2.69	3.30	2.10		2060	114	320	2						
13		90	59	C	56	2.60	3.00	2.10	7.5	2030	105	280	3						
14		94	62	C	57	2.73	3.30	2.20	7.5	1720	113	280	2						
15		90	64	C	57	2.69	3.20	2.10	7.6	2250	111	280	3						
16		94	74	C	58	2.71	3.20	2.10	7.5	2250	111	280	2						
17	.72	88	68	R	59	2.75	3.70	2.10	7.5	2060	116	320	3						
18	.07	86	64	R	59	2.71	3.20	2.00	7.4	2080	106	280	3						
19	.41	72	60	R	59	2.63	3.20	2.00	7.4	2060	106	320	3						
20		85	60	CL	59	2.62	3.00	2.10	7.5	2040	113	280	1						
21		86	62	C	58	2.73	3.40	2.00	7.6	2050	115	280	1						
22		90	60	C	58	2.68	3.10	2.00	7.5	1820	104	280	1						
23	.35	90	62	R	58	2.69	3.20	2.00	7.3	1840	109	280	2						
24	.02	86	58	R	59	2.62	3.20	1.90	7.5	1840	108	280	2						
25	.04	84	62	R	59	2.60	3.20	1.80	7.4	2180	111	280	3						
26	.40	90	66	R	59	2.59	3.10	2.00	7.7	1850	102	240	2						
27	.01	84	59	R	58	2.55	3.00	2.00	7.5	1840	117	240	2						
28	.03	78	60	R	58	2.59	3.20	1.60	7.5	1620	102	280	2						
29		82	55	C	58	2.61	3.20	2.00	7.5	1660	112	280	2						
30		84	60	C	58	2.56	3.00	1.60	7.4	1630	102	240	2						
31	.45	83	62	R	58	2.54	3.20	1.50	7.5	1620	105	280	2						
TOTAL	3.49										3421	8480	84						
ARITH. MEAN						2.67				1923	110								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH July 1969 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	48	108	44	99	8	91	205	27	61	70	75	169	21	47						
2	57	128	42	94	26	68	153	28	63	59	65	146	28	63						
3	54	122	42	95	22	105	238	29	66	72	87	197	24	54						
4	56	127	32	81	36	90	203	25	57	72	81	183	22	50						
5						41	93	20	45	51	40	91	20	45						
6	45	99	42	92	7	69	151	27	59	61	60	132	23	50						
7	72	161	51	114	29	120	269	44	99	63	106	238	39	87						
8	60	134	45	100	33	95	212	39	87	56	87	194	33	73						
9	60	136	54	122	10	80	181	33	75	59	76	172	31	70						
10	60	138	48	110	20	88	203	24	55	73	76	175	21	48						
11	57	133	51	119	11	79	184	38	89	52	66	154	33	77						
12																				
13	72	156	48	104	33	60	130	22	48	63	51	111	20	43						
14	68	155	51	116	17	90	205	30	68	67	79	180	26	59						
15	60	135	42	94	30	102	229	50	112	51	89	200	43	96						
16	57	129	51	115	11	83	188	28	63	66	57	129	22	50						
17	60	138	60	138	0	73	167	38	87	48	64	147	32	73						
18	84	190	51	115	39	96	217	31	70	68	88	199	27	61						
19	64	140	57	125	11	50	110	26	57	48	46	101	26	57						
20	80	175	45	98	44	104	227	21	46	78	80	175	18	39						
21	57	130	48	109	16	69	157	30	68	57	63	143	23	52						
22	80	179	51	114	36	116	259	25	56	79	103	241	21	47						
23	60	135	42	94	30	48	108	21	47	56	41	92	21	47						
24	63	138	54	118	14	42	92	26	57	38	34	74	17	37						
25	76	165	60	130	21	92	199	33	72	64	85	185	33	72						
26	66	143	60	130	9	106	229	30	65	72	99	214	28	60						
27	51	108	48	102	6	78	166	23	49	71	73	155	20	43						
28	60	130	48	104	20	95	205	33	71	65	75	162	23	50						
29	96	209	57	124	41	100	218	34	74	66	85	185	28	61						
30	60	128	48	102	20	83	177	27	58	68	72	154	45	45						
31	72	152	45	95	37	107	227	25	53	77	94	199	21	44						
TOTAL		4121		3153			5602		1977			4896		1700						
ARITH. MEAN	64	142	49	109	22	84	187	30	66	63	73	163	26	57						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH July 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals	Raw Sludge: Lbs Per 1000 c f Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol Solids %	Supernatant: Susp Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol Acids Mg/l	sludge near bottom: pH	Temp: °F #1	Gas: Produced cu ft X 100	Gas: Wasted cu ft	Remarks
1	1768	20	5.6	6.0	68											99	42	0	Note — include gallons
2	1326	16		5.9	71											102	29	14	of sludge to beds
3	1326	22		8.3	69											100	25	25	
4	884	14	5.7	8.3	69											99	25	25	
5	884	14	5.6	8.5	67											98	26	26	
6	1326	17	5.6	6.7	68											97	25	25	
7																95	44	0	
8	1326	23	5.6	8.8	68											95	32	0	
9	884	15	5.5	9.8	61											99	28	0	
10	1768	23	5.6	6.8	66												40	0	
11	884	10		5.8	67	15028		.21	52	790	330					101	43	0	
12	884	12	5.6	6.6	72											99	37	0	
13																97	33	25	
14	1326	17	5.7	7.0	65											98	36	12	
15	2210	30	5.7	6.9	69											99	21	21	
16	1326	16	5.7	6.4	67											98	56	56	
17	1326	19	5.6	7.9	64											96	43	43	
18	884	14	5.7	8.8	65											95	34	34	
19	1326	19	5.6	8.0	62											94	32	32	
20	884	15	5.8	8.5	69											94	34	0	
21																96	30	0	
22	2210	32	5.7	7.4	67											99	37	26	
23	1326	18	5.8	6.7	71											99	38	38	
24	1326	15	5.8	5.7	72											97	41	41	
25						9724		.20	67	680	360					96	43	43	
26	1768	23	5.7	6.7	68											96	29	29	
27	1326	21	5.7	7.9	70											95	51	51	
28	1768	18	5.8	4.9	74											93	40	0	
29	884	7	5.9	3.7	73											97	40	31	
30																95	23	23	
31	1768	23		6.7	68											95	36	0	
ARITH MEAN	1343	18	5.7	7.1	68	12376		.20	60	735	345					97	35	20	
STAT MEAN		18																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH August 19 69 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~xx~~	lbs.	KWH	*						
1		80	56	C	58	2.56	3.10	1.60	7.4	1600	106	240	6						* Gas - cu. ft. X 100
2		78	54	CL	58	2.48	3.10	1.80	7.5	1610	107	240	3						
3		86	54	C	58	2.44	3.00	1.80	7.5	1670	109	240	3						
4		84	56	C	59	2.54	3.40	2.00	7.4	1670	102	240	3						
5		82	60	C	58	2.51	3.10	1.90	7.5	1600	110	240	3						
6		88	66	C	59	2.48	3.00	1.90	7.5	1800	111	240	2						
7	.05	84	60	R	59	2.50	3.00	1.80	7.5	1860	106	200	2						
8	.17	80	55	R	59	2.52	3.00	1.80	7.5	1780	73	240	1						
9	.15	80	50	R	59	2.41	2.90	1.80	7.5	1670	109	280	1						
10		76	50	C	58	2.38	2.80	1.60	7.5	1890	109	240	1						
11		80	54	C	58	2.43	3.20	1.60	7.5	1850	111	240	0						
12		86	56	C	58	2.41	2.90	1.90	7.4	1950	104	240	0						
13		86	62	C	59	2.40	3.00	1.00		1860	103	240	1						
14	.02	90	68	R	60	2.45	3.00	2.00	7.8	1850	109	240	0						
15	.17	92	66	R	59	2.51	3.00	1.20	7.5	1860	114	240	3						
16	.13	84	58	R	59	2.47	3.10	1.40	7.6	1830	111	240	4						
17	.49	85	63	R	60	2.47	3.70	1.60	7.5	1910	107	240	3						
18		86	66	C	60	2.59	3.40	1.40		1820	105	200	3						
19		84	54	C	60	2.51	3.10	1.30	7.5	2110	110	280	3						
20		74	46	C	59	2.44	3.10	1.40	7.4	1880	115	240	3						
21		76	46	C	59	2.42	3.00	1.80	7.5	1900	113	240	3						
22		82	52	C	59	2.41	3.00	1.20	7.4	1850	110	240	3						
23		86	56	C	59	2.39	3.00	1.10	7.5	2020	132	240	4						
24		87	57	C	59	2.33	3.00	1.60		1770	105	200	3						
25		86	60	C	59	2.43	3.00	1.20	7.4	1740	113	280	3						
26		80	62	C	59	2.37	3.00	1.30	7.4	1970	107	240	4						
27		86	60	C	60	2.37	2.90	1.70		1870	107	240	3						
28		88	64	C	60	2.50	3.00	1.80	7.6	1910	111	240	4						
29		88	64	C	60	2.44	3.00	1.80	7.5	2170	121	240	3						
30		90	66	C	60	2.34	3.00	1.00	7.5	1780	144	200	4						
31		90	62	C	60	2.33	2.90	1.60	7.4	1980	113	240	3						
TOTAL	.038										3407	7400	82						
ARITH. MEAN						2.45				1840	110								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH August 1969 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	68	145	44	94	36	94	201	30	64	68	82	175	24	51						
2	72	149	63	130	13	66	136	22	45	67	58	120	20	41						
3	68	138	54	110	20	67	136	24	49	64	55	112	18	37						
4	72	152	68	144	5	132	280	39	83	70	123	261	33	70						
5	88	184	60	126	32	141	295	37	77	74	131	274	33	69						
6	72	149	51	105	29	101	209	52	108	49	83	172	43	89						
7	68	142	51	106	25	140	291	31	65	78	116	242	23	48						
8	96	202	54	113	44	95	200	28	59	71	74	155	22	46						
9	84	169	60	120	29	104	209	56	113	46	98	197	52	105						
10	72	143	48	95	33	115	228	23	46	80	105	208	22	44						
11	68	138	54	109	21	83	168	29	59	65	64	130	25	51						
12	64	129	54	109	6	104	209	32	64	69	78	157	29	58						
13																				
14	56	114	51	104	9	98	200	31	63	68	82	168	25	51						
15	76	159	68	142	11	152	318	52	109	66	132	276	44	92						
16	72	148	60	124	17	114	235	26	54	77	100	206	24	49						
17	72	148	42	87	42	69	142	22	45	68	60	124	13	27						
18	80	173	64	138	20	129	279	37	80	71	109	235	23	50						
19	64	134	48	100	25	73	153	35	73	52	59	123	29	61						
20	64	130	51	104	20	91	185	32	65	65	76	155	28	57						
21	64	129	51	103	20	86	174	35	71	59	86	174	35	71						
22	72	145	60	121	17	75	151	40	80	47	68	137	38	76						
23	56	112	36	72	36	94	187	42	84	55	84	167	38	76						
24																				
25	71	144	63	128	11	118	239	35	71	70	107	217	34	69						
26	68	134	39	77	43	109	215	27	53	75	96	190	27	53						
27	68	134	51	101	25	191	378	30	59	84	179	354	28	55						
28	52	108	52	108	0	159	332	28	58	82	148	309	25	52						
29	60	122	52	106	13	110	224	46	94	58	97	197	40	81						
30	75	146	60	117	20	124	242	36	70	71	112	219	32	62						
31	72	140	57	111	21	96	187	29	56	70	82	159	22	43						
TOTAL		4160		3204			6403		2016			5613		1734						
ARITH. MEAN	70	143	54	110	21	108	221	34	70	67	95	194	29	60						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

D-4.5

MONTH August 1969

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant X10						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1768	28		8.4	68											98	33	0	Note — include gallons
2	1326	18	5.9	7.0	67											100	42	0	of sludge to beds
3	1326	16	5.9	6.1	69											97	40	0	
4	1768	23	5.7	7.0	65											95	35	0	Transfered 25194 gals
5	884	18	5.6	11.6	62											101	32	0	from #1 to #2 during
6	1768	19	5.9	5.4	72												39	35	month. Averaged 1.5%
7	1768	20		5.4	75											98	40	40	dry solids and 59.0%
8	884	17	5.5	10.2	68											96	45	9	volatile solids.
9	1326	18	5.8	6.9	68											100	46	0	
10	884	10	5.8	7.2	58											102	35	0	
11	1768	35	5.6	9.8	71											105	30	20	
12	1326	19		7.5	67												43	0	
13	1768	22	5.7	6.5	67												40	0	
14	1326	12	5.7	5.9	56											104	40	0	
15	1326	21	5.6	7.9	71												42	27	
16	1326	19	5.7	8.7	59											102	41	41	
17	1326	22	5.7	8.8	66											100	41	41	
18																99	38	38	
19	1326	27	5.6	11.1	65											99	18	18	
20	1326	22	5.7	8.5	67											98	31	31	
21	884	13	5.7	7.4	70	11492		.16	53	57	80					97	32	32	
22	884	11	5.7	6.7	66											96	35	35	
23	1326	21	5.6	8.2	68											95	33	33	
24	884	15	5.5	10.5	58											94	33	33	
25	1326	19	5.6	7.4	69											94	37	2	
26	1768	25	5.6	7.2	70											97	36	25	
27	884	13	5.7	6.9	73											96	37	37	
28	1768	28	5.6	8.3	67											96	37	37	
29						13702		.20	70	104	260					94	48	34	
30	1326	18	5.6	7.0	70											96	35	35	
31	1326	19	5.6	7.0	71											95	37	37	
ARITH. MEAN	1341	19	5.7	7.8	68	12597		.18	62	80	170					98	37	21	
STAT. MEAN		20																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH September 19 69

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~XX~~	lbs.	KWH	*						
1		88	60	CL	60	2.33	3.00	1.10	7.6	1870	105	200	3						* Gas - cu. ft. X 100
2		82	58	CL	61	2.37	2.90	1.80	7.6	1660	110	240	3						
3		86	60	C	60	2.36	2.90	1.80	7.5	1650	111	240	3						
4	.05	84	66	R	60	2.39	2.80	1.40	7.5	1670	106	240	3						
5		84	66	CL	61	2.40	2.90	1.20		1630	109	280	3						
6	.73	86	62	R	61	2.47	3.80	1.10	7.4	1580	100	320	5						
7		80	52	CL	59	2.37	2.90	1.70		1650	105	280	3						
8		68	46	CL	60	2.44	3.20	1.50	7.5	1660	109	280	4						
9		66	37	C	59	2.30	2.80	1.70	7.4	1660	110	320	7						
10		68	44	C	58	2.32	2.80	1.80	7.5	1660	106	240	6						
11		72	48	C	58	2.36	2.90	1.80	7.4	1630	113	280	2						
12		76	52	C	59	2.35	3.00	1.80	7.4	1870	112	240	2						
13		78	54	C	59	2.38	3.80	1.70	7.5	1870	121	240	2						
14		81	57	CL	59	2.33	3.00	1.80	7.6	1530	103	240	4						
15		82	62	CL	60	2.38	3.00	1.80	7.3	1540	110	280	4						
16	.15	68	52	R	59	2.41	2.90	1.80	7.4	2000	114	240	2						
17		66	46	C	59	2.33	3.00	1.80	7.6	2020	105	240	3						
18		67	48	CL	59	2.35	3.00	1.80		2040	112	280	3						
19		68	42	C	59	2.24	2.90	1.60	7.5	2030	118	240	3						
20		68	46	C	58	2.23	2.90	1.70	7.4	1980	115	280	4						
21		72	51	CL	58	2.22	2.80	1.70		2020	110	240	4						
22		78	54	C		2.35	3.00	1.70	7.5	1680	107	240	4						
23	.01	78	46	R	60	2.28	2.90	1.80	7.6	1600	107	240	3						
24		58	48	CL	59	2.25	2.90	1.70	7.5	1560	101	240	3						
25		64	50	C	59	2.25	2.90	1.70	7.5	1770	107	240	3						
26	.09	72	50	R	59	2.26	2.90	1.80		1810	114	280	2						
27		68	40	C	59	2.21	2.90	1.80	7.4	1690	104	240	3						
28		64	36	CL	58	2.21	2.80	1.80	7.5	1970	108	240	4						
29	.13	60	44	R	59	2.26	3.00	1.80	7.4	1740	109	240	5						
30		68	46	C	58	2.28	3.00	1.70	7.5	1750	106	240	5						
31																			
TOTAL	1.16										3267	7640	105						
ARITH. MEAN						2.32				1760	109								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH September 19 69 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	57	111	40	78	30	47	91	32	62	32	38	74	25	49						
2	76	150	64	127	16	110	217	41	81	63	95	188	32	63						
3	72	142	68	134	6	101	199	33	65	67	97	191	33	65	5.7	112	4.9	96	14	
4	64	128	54	108	16	138	275	28	56	80	126	251	25	50	4.9	98	4.7	94	4	
5																				
6	132	272	68	140	49	136	280	38	78	72	120	247	37	76						
7						110	217	34	67	69	86	170	29	57						
8	128	260	66	134	49	134	273	37	75	72	108	220	37	75						
9	72	138	57	109	21	83	159	36	69	57	72	138	31	59	4.6	88	4.2	81	9	
10	88	170	66	128	25	110	213	31	60	72	102	197	29	56						
11	144	283	60	118	58	73	144	45	89	74	58	114	39	77						
12	128	251	76	149	41	110	216	36	71	67	88	172	33	65						
13	92	183	65	129	29	102	202	27	54	74	88	175	24	48						
14	132	256	55	107	58	93	181	34	66	63	83	161	25	49						
15	96	191	57	113	41	115	228	22	44	81	99	197	22	44						
16	112	225	68	137	39	117	235	43	86	63	103	207	39	78	4.6	92	4.1	82	11	
17																				
18	88	172	72	141	18	101	198	21	41	79	90	176	18	35						
19	84	157	57	106	32	135	252	35	65	74	126	235	35	65						
20	76	141	66	123	13	114	212	30	56	81	96	179	28	51						
21	72	133	72	133	0	62	115	33	61	47	53	98	29	54						
22	92	180	66	129	28	110	216	35	69	68	99	194	34	67	4.9	96	4.9	96	0	
23	54	103	51	97	6	78	148	29	55	63	70	133	26	49						
24	88	165	63	118	28	95	178	25	47	74	82	154	24	45						
25	72	135	63	118	15	91	171	36	68	60	84	158	34	64	4.1	77	4.1	77	0	
26																				
27	72	133	68	125	6	70	129	28	52	60	58	107	25	46						
28	76	140	60	111	21	89	164	37	68	58	72	133	30	55						
29	69	130	60	113	16	63	119	33	62	48	52	98	27	51	5.1	96	4.6	87	10	
30	76	145	60	114	21	112	213	33	63	71	102	194	30	57						
31																				
TOTAL		4494		3139			5245		1730			4561		1550		659		613		
ARITH. MEAN	89	173	62	121	26	100	194	33	64	66	87	169	30	57	4.8	94	4.5	88	7	

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH September 19 69 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft. X 100	
1																94	31	31	Note — include gallons
2	1326	23	5.6	8.4	72											94	36	1	of sludge to beds
3	1326	22	5.6	8.6	69											98	40	0	
4	1326	19	5.8	7.1	71											101	48	0	Transfered 14586 gals.
5	1326	18	5.7	6.8	72											104	39	2	from #1 to #2 during
6	1326	13	5.7	6.2	54											104	35	0	month. Average - 1.9%
7	1326	23	5.8	8.7	71											102	39	0	dry and 40.0% volatile
8																106	3	2	solids.
9	884	13	5.5	7.7	69											104	31	31	
10	1326	23	5.6	9.9	63											102	35	35	
11	1768	26	5.6	7.8	66											100	36	36	
12	884	13	5.7	7.6	68											99	38	38	
13	884	12	5.6	6.7	71											98	33	33	
14	884	12	5.6	7.2	69											98	34	34	
15	1768	24	5.9	6.6	72											96	35	35	
16	1326	19		7.0	73											95	38	38	
17	884	22	5.4	13.5	64											94	33	0	
18																98	26	0	
19	1326	22	5.6	9.1	66	14586		.20	67		360					99	35	0	
20	1326	26		9.9	70											97	33	0	
21	1768	21	5.9	6.1	70											101	40	0	
22	1326	17	5.4	6.4	72											104	34	0	
23	1326	19	5.7	7.4	68												39	0	
24																100	34	0	
25	1326	26	5.5	9.5	72												30	0	
26	1768	27	5.6	7.4	72												35	0	
27	884	15	5.7	7.6	80											101	33	0	
28	1326	20	5.6	7.4	73											104	45	45	
29	1326	21	5.8	7.4	75											100	36	36	
30																100	30	30	
31																			
ARITH. MEAN	1290	20	5.7	7.9	70	14586		.20	67		360					100	34	14	
STAT. MEAN		20																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH October 1969 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~XX~~	lbs.	KWH	*						
1	.05	80	54	R	59	2.29	2.80	0.90		1750	105	240	9						* Gas - cu. ft. X 100
2		68	48	CL	60	2.28	2.90	1.70	7.5	1760	141	240	9						
3	.02	76	54	R	59	2.31	3.00	1.70	7.4	1830	113	240	9						
4		68	46	C	59	2.24	2.90	1.70	7.4	1720	103	240	5						
5		73	53	CL	58	2.17	2.70	1.70	7.5	1730	106	240	6						
6	.75	64	48	R	60	2.40	3.00	1.80	7.6	1470	108	200	5						
7	.01	66	44	R	59	2.30	2.90	1.20	7.5	1920	102	240	5						
8		58	34	C	59	2.24	3.00	1.70	7.6	2100	109	280	5						
9		72	40	C	59	2.28	2.90	1.70	7.7	1920	115	240	7						
10	.37	66	56	R	59	2.35	2.90	1.80	7.5	1970	111	280	8						
11	.02	66	46	R	59	2.25	3.00	1.20	7.5	1880	116	240	9						
12	.47	66	46	R	57	2.32	2.90	1.40		1910	108	240	11						
13	.40	68	40	R	58	2.48	3.10	1.00	7.5	1780	105	240	11						
14		48	30	C	58	2.32	3.00	1.00	7.5	2140	120	280	11						
15	.05	56	34	R	59	2.33	2.90	1.00	7.5	1930	109	320	13						
16	.05	50	36	R	57	2.29	3.00	1.70	7.5	1900	109	200	14						
17	.01	48	32	R	57	2.26	2.90	1.80	7.5	1900	107	280	11						
18	.03	56	36	R	57	2.22	2.80	1.70	7.4	1880	95	240	15						
19	.83	59	43	R	57	2.27	3.00	1.80	7.6	1930	91	280	19						
20	.06	62	36	R	58	2.39	3.20	1.80	7.5	1850	77	240	24~~2~~						
21	.02	64	32	R	58	2.33	2.90	1.70	7.8	1890	95	280	16						
22	.02	40	20	S	57	2.28	2.80	1.70	7.6	2030	105	240	22						
23		40	22	C	57	2.23	2.80	1.70	7.5	2130	105	280	21						
24		50	26	C	57	2.23	2.80	1.70	7.5	1910	104	240	18						
25		54	30	CL	57	2.21	2.80	1.70	7.4	1920	167	280	15						
26		58	36	CL	57	2.17	2.70	1.70	7.5	1900	88	240	17						
27		44	32	C	57	2.26	2.90	1.70	7.6	1880	106	240	15						
28		46	24	C	56	2.22	2.90	1.70	7.3	2100	125	240	16						
29		48	28	C	56	2.24	2.80	1.70	7.5	1920	115	280	16						
30		52	30	C	56	2.23	2.90	1.70	7.6	2110	107	240	17						
31	.69	52	40	R	56	2.27	2.80	1.80	7.5	1980	110	280	18						
TOTAL	3.85										3379	7840	397						
ARITH. MEAN						2.28				1905	109								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH October 1969 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	72	138	57	109	21	61	117	33	63	46	58	111	34	65						* Strong acid used
2	68	129	57	108	16	80	152	29	55	64	64	122	24	46						for pO_4 test was
3	75	145	64	123	15	73	142	43	83	41	67	129	39	75						inavertently added
4	72	134	66	123	8	55	103	36	67	35	51	95	33	62						to a bottle of B.O.D.
5	69	125	48	87	30	81	147	31	56	62	68	123	24	43						water. The B.O.D.s
6	80	160	60	120	25	100	200	36	72	64	96	192	35	70						from Oct. 10-22 were
7	72	138	48	92	33	99	190	52	100	48	90	173	47	90						ruined.
8	69	129	57	106	17	73	136	62	62	55	65	121	28	52						
9	66	126	51	97	23	116	221	46	87	60	94	179	35	67						
10						79	155	31	61	62	74	145	28	55						
11						78	146	35	66	55	70	131	34	64						
12																				
13						108	223	33	68	69	98	203	29	60						
14						102	197	38	74	63	90	174	38	74						
15						80	155	32	62	60	74	144	30	58						
16						74	141	37	71	50	68	130	37	71						
17						77	145	36	68	53	73	138	34	64						
18						56	104	28	52	50	52	96	28	52						
19						89	168	35	66	61	80	151	29	55						
20						71	142	37	74	48	64	128	33	66						
21						116	225	30	58	74	92	179	28	54						
22						62	118	30	57	52	59	112	30	57						
23	60	112	56	104	7	70	130	46	86	34	65	121	40	74						
24	72	134	57	106	21	98	182	47	87	52	89	165	44	82						
25	76	140	54	100	29	118	217	40	74	66	110	203	34	63						
26	57	103	42	76	26	83	150	34	62	59	73	132	28	51						
27	80	151	54	102	32	91	172	40	75	56	76	143	36	68						
28	80	148	62	115	22	93	172	45	83	52	86	159	44	81						
29	72	134	54	101	25	83	155	39	73	53	74	138	37	69						
30	63	117	54	100	14	97	180	38	71	61	78	145	34	63						
31	92	174	56	106	39	99	187	25	47	75	97	184	25	47						
TOTAL		2437		1875			4872		2080			4366		1898						
ARITH. MEAN	72	135	55	104	22	85	162	37	67	56	77	146	33	63						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH October 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals	Raw Sludge: Lbs Per 1000 c f Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Supernatant: Gals.	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol Solids %	Supernatant: Susp Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol Acids Mg/l	sludge near bottom: pH	Temp °F #1	Gas: Produced cu ft X 100	Gas: Wasted cu ft X 100	Remarks
1	1989	31		7.5	72											99	38	38	Note — include gallons
2	1326	25	5.7	9.7	70											97	38	38	of sludge to beds
3	1768	23		6.8	68	11492		.23	69	1210	320					95	38	38	Transfered 36686 gals.
4	1326	20	5.6	8.2	65											94	59	26	from #1 to #2 during
5	1326	24	5.7	8.3	77											97	42	0	month. Averaged 1.2%
6																100	32	20	dry solids and 70.1%
7	1768	27	5.6	7.5	73											100	37	37	volatile.
8	1326	21	5.5	7.5	74											98	39	39	
9	1326	19	5.7	6.9	73											96	39	39	
10	1326	22	5.6	7.9	73											94	51	0	
11	1326	18	5.7	6.5	76											100	47	0	
12	884	13		6.8	73											102	42	0	
13																104	30	0	
14	1768	27	5.5	7.6	71	11934		.25	64	1350						107	30	0	
15	884	18	5.6	10.8	66												37	27	
16	1326	17	5.6	7.2	64											102	40	40	
17	884	13		7.2	71											99	36	36	
18	1326	23	5.7	8.9	69											97	35	35	
19	1326	25	5.5	10.1	67											96	34	34	
20																94	45	33	
21	1326	23	5.6	9.0	68											94	31	31	
22	884	16		8.8	70											93	32	32	
23	1326	23		8.8	70											92	33	33	
24	1326	20	5.7	7.6	70											90	30	0	
25	1326	19	5.7	7.1	70											93	27	0	
26	1326	23	5.8	7.6	80											94	29	0	
27						13260		.28	71	1600	380					96	43	35	
28	1768	22	5.7	6.6	67											96	40	20	
29	1326	13	5.7	5.2	64											96	33	33	
30	1326	19	5.6	7.5	69											93	35	35	
31	884	16	5.7	9.5	67											91	40	12	
ARITH MEAN	1334	21	5.6	7.9	70	12229		.25	68	1386	350					97	38	23	
STAT MEAN		21																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH November 19 69

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf~~xxx~~	lbs.	KWH	*						
1	.03	56	40	R	57	2.20	2.80	1.80	7.4	1900	111	240	16						* Gas - cu. ft. X 100
2		50	40	CL	57	2.18	2.70	1.80	7.5	1890	109	240	15						
3	.17	48	38	R	58	2.25	3.00	1.80	7.6	2190	104	240	16						
4	.17	42	34	R	57	2.23	2.70	1.70	7.6	1910	114	240	18						
5		48	26	CL	57	2.19	2.70	1.00	7.5	1950	110	280	19						
6		54	24	C	56	2.18	2.70	0.80	7.6	1900	102	240	16						
7		52	28	C	56	2.14	2.80	0.70	7.5	1900	123	280	16						
8		44	36	CL	56	2.14	2.80	0.70	7.4	1890	105	240	15						
9		50	36	CL	56	2.11	2.70	0.60		1920	98	240	17						
10		46	38	CL	57	2.19	3.00	1.20	7.5	1670	100	240	17						
11	.04	56	36	R	56	2.15	2.90	1.60	7.4	1470	97	240	19						
12		46	30	CL	56	2.14	2.90	1.20	7.6	2030	98	240	16						
13		42	21	CL	55	2.08	2.80	0.70	7.5	1800	102	280	16						
14	.02	32	18	S	56	2.04	3.10	0.60	7.5	1920	100	240	27						
15	.01	30	20	S	56	1.99	2.80	1.20		1770	100	240	25						
16	.09	46	24	R	56	2.05	2.90	1.80	7.6	1810	96	240	18						
17	.12	50	40	R	57	2.13	2.90	1.30	7.5	1750	104	240	23						
18	1.30	52	30	R&S	56	2.26	2.80	1.80	7.6	1810	108	280	19						
19	.10	30	18	S	55	2.30	3.00	1.90	7.5	1850	117	240	27						
20	.01	30	16	S	55	2.31	2.70	1.80	7.6	1790	105	280	26						
21		32	20	C	55	2.28	2.80	1.80	7.6	1810	110	280	30						
22		44	26	C	54	2.28	2.90	1.80	7.4	1760	103	240	25						
23		40	24	CL	55	2.24	2.70	1.70		1780	107	240	21						
24		44	28	CL	56	2.30	2.90	1.80	7.5	1780	105	280	19						
25		46	24	C	55	2.27	2.80	1.80	7.5	1970	105	280	18						
26		42	26	CL	54	2.26	3.00	1.70	7.4	1890	114	280	22						
27	.08	34	10	S	54	2.19	2.80	1.70	7.4	1820	72	200	27						
28		34	20	CL	55	2.15	2.70	1.70	7.4	1750	105	240	30						
29		36	22	CL	54	2.18	2.80	1.70	7.6	1780	114	280	24						
30		42	23	CL	54	2.16	2.70	1.70	7.6	1800	107	240	26						
31																			
TOTAL	2.14										3145	7560	623						
ARITH. MEAN						2.19				1842	105								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH November 19 69 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X –	Mg/l	LBS. X –	%	
1	75	138	57	105	24	88	161	38	70	57	82	150	38	70						
2	54	98	48	87	11	88	160	34	62	61	78	142	29	53						
3	96	180	63	118	34	90	169	32	60	64	81	152	32	60						
4	63	117	51	95	19	47	87	38	71	19	37	69	29	54						
5	57	104	39	71	32	96	175	35	64	64	84	153	28	51						
6	64	116	52	95	19	68	124	36	65	47	51	93	26	47						
7	66	118	48	86	18	75	134	31	55	59	75	134	31	55						
8	66	118	54	96	18	102	182	46	82	55	86	154	42	75						
9																				
10	60	110	45	82	25	51	93	29	53	43	44	80	26	47	4.9	89	4.2	77	13.5	
11	54	97	48	86	11	63	113	30	54	52	55	99	27	48	3.9	70	3.6	65	7.2	
12	72	129	54	96	25	82	146	33	59	60	75	134	31	55						
13	63	109	45	78	29	57	99	24	42	58	50	87	18	32						
14	66	112	30	51	26	43	73	27	46	37	43	73	26	44						
15	54	90	42	70	22	47	78	19	32	60	40	66	18	30						
16	39	67	36	62	9	54	92	31	53	43	46	79	28	48						
17	54	96	54	96	0	58	103	30	53	48	55	98	30	53						
18	52	98	42	79	19	47	88	33	62	30	39	74	27	51						
19	64	123	51	98	20	94	180	42	81	55	80	153	38	73	3.9	75	3.9	75	0.0	
20	66	127	60	116	9	83	160	30	58	64	78	150	30	58						
21	72	137	42	80	42	107	204	22	42	79	96	183	22	42						
22	80	152	66	126	18	52	99	36	68	31	52	99	36	68						
23	57	106	52	97	9	89	166	34	64	62	74	138	28	52	4.9	92	4.9	92	0.0	
24	69	132	64	123	7	85	163	45	86	47	75	144	38	73	5.4	104	5.1	98	5.8	
25	84	159	51	97	39	100	189	36	68	64	92	174	34	64	4.6	87	4.4	83	4.6	
26	76	143	66	124	13	77	145	35	66	55	70	132	33	62						
27	72	131	54	99	25	121	221	36	66	70	105	192	33	60						
28	88	158	63	113	28	136	244	46	82	66	125	224	42	77						
29	60	109	46	84	30	76	138	38	80	50	68	124	37	67						
30	64	115	51	92	20	85	153	37	67	57	73	131	31	56						
31																				
TOTAL		3489		2702			4139		1800			3681		1625		517		490		
ARITH. MEAN	66	120	51	93	22	78	143	34	62	54	69	127	31	56	4.6	86	4.4	82	5.2	

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH November 19 69 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge: Gals	Raw Sludge: Lbs Per 1000 c f Digester	Raw Sludge: pH	Raw Sludge: Total Solids %	Raw Sludge: Vol Solids %	Supernatant: Gals	Supernatant: pH	Supernatant: Total Solids %	Supernatant: Vol Solids %	Supernatant: Susp Solids Mg/l	Supernatant: 5-Day B O D Mg/l	sludge near bottom: Total Solids %	sludge near bottom: Vol Solids %	sludge near bottom: Vol Acids Mg/l	pH	Temp °F #1	Gas: Produced cu ft X 100	Gas: Wasted cu ft	Remarks
1	1326	20	5.7	6.9	72											94	37	0	Note — include gallons
2	1326	23	5.9	8.1	70											97	40	0	of sludge to beds
3																100	33	0	
4	1326	16	5.8	5.6	70											102	27	0	Transfered 13702 gals.
5	1768	26	5.7	6.8	72												32	23	from #1 to #2 during
6	1768	18	5.9	5.2	65											96	24	24	month. Averaged 1.3%
7	884	17	5.8	11.0	59											94	35	35	dry solids and 37.5%
8	1326	16	6.2	5.7	68											92	35	0	volatile.
9	1326	24	5.7	8.5	70											95	31	0	
10	1326	15	5.9	6.0	63											98	29	0	Filled 1 bed during the
11	1326	13	6.0	4.6	68											100	30	0	month. 7956 gals. at
12	1326	21	5.8	8.5	60											101	32	0	2.2% dry solids and 61.5
13	1326	23	5.9	9.2	62											102	32	22	volatile.
14	1326	20	5.9	8.1	63											100	33	33	
15	1326	14	5.8	5.3	67											97	24	34	
16	1326	20	5.9	8.2	62											94	30	30	
17	1326	23	5.9	8.6	67											92	22	0	
18	2210	25	5.9	5.7	67											94	28	0	
19						13702		.28	69	1800	240					95	30	0	
20	1326	22	5.8	8.0	68											98	21	0	
21	1326	20	6.0	7.0	70											99	20	0	
22	1326	22		7.7	70											100	24	0	
23	1326	17	5.8	5.9	71											101	30	0	
24																102	30	0	
25	2652	34	6.0	5.5	76											104	30	0	
26	1326	17	6.0	6.3	70											103	23	23	
27																100	32	32	
28	1326	21	5.9	7.1	73											99	30	30	
29	1326	24	5.8	7.7	76											96	31	31	
30	1326	23	5.8	8.4	67											94	33	33	
31																			
ARITH MEAN	1428	21	5.9	7.1	68	13702		.28	69	1800	240					98	30	12	
STAT MEAN		20																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH December 19 69

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~SRDI~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~m~~	lbs.	KWH	*						
1		32	16	C	55	2.24	2.90	1.70	7.5	1760	106	240	25						* Gas - cu. ft. X 100
2		42	22	CL	54	2.19	2.80	1.70	7.6	1790	105	280	21						
3		32	16	CL	54	2.17	2.90	1.70	7.6	1880	117	240	20						
4		32	18	C	53	2.15	2.80	1.70	7.6	1820	100	240	30						
5		34	24	C	53	2.15	2.80	1.70	7.5	1810	107	240	33						
6		38	26	C	53	2.14	2.80	1.70	7.5	1800	106	240	24						
7	.11	40	30	R	54	2.16	2.80	1.70	7.6	1850	106	240	20						
8		36	22	CL	54	2.18	2.90	1.70	7.5	1760	105	240	25						
9		42	22	C	54	2.17	2.80	1.70	7.5	2250	104	280	27						
10		30	24	C	53	2.18	2.80	1.70	7.5	1790	104	200	23						
11	.03	38	24	S	53	2.18	2.80	0.70	7.5	1790	103	280	25						
12	.03	30	22	S	53	2.15	2.90	0.60	7.5	1930	124	240	27						
13	.01	36	24	S	53	2.15	2.90	0.70	7.4	1830	110	240	29						
14		36	26	Cl	53	2.05	2.80	1.00	7.5	1730	107	240	28						
15		30	10	CL	53	2.15	2.90	1.00	7.5	1820	108	240	26						
16	.03	30	10	S	52	2.11	2.70	1.00	7.5	1780	92	240	30						
17		34	18	CL	52	2.11	2.60	1.40	7.5	1760	103	240	27						
18	.02	34	28	S	52	2.15	2.80	0.90	7.5	1810	102	240	26						
19	.02	32	22	S	53	2.18	2.90	1.70	7.5	1920	110	240	30						
20		28	12	CL	52	2.07	2.90	1.70	7.5	1750	98	240	32						
21		30	16	CL	53	2.05	2.60	1.60	7.6	1810	103	200	30						
22	.08	24	16	S	53	2.13	2.90	1.70	7.6	1790	106	240	30						
23	.13	18	-4	S	52	2.09	2.70	1.70	7.6	1790	107	240	31						
24	.01	20	-2	S	53	2.06	2.70	1.70	7.5	1770	117	240	30						
25		30	20	CL	51	1.97	2.40	1.60	7.5	1810	94	200	31						
26	.08	36	6	S	52	2.06	2.70	1.60	7.4	1790	109	240	30						
27		26	26	CL	52	2.04	2.90	1.60	7.5	1790	102	240	28						
28		34	20	CL	51	2.00	2.60	1.60	7.6	1780	105	240	30						
29		36	26	CL	52	2.12	2.90	0.60	7.6	1770	113	240	29						
30	.04	36	24	S	52	2.07	2.80	1.20	7.5	2030	106	240	30						
31	.05	34	14	S	51	2.07	2.90	0.90	7.4	1750	103	240	26						
TOTAL	.64										3282	7440	853						
ARITH. MEAN						2.12				1823	106								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH December 19 69 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	75	140	57	106	24	86	161	27	50	69	76	142	24	45						
2	64	117	57	104	11	72	131	38	69	47	61	111	30	55						
3	63	114	36	65	43	81	147	46	83	43	73	132	42	76						
4	72	129	28	50	61	55	99	31	56	44	49	88	27	48						
5	76	136	45	81	41	148	265	39	70	74	141	253	35	63						
6	64	114	27	48	58	62	111	25	45	60	53	95	25	45						
7	68	122	42	76	38	82	148	37	67	55	72	130	30	54						
8	64	116	57	104	11	90	164	41	75	54	79	144	34	62						
9	96	174	54	98	44	86	156	37	67	57	77	139	37	67						
10	72	131	54	98	25	57	104	37	67	35	57	104	37	67						
11	70	127	54	98	23	82	149	31	56	62	78	142	31	56						
12	66	118	54	98	18	57	102	43	77	25	54	97	43	77						
13	76	136	63	113	17	116	208	39	70	66	111	199	38	68						
14	68	116	63	108	7	77	132	48	82	38	65	111	40	68						
15	80	143	63	113	17	67	120	42	75	37	62	111	40	72						
16	72	127	66	116	8	72	127	38	67	47	63	111	36	63						
17	72	127	45	79	37	68	120	41	72	40	66	116	39	69						
18	66	118	54	97	18	83	149	33	59	60	73	131	32	57						
19	63	115	54	98	14	90	164	36	65	60	83	151	35	64						
20	84	145	60	104	29	99	171	47	81	53	81	140	45	78						
21	64	109	48	82	25	90	154	33	56	63	75	128	25	43						
22	76	135	64	114	16	105	186	43	76	59	97	172	38	67						
23	72	125	51	89	29	87	152	40	70	54	83	145	39	68						
24	57	98	48	82	16	55	94	32	55	42	51	88	31	53						
25	51	84	48	79	6	46	76	29	48	37	44	72	26	43						
26	92	158	66	113	28	80	137	45	77	44	77	132	43	74						
27	90	153	75	128	17	71	121	43	73	39	65	111	39	66						
28	84	140	54	90	36	85	142	38	63	55	71	118	30	50						
29	84	149	68	120	19	87	157	46	81	48	76	134	38	67						
30	84	145	67	116	20	98	169	45	78	54	90	155	38	66						
31	96	166	68	117	29	92	159	40	69	57	81	140	35	60						
TOTAL		4027		2983			4475		2099			4042		1911						
ARITH. MEAN	74	130	55	96	25	81	144	38	68	51	74	130	35	62						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH December 1969 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant								sludge near bottom				Temp	Gas		Remarks
	Gals	Lbs Per 1000 c.f Digester	pH	Total Solids %	Vol Solids %	Gals	pH	Total Solids %	Vol Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol Solids %	Vol Acids Mg/l	pH	°F #1	Produced cu ft	Wasted cu ft	
1																91	30	0	Note — include gallons
2	2652	33		5.5	74											94	30	0	of sludge to beds
3	1768	28	5.9	6.9	76											95	28	0	Transfered 36686
4	1326	21	5.8	6.8	76	11050		.33		3040	420					98	30	0	gals. during month.
5	1326	20	5.8	6.8	75											100	22	21	Averaged 1.4% dry
6																99	26	26	solids and 64.6%
7	2210	28	5.6	5.6	76											97	28	28	volatile.
8	1326	18	5.9	6.1	73											93	30	0	
9																94	30	0	
10	2652	30	5.8	4.7	81											96	30	0	
11	1326	15		5.2	72											96	24	0	
12	1326	14	6.0	4.6	78	14144		.32	69	2180	320					96	24	0	
13	1326	18	5.9	6.6	68											96	30	0	
14	1768	31	5.8	7.8	75											97	25	0	
15																96	32	31	
16	1326	22	5.9	8.0	69											95	36	11	
17	1326	22	5.8	7.9	68											95	32	0	
18	1326	19	5.9	6.4	72											97	38	0	
19	1326	13		4.6	70											98	39	0	
20	1326	20	5.8	6.7	75											99	31	0	
21	1326	18	5.9	6.5	71											100	23	0	
22	1768	17	5.8	4.5	69											99	30	30	
23	1326	10	5.9	3.2	79											96	31	31	
24	1326	15	5.8	5.8	66	11492		.34	69	2160	330					92	33	2	
25																96	30	0	
26	1768	36	5.7	9.3	72											98	30	0	
27	884	11	5.8	5.7	72											93	32	0	
28	1326	19	5.8	6.5	74											97	21	0	
29	1768	24	5.5	6.0	74											99	24	20	
30	1326	12	6.1	4.1	71											96	30	30	
31	884	13	5.8	7.0	67											93	30	30	
ARITH MEAN	1513	20	5.8	6.1	73	12229		.33	69	2460	356					96	29	8.4	
STAT MEAN		20																	

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH January 1970 — MISCELLANEOUS DATA — OPERATOR Robert J. Swihell

DATE	WEATHER				RAW SEWAGE					~~GRIT~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED	REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH						
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~mg~~	lbs.	KWH			
1	.04	36	16	S	51	1.94	2.60	1.00	7.7	1850	96	240	31		As per my conversation with Mr. Hoeschele on his last visit, I am discontinuing the probability charts. If in the future your office thinks that they are again needed please let me know and I will resume their use.
2	.01	37	12	S	51	2.01	2.80	0.60	7.5	1470	135	240	30		
3		24	6	CL	51	2.03	2.80	0.60	7.5	1550	100	240	22		
4		22	8	CL	51	1.95	2.80	0.60	7.6	1400	57	200	30		
5		28	2	CL	51	2.08	2.90	0.90		1290	100	240	30		
6		22	-1	CL	51	2.06	2.90	0.90	7.6	1480	113	280	37		
7		12	-6	CL	52	2.07	2.90	1.00	7.6	1440	101	240	30		
8	.03	14	-6	S	50	2.04	2.80	1.30	7.6	1490	93	280	71		
9	.01	22	6	S	50	2.04	3.10	0.50	7.5	1490	100	280	40		
10	.01	18	6	S	50	2.01	2.80	1.60	7.6	1480	100	280	34		
11	.06	26	14	S	51	2.02	2.60	1.60	7.6	1500	101	240	30		
12		30	4	C	52	2.11	2.80	1.50	7.6	1670	108	280	30		
13		28	10	CL	52	2.06	2.70	1.50	7.6	1450	111	280	25		
14		24	10	CL	51	2.06	2.70	1.50	7.6	1490	116	200	31		
15		34	16	CL	51	2.06	2.70	1.50		1490	109	240	30		
16	.07	40	26	R+S	51	2.04	2.70	1.50	7.5	1470	103	240	29		
17	.16	30	12	S	51	2.00	2.70	1.50	7.5	1450	101	240	22		
18		19	-4	CL	51	1.98	2.70	1.50	7.6	1480	103	240	33		
19		18	-2	CL	52	2.05	2.80	1.30	7.7	1530	114	240	30		
20		13	-11	CL	50	2.02	2.70	1.00	7.6	1520	100	240	34		
21	.03	18	-13	S	51	2.01	2.70	1.20	7.7	1450	103	280	35		
22	.03	18	10	S	51	2.04	2.80	1.30	7.7	1490	105	240	34		
23		22	-10	CL	51	2.02	2.80	1.50	7.6	1570	163	280	22		
24		32	12	CL	50	1.96	2.70	1.50	7.6	1470	96	240	26		
25		40	27	CL	51	2.01	2.50	1.50	7.7	1520	102	240	30		
26	.10	36	26	S	52	2.04	2.60	1.60	7.6	1400	109	240	30		
27		36	28	CL	51	2.01	2.50	1.50	7.6	1370	125	240	30		
28	.01	46	34	R	51	2.14	2.60	1.60	7.5	1410	123	240	35		
29		34	14	CL	51	2.06	2.60	1.60	7.6	1490	103	240	25		
30		28	18	CL	51	2.09	2.70	1.60	7.5	1370	115	240	24		
31		40	24	C	50	2.01	2.70	1.60	7.5	1400	110	240	21		
TOTAL	.56										3334	7680	32		
ARITH. MEAN						2.03				1479	108				

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH January 19 70 PRIMARY TREATMENT DATA OPERATOR Robert J. Swallwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	65	105	54	87	17	74	120	60	97	19	68	110	50	81						
2	76	127	60	101	21	129	216	47	79	64	104	174	38	64						
3	80	135	64	108	20	80	135	43	73	46	74	125	40	68						
4	68	111	64	104	6	65	106	45	73	31	57	93	42	71						
5	72	125	60	104	17	122	212	37	64	70	112	194	35	61						
6	84	144	60	103	29	101	174	34	58	66	85	146	31	53						
7	76	131	64	110	16	68	117	41	71	41	66	114	39	67						
8	69	117	57	97	17	63	107	27	46	43	61	104	27	46						
9	68	116	57	87	25	93	158	32	54	66	88	150	31	53						
10	80	134	66	111	18	106	178	38	64	64	96	161	34	57						
11	103	182	48	81	56	94	158	37	62	61	81	136	29	49						
12	72	127	60	106	17	98	172	35	62	64	92	162	31	55						
13	72	124	57	98	21	82	141	40	69	51	63	108	27	46						
14	72	124	64	110	11	90	155	61	105	32	73	125	42	72						
15																				
16	76	129	67	117	9	87	148	40	68	54	81	138	37	63						
17	80	133	60	100	25	58	97	26	43	55	52	87	25	42						
18	68	112	57	94	16	77	127	34	56	56	68	112	34	56						
19	63	108	57	97	10	66	113	44	75	33	62	106	40	68						
20	72	121	60	101	17	64	108	35	59	45	56	94	30	51						
21	67	116	48	80	30	111	186	31	52	72	104	174	29	49						
22	64	108	57	96	11	80	135	29	49	64	76	128	28	47						
23	78	131	60	101	23	87	147	61	103	30	84	142	48	81						
24	72	118	63	103	13	116	190	38	64	66	105	172	35	57						
25	72	121	45	75	37	69	116	42	70	39	58	97	32	54						
26	80	136	68	116	15	85	145	37	63	57	83	141	36	61						
27	72	121	60	101	17	83	141	33	55	63	84	141	33	55						
28	92	164	63	114	29	110	196	49	87	57	88	157	36	64						
29	76	131	60	103	21	58	100	42	72	28	55	94	37	67						
30	72	125	63	110	13	102	178	37	64	58	85	148	34	59						
31	84	141	48	80	43	81	136	58	97	28	70	117	46	77						
TOTAL		3817		2993			4419		2054			3306		1794						
ARITH. MEAN	75	127	59	100	21	87	147	41	68	51	78	132	35	60						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH January 1970 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swihart

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1																90	28	28	Note — include gallons
2						14586		.36	61.4	2240	340					89	30	15	of sludge to beds
3	2210	41		9.1	67											92	30	27	
4	1768	26		6.7	72											88	27	0	
5	1326	16	5.6	6.0	67											92	30	12	
6																94	30	15	
7	1326	16	5.8	6.0	67											94	30	30	
8	2652	41	5.7	6.6	77											96	26	26	
9	1326	16	5.7	5.9	66											98	36	21	
10	1326	13	5.8	4.6	70											100	27	25	
11	1326	19	6.0	6.5	74											96	31	0	
12	2210	38	6.0	7.7	73											99	20	0	
13	3094	36	6.1	5.1	74											97	30	21	
14						12376		.36	63.7	2340	380					97	43	22	
15	1768	18	5.8	4.9	68											99	21	0	
16	1326	12	5.9	4.2	72											100	23	0	
17	1326	12	5.8	3.6	80											100	25	0	
18	1768	29	5.7	7.1	76											102	24	0	
19	1768	20	5.9	4.8	77											102	30	25	
20	1768	25	5.7	6.1	75											100	27	4	
21	1326	21		7.1	75											100	28	1	
22	1326	12	6.1	3.9	76											102	30	0	
23	1326	12	6.2	4.2	73	11492		.32	62.0	2040						102	30	0	
24	1326	13		4.4	75											104	30	0	
25	1326	17	6.1	5.6	76											104	30	0	
26																104	30	30	
27	1326	7	6.4	2.3	80											101	30	30	
28	1326	19	5.9	6.1	77												36	0	
29	1326	19	5.8	6.4	74											98	28	0	
30	1326	18	5.7	5.9	75												34	0	
31	1326	26		8.7	74											95	35	0	
ARITH. MEAN	1598	21	5.8	5.8	73	12818		.35	62.4	2201	360					98	30	11	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH February 19 70 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~xx~~	lbs.	KWH	* *						
1	.14	44	32	R&S	51	2.03	2.60	1.60	7.7	1560	112	240	25						* * Gas - cu. ft x 100
2		36	3	CL	51	2.12	2.90	1.60	7.6	1470	128	280	25						
3	.03	10	-6	S	51	2.06	2.70	1.60	7.5	1640	111	280	20						* Plant water system
4	.07	30	-2	S	50	2.03	2.60	i.60	7.6	1450	106	280	41						float filled with
5		32	18	C	50	2.04	2.60	1.60	7.5	1450	105	240	38						water and held valve
6		36	24	CL	50	2.04	2.60	1.20	7.4	1470	109	240	15						open.
7		42	24	CL	50	2.03	2.70	1.50	7.5	1470	102	240	12						
8	.10	38	27	S	50	2.01	2.60	1.60	7.6	1500	103	240	24						
9	.03	32	22	S	50	2.05	2.50	1.30	7.6	1400	115	240	24						
10		38	26	CL	50	2.06	2.60	1.50	7.5	1420	99	280	24						
11		30	12	CL	50	2.05	2.60	0.50	7.5	1480	110	280	24						
12	.03	26	-4	S	50	2.06	2.80	0.60		1480	110	240	30						
13		18	-4	CL	50	2.03	2.80	0.60	7.5	1500	130	280	30						
14		22	0	CL	50	1.97	2.70	1.50	7.5	1480	100	200	29						
15		28	4	CL	50	1.94	2.60	1.00	7.6	1590	107	240	25						
16		32	8	C	51	2.04	3.80	1.60	7.5	1460	113	240	21						
17		42	20	C	51	2.02	2.70	1.60	7.6	1430	107	240	27						
18	.07	46	10	S	51	2.02	2.70	1.60	7.6	1660	118	200	25						
19		28	8	CL	49	2.01	2.70	1.60	7.6	1490	114	280	25						
20		24	10	CL	50	2.00	2.60	1.60	7.6	1490	111	280	25						
21		38	24	C	50	2.03	2.70	1.60	7.5	1480	117	200	34						
22		46	18	C	50	2.00	2.60	1.60		*5323	117	240	25						
23		42	22	C	51	2.05	2.80	1.60	7.6	1817	111	280	22						
24		47	14	CL	50	2.01	2.70	1.60	7.6	1390	113	280	22						
25		16	6	C	50	2.02	2.80	1.60	7.7	1540	137	240	20						
26	.05	30	10	S	49	2.00	2.70	1.60	7.5	1550	109	240	22						
27		30	6	CL	50	2.01	2.60	1.50	7.5	1510	98	280	25						
28		34	12	CL	50	1.96	2.70	1.60	7.5	1450	109	240	20						
29																			
30																			
31																			
TOTAL	.52										3121	7040	699						
ARITH. MEAN						2.02				1641	111								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH February 19 70 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	76	129	60	102	21	81	137	36	61	56	77	130	36	61						
2	69	122	60	106	13	51	90	38	67	25	39	69	32	57						
3	84	144	60	103	28	82	141	34	58	59	76	131	31	53						
4	76	129	52	88	31	136	230	34	58	75	115	195	29	49						
5	66	112	57	97	13	87	148	45	77	54	82	139	42	71						
6	68	116	51	87	25	86	146	35	60	59	136	35	60	60						
7	84	142	66	112	22	91	154	51	86	44	84	142	47	80						
8	68	114	51	85	25	79	132	23	39	71	65	109	19	32						
9	68	116	60	103	13	76	130	33	56	57	67	115	27	46						
10	68	117	54	93	21	75	129	35	60	53	67	115	32	55						
11	72	123	60	103	17	69	118	29	50	58	56	96	29	50						
12																				
13	68	115	60	102	12	98	166	48	81	51	94	159	48	81						
14	78	128	57	94	27	107	176	51	84	52	98	161	44	72						
15						70	113	33	53	53	60	97	25	40						
16	60	102	48	83	20	66	112	30	51	55	60	102	26	44	5.4	92	5.2	88	4.3	
17	88	148	63	106	28	92	155	41	69	55	87	147	39	66	4.7	79	4.3	72	8.9	
18	84	142	63	106	23	95	160	47	79	51	79	133	42	71	4.4	74	4.1	69	6.8	
19	72	121	57	96	21	67	112	39	65	42	59	99	35	59	5.1	85	4.0	67	21.0	
20	69	115	51	85	26	112	187	35	58	69	105	175	30	50						
21	84	142	72	122	14	88	149	56	95	36	71	120	51	86						
22																				
23	76	130	30	51	60	111	190	42	72	62	96	164	39	67	5.7	97	5.0	86	11.0	
24	76	127	66	111	13	86	144	38	64	56	76	127	35	59	5.1	85	5.1	85	0.0	
25	72	121	48	81	33	69	116	53	89	23	62	104	47	79						
26	76	127	57	95	25	83	138	44	73	47	72	120	38	63						
27	80	134	54	91	32	80	134	30	50	63	72	121	25	42						
28	76	124	60	98	21	83	136	38	62	54	78	128	34	56						
29																				
30																				
31																				
TOTAL		3140		2399			3742		1717			3334		1549		512		467		
ARITH. MEAN	74	126	~~96~~ 57	96	23	85	144	39	66	53	76	128	35	59	5.1	87	4.6	78	8.7	

1-L

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH February 1970 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1																97	25	0	Note — include gallons
2	1326	20	5.8	6.7	76	14144		.42	70	2820	900					98	39	0	of sludge to beds
3	1326	19	5.9	6.1	77											95	8	19	
4	1768	39	5.8	9.5	77											93	38	0	Transfered 39780 gals.
5	1326	19		6.3	73												40	0	during month. Averaged
6	1768	25	5.9	6.2	74											94	43	0	1.5% dry solids and
7	1326	20		6.7	74											96	38	0	64.5% volatile solids.
8	1326	15	5.9	4.8	77											98	40	0	
9	1326	20	5.8	6.9	71											99	38	0	
10	1326	17	5,8	5.4	78											97	24	17	
11																98	0	25	
12	1326	22	5.6	7.7	72											96	0	24	
13	2210	35	5.9	7.8	66	10608		.48	68	3660	420					93	35	0	
14	1326	18	5.9	6.0	74											94	32	0	
15	1326	8	6.0	2.5	79											95	23	0	
16																96	0	30	
17																93	0	30	
18	1768	24	5.5	6.1	73											92	0	30	
19	1326	18	5.8	6.0	73											90	26	4	
20	1326	25	5.9	7.9	79											88	30	0	
21	1326	17	5.8	5.6	76											91	47	0	
22	1326	19	5.8	6.3	77											94	39	0	
23	1326	19		6.1	75											94	27	0	
24	1326	19	5.9	6.6	71											95	30	0	
25	1768	23	5.9	5.9	74	15028		.40	71	2580	690					96	36	0	
26	1326	33	5.7	10.5	81											98	43	0	
27	1326	19	5.8	6.5	73											100	36	0	
28	1326	19		6.1	75											100	33	0	
29																			
30																			
31																			
ARITH MEAN	1436	21	5.8	6.5	72	13260		.43	70	3020	670					95	27	6	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH March 19 70

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~MX~~	lbs.	KWH	*						
1		41	27	CL	50	1.94	2.60	1.60	7.6	1530	103	280	20						
2	.31	42	32	R	51	2.03	2.80	1.10	7.5	1440	106	240	17						
3	.71	48	32	R	49	2.12	2.90	1.80	7.5	1710	110	280	18						
4	.22	50	22	R	50	2.14	2.90	1.80	7.5	1400	107	240	20						
5		42	22	C	50	2.11	2.80	1.60	7.6	1480	104	280	19						
6		46	22	C	50	2.17	2.70	1.00	7.5	1470	111	280	18						
7		46	12	C	50	2.03	2.80	1.60	7.5	1470	100	200	19						
8	.13	28	14	S	50	1.99	2.70	1.60	7.6	1510	104	240	21						
9		32	16	C	51	2.06	3.00	1.60	7.6	1390	109	240	19						
10		34	12	CL	50	2.03	2.70	1.60	7.6	1470	107	240	26						
11		36	18	C	49	2.01	2.60	1.60	7.5	1450	130	240	25						
12		38	16	C	49	2.00	2.60	1.60	7.5	1460	106	280	21						
13	.01	36	14	S	50	1.98	2.50	1.60	7.5	1510	105	240	20						
14		30	10	CL	49	1.91	2.60	1.60	7.5	1450	100	240	21						
15		30	12	CL	49	1.91	2.50	1.60		1660	102	240	22						
16		36	14	C	50	1.98	2.60	1.60	7.7	1460	105	240	30						
17	.06	44	20	S	50	1.94	2.60	1.50	7.6	1520	94	240	24						
18		38	28	C	50	1.93	2.50	1.60	7.6	1540	88	240	35						
19	.27	50	30	R	50	2.07	2.80	1.60	7.6	1470	110	280	20						
20		40	28	CL	50	2.10	2.70	1.60	7.5	1560	124	240	10						
21		52	32	C7	50	2.05	2.80		7.5	1500	98	240	12						
22	.15	38	32	S	50	2.03	2.60	1.60	7.5	1530	98	280	16						
23		46	32	CL	50	2.14	2.80	0.70	7.6	1440	108	240	21						
24		40	24	CL	50	2.08	2.60	1.50	7.5	1480	109	240	20						
25	.90	48	30	S	50	2.08	2.60	0.50	7.6	1520	111	240	20						
26	.11	32	20	S	49	2.05	2.70	0.50		1450	107	280	25						
27	.03	42	24	S	49	2.09	2.90	0.60	7.5	1520	122	240	20						
28		28	14	CL	50	2.04	2.80	0.60	7.5	1490	100	240	20						
29		33	15	C	49	1.98	2.60	1.30	7.5	1560	99	240	20						
30		38	16	C	50	2.13	2.90	1.80	7.6	1410	110	280	18						
31		44	22	C	49	2.14	2.70	1.80	7.5	1460	108	240	19						
TOTAL	2.90										3295	7260	636						
ARITH. MEAN						2.04				1494	106								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH March 1970 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	88	142	54	87	38	67	108	37	60	45	59	95	30	49						
2	68	115	60	102	12	90	152	33	56	63	70	119	24	41						
3	66	117	48	85	27	75	133	30	53	60	66	117	24	42						
4	64	114	48	86	25	109	195	26	46	76	100	179	26	46						
5	63	111	42	74	33	78	137	30	53	62	67	118	30	53						
6	57	103	42	76	26	79	143	27	49	66	73	132	25	45						
7	66	112	39	66	41	68	115	22	37	68	63	107	21	36						
8	69	115	36	60	48	55	91	21	35	62	48	80	16	27						
9	60	103	36	62	40	68	116	28	48	59	65	112	24	41						
10	60	102	42	71	30	56	95	25	42	55	46	78	22	37						
11	57	96	45	75	21	58	97	36	60	38	45	75	30	50						
12	48	80	33	55	31	106	177	24	40	77	101	168	22	37						
13	48	79	40	66	17	62	102	44	73	29	58	96	41	68						
14	63	100	42	67	33	74	118	65	104	12	70	112	62	99						
15																				
16	64	106	48	79	25	81	134	37	61	54	63	104	31	51						
17	72	116	57	92	21	73	118	28	45	62	62	100	26	42						
18	42	68	27	43	36	42	68	31	50	26	42	68	31	50						
19	65	112	60	104	8	98	169	37	64	62	92	159	34	59						
20	64	112	54	95	16	47	82	40	70	15	44	77	38	67						
21	84	144	72	123	14	88	160	52	89	41	86	147	52	89						
22	76	129	63	107	17	96	163	34	58	65	86	146	30	51						
23	64	114	60	107	6	84	150	40	71	52	65	116	34	61						
24	84	146	68	118	19	73	127	36	62	51	67	116	34	59						
25	76	132	54	94	29	60	104	34	59	43	54	94	32	56						
26																				
27	92	160	68	119	26	67	117	52	91	22	62	108	51	89						
28	72	122	68	116	6	129	219	36	61	72	120	204	34	58						
29	64	106	56	92	13	61	101	33	54	46	54	89	27	45						
30	72	128	68	121	6	87	155	56	99	36	81	144	54	96						
31	64	114	60	107	6	127	227	50	89	61	117	209	44	79						
TOTAL		3298		2549			3863		1779			3469		1623						
ARITH. MEAN	67	114	51	88	23	73	133	34	61	51	70	120	33	56						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH March 1970 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1768	22	5.7	5.3	78											102	35	0	Note — include gallons
2																102	28	0	of sludge to beds
3																104	24	14	
4	2210	42	5.6	9.0	70											102	31	0	Transfered 36686 gals.
5	1768	26	5.9	7.0	70												42	0	from #1 to #2 during
6	1326	27	5.7	8.4	81												43	0	month. Averaged 1.3%
7	1768	30	5.7	7.7	72											93	39	0	dry solids and 78.6%
8	1326	19	5.8	6.6	72											97	40	0	volatile.
9																98	31	0	
10	1326	21	5.7	7.2	73											96	34	0	
11	1768	21	6.0	5.7	69	12376		.45	65	1900						99	39	0	
12																	38	0	
13	1326	21	5.6	7.4	71											95	31	0	
14	1768	28		7.4	71											97	31	0	
15	1326	28	5.7	10.2	69											98	29	0	
16	1768	21	6.1	5.9	68											98	29	0	
17	1326	16	5.6	6.1	67												39	0	
18	884	13		7.0	72											96	28	0	
19																97	25	0	
20	2210	37	5.6	7.1	78	11050		.53	70	4400	900					98	40	0	
21	1326	22	5.7	7.3	75											99	35	0	
22	1768	31	5.9	7.7	75											94	35	0	
23	1326	13	6.2	4.7	69											97	30	0	
24	1326	19	5.8	6.8	71											98	28	0	
25	2210	31	5.9	6.2	74											98	32	0	
26	884	17	5.7	8.6	75											99	23	13	
27	1326	15	5.9	5.0	73	13260		.40	68	4880						98	20	20	
28	1326	17	5.9	5.5	76											94	19	19	
29	1326	20	5.8	7.1	71											92	19	19	
30																88	19	19	
31	2210	37	5.7	8.2	68											87	18	18	
ARITH. MEAN	1556	24	5.8	7.0	72	12229		.46	67	3727	900					97	31	4	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH April 19 70 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXXXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~XXX~~	lbs.	KWH	*						
1	.86	44	28	R&S	49	2.15	2.70	1.70	7.5	1480	113	240	20						* Gas - cu. ft. X 100
2	.14	38	24	S	49	2.11	2.80	1.80	7.7	1430	113	280	20						
3		44	28	C	50	2.28	3.10	1.80	7.6	1480	108	320	19						
4		40	20	C	50	2.22	2.80	1.70	7.4	1430	110	280	19						
5	.01	48	20	R	50	2.27	2.70	1.70	7.6	1510	100	240	20						
6	.14	42	28	R&S	50	2.45	3.10	1.80	7.5	1380	72	280	16						
7		54	34	C	50	2.46	3.10	1.70	7.6	1510	100	280	14						
8		72	38	C	50	2.49	3.50	1.70	7.6	1510	126	280	16						
9		54	26	C	51	2.44	3.00	1.90	7.5	1590	111	280	15						
10		42	24	C	50	2.41	2.90	1.80	7.5	1540	115	280	11						
11	.18	36	28	S	50	2.37	2.90	1.90	7.6	1430	112	240	12						
12		56	34	CL	50	2.35	2.80	1.90	7.6	1520	115	280	10						
13	.24	50	36	R	50	2.43	3.20	2.00	7.5	1480	111	240	12						
14		60	34	C	50	2.34	2.90	2.00	7.7	1510	112	240	10						
15		64	40	CL	50	2.33	2.80	1.80	7.5	1480	120	280	11						
16		62	36	C	51	2.33	2.80	1.80	7.4	1490	118	280	11						
17		58	32	C	51	2.32	2.90	1.80	7.5	1500	116	240	10						
18	.07	48	36	R	51	2.29	2.90	1.80	7.4	1460	118	240	15						
19	.70	52	36	R	50	2.34	2.80	1.80	7.5	1550	105	280	16						
20	.52	58	38	R	51	2.44	3.00	2.10	7.4	1450	116	280	11						
21	.02	48	32	R	51	2.43	3.00	2.00	7.4	1730	108	280	6						
22	.04	66	44	R	51	2.44	3.00	1.80	7.5	1500	112	240	10						
23		60	44	CL	51	2.42	3.00	1.90	7.5	1500	115	280	8						
24		66	42	C	51	2.40	3.00	1.80	7.5	1480	103	280	5						
25		74	44	C	52	2.35	3.00	1.80	7.5	1480	110	240	4						
26		76	48	C	52	2.37	2.80	1.80	7.4	1580	102	240	3						
27	.14	82	54	R	52	2.46	3.10	1.90	7.6	1500	112	280	1						
28		74	58	CL	52	2.40	2.90	1.80	7.5	1530	111	280	3						
29	.60	84	64	R	52	2.46	3.60	1.90	7.7	1480	104	240	1						
30	.05	82	64	R	53	2.46	2.90	1.90	7.5	1530	104	280	2						
31																			
TOTAL	3.71										3292	8000	331						
ARITH. MEAN						2.37				1501	110								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH April 1970 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	63	113	57	102	10	55	99	48	86	14	53	95	48	86						
2	63	111	54	95	14	92	162	49	86	47	76	134	42	74						
3	72	137	42	80	42	109	207	50	95	54	91	173	48	91						
4	68	126	52	96	24	58	107	37	68	36	55	102	37	68						
5	84	159	57	108	32	115	218	32	61	72	98	186	27	51						
6	72	147	64	131	11	82	168	54	110	34	73	149	48	98						
7	76	156	60	123	21	87	179	47	96	46	72	148	40	82						
8	57	118	48	100	16	81	168	58	120	28	71	147	50	104						
9	66	134	54	110	18	137	279	40	81	71	102	208	32	65						
10	63	127	57	115	10	74	149	41	82	45	71	143	39	78						
11	84	166	60	119	29	113	223	38	75	66	109	215	36	71						
12	72	141	51	100	29	105	206	33	65	69	93	182	24	47						
13	80	162	60	122	25	79	160	45	91	43	73	148	45	91						
14	80	156	57	111	29	82	160	40	78	51	76	148	38	74						
15	68	132	60	117	12	109	212	49	95	55	105	204	43	84						
16	68	132	54	105	21	97	189	43	84	56	79	153	41	80						
17	68	132	54	104	21	86	166	31	60	64	82	159	31	60						
18	76	145	36	69	17	63	120	42	80	33	60	115	41	78						
19	72	141	53	103	26	94	183	39	76	59	82	160	34	66						
20	80	163	60	122	25	87	177	51	104	41	76	155	35	71						
21	72	146	54	109	25	81	164	38	77	53	68	138	33	67						
22	84	171	60	122	29	76	155	50	102	34	65	132	41	83						
23	80	161	66	133	18	83	167	45	91	46	60	121	32	65						
24	72	144	57	114	21	129	258	42	84	67	121	242	39	78						
25	80	157	63	123	21	62	122	31	61	50	57	112	31	61						
26	72	142	57	113	21	90	178	38	75	58	69	136	26	51						
27	72	148	54	111	25	73	150	23	47	69	62	127	20	41						
28	68	136	62	124	9	68	136	30	60	56	57	114	29	58						
29	76	156	48	98	37	111	228	36	74	68	96	197	31	64						
30	63	129	51	105	19	83	170	45	92	46	63	129	31	64						
31																				
TOTAL		4288		3284			5260		2456			4571		2151						
ARITH. MEAN	72	143	55	109	22	89	175	42	82	51	77	152	36	72						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

D-4.5
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MONTH April 19 70 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F # 1	Produced cu. ft. X 100	Wasted cu. ft.	
1	1326	21	5.9	7.3	71											85	22	0	Note — include gallons
2	1768	38	5.6	10.4	69											85	27	0	of sludge to beds
3	1326	22	5.9	7.4	73											87	25	0	Transfered 39780 gals.
4	1768	21	5.9	5.5	70											87	20	0	from #1 to #2 during
5	1768	20	5.8	5.3	72											88	25	0	month. Averaged 1.2%
6	1326	22	5.8	7.3	74											88	24	0	dry solids and 42.0%
7																91	23	0	volatile.
8	2210	37	5.7	7.9	70	9724		.42	66	2800	360					92	36	0	
9	2210	37	5.8	8.0	69											93	35	0	Filled bed # S-1 on
10	1326	19		6.9	70											94	33	0	April 22. 7960 gals.
11	1326	16	5.7	5.7	71											96	30	0	averaged 8.9% dry
12	2210	32	5.8	6.9	69											96	23	0	solids and 45.5%
13																96	20	0	volatile.
14	1768	25	5.6	6.5	73											97	30	0	
15																97	12	0	Filled bed # 2-2
16	1326	29	5.7	10.2	70	14144										96	52	0	on April 22. 7960
17	2210	40	5.7	9.0	66												31	0	gals. Averaged 11.7%
18	1326	12		4.9	62											95	4	0	dry solids and
19	1768	29	5.7	7.9	69											91	51	0	48.4% volatile
20	1326	18	5.8	5.9	76											95	37	0	
21	1326	17	5.9	5.7	76											97	38	0	
22																98	4	0	
23	1326	15		5.5	68											97	40	0	
24	2210	30	5.7	6.0	74											98	30	0	
25	1326	18	5.8	6.2	70											98	32	0	
26	1326	20	5.7	7.1	72											100	35	0	
27	2210	30	6.1	6.3	70											102	31	0	
28	1326	20	5.9	7.2	69												40	0	
29																	33	0	
30	2210	28	5.8	5.5	75											100	33	0	
31																			
ARITH MEAN	1662	24	5.8	6.9	71	11934		.42	66	2800	360					94	29	0	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH May 19 70 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/~~xx~~	lbs.	KWH	*						
1		76	38	CL	53	2.42	3.00	1.80	7.5	1740	114	240	7						Gas - cu. ft. X 100
2		48	30	CL	51	2.35	2.90	1.80	7.4	1540	100	280	11						
3		66	43	CL	52	2.28	2.80	1.70	7.5	1510	98	240	5						
4		70	36	C	52	2.41	3.10	1.60	7.5	1550	113	280	6						
5		60	28	CL	52	2.32	2.90	1.70	7.5	1620	114	280	4						
6		56	32	C	52	2.30	2.80	1.60	7.4	1620	110	280	6						
7		70	46	C	52	2.28	2.80	1.50	7.5	1590	112	280	5						
8		82	60	C	53	2.33	2.90	1.70	7.4	1570	108	280	3						
9		82	60	C	54	2.25	2.90	1.70		1560	120	240	3						
10		76	52	CL	53	2.23	2.70	1.60		1570	105	240	2						
11	.03	78	52	R	53	2.30	2.80	1.60	7.5	1510	110	240	2						
12	1.79	74	58	R	54	2.56	4.20	1.70	7.5	1520	100	280	2						
13	.04	68	44	R	54	2.46	3.00	1.70	7.5	1530	125	320	3						
14	1.33	58	46	R	53	2.71	4.20	2.20	7.4	1500	122	320	3						
15	.41	78	46	R	53	2.72	3.20	2.20	7.4	1640	119	280	4						
16	.02	60	44	R	53	2.59	3.20	2.20	7.6	1500	111	280	2						
17		64	36	CL	52	2.53	3.00	2.20	7.5	1500	113	280	2						
18		76	54	C	53	2.63	3.20	2.10	7.4	1450	116	280	2						
19		82	58	C	53	2.62	3.10	2.10	7.6	1470	120	280	3						
20		84	54	C	53	2.57	3.00	2.10	7.5	1450	121	280	2						
21		86	62	C	54	2.57	3.00	2.00	7.6	1510	114	280	2						
22	1.25	86	58	R	54	2.67	3.40	2.10	7.4	1610	117	320	2						
23	.34	70	58	R	55	2.62	3.20	1.80	7.5	1580	122	320	2						
24	.01	80	60	R	54	2.61	3.20	1.80	7.6	1650	121	280	1						
25	.26	78	52	R	54	2.72	3.40	1.20	7.5	1530	118	320	2						
26		58	46	C	54	2.58	3.20	2.20	7.6	1720	123	240	2						
27		68	52	C	54	2.52	3.00	2.10	7.7	1630	112	280	2						
28		76	52	C	54	2.45	3.00	2.10	7.5	1620	113	240	2						
29	.03	86	64	R	54	2.53	3.00	2.00	7.5	1650	113	240	2						
30	.12	82	66	R	54	2.42	2.90	1.90	7.5	1560	108	280	1						
31	.01	77	64	R	54	2.50	2.90	2.00	7.6	1700	106	240	2						
TOTAL	5.64										3518	8520	97						
ARITH. MEAN						2.49				1571	113								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH May 19__ PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	69	139	63	127	9	88	178	42	85	52	82	165	40	81						
2	76	149	63	123	17	61	120	31	61	49	58	114	31	61						
3	96	183	80	152	17	89	169	34	65	62	78	148	26	49						
4	84	169	72	145	14	81	163	30	60	63	61	123	25	50						
5	80	155	80	155	0	89	172	37	72	58	84	163	34	66						
6	88	169	84	161	5	70	134	51	98	27	65	125	50	96						
7	90	171	60	114	33	83	158	40	76	52	75	143	34	65						
8	88	171	68	132	23	79	153	36	70	54	75	146	35	68						
9																				
10	80	149	72	134	10	84	156	32	60	62	75	140	26	48						
11	92	176	80	153	13	117	224	41	79	65	105	201	37	71						
12	80	171	72	154	10	130	278	44	94	66	104	222	35	75						
13	80	164	68	140	15	127	261	37	76	71	113	232	35	72						
14	76	172	57	129	25	78	176	33	75	58	63	142	30	68						
15	72	163	60	136	17	79	179	42	95	47	71	161	36	82						
16	68	147	54	117	21	66	143	36	78	46	61	132	35	76						
17	72	152	61	129	15	62	131	33	70	47	57	120	29	61						
18	80	175	60	132	25	102	224	41	90	60	80	175	28	61						
19	76	166	63	138	17	88	192	34	74	61	79	173	32	70						
20	80	171	60	129	25	80	171	31	66	61	77	165	31	66						
21	76	163	54	116	29	79	169	30	64	62	74	159	25	54						
22	60	134	48	107	20	99	220	32	71	68	85	189	29	65						
23	66	144	60	131	9	63	138	39	85	38	54	118	33	72						
24	51	111	51	111	0	72	157	24	52	67	60	131	21	46						
25	60	136	57	129	5	74	168	47	107	37	55	125	29	66						
26	60	129	51	110	15	80	172	32	69	60	65	140	22	47						
27	57	120	57	120	0	85	179	27	57	68	77	162	22	46						
28	68	139	57	116	16	64	131	31	63	52	60	123	31	63						
29	63	133	56	118	11	48	101	22	46	54	47	99	22	46						
30	60	121	57	115	5	48	97	22	44	54	44	89	21	42						
31	54	113	54	113	0	63	131	29	60	54	60	125	25	52						
TOTAL		4555		3886			5045		2162			4450		1885						
ARITH. MEAN	73	152	63	130	14	81	168	35	72	56	71	148	30	63						

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MICHIGAN DEPARTMENT OF PUBL... HEA...

MONTH May 1970

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant					sludge near bottom				Temp.	Gas		Remarks
	Gals.	Lbs. Per 1000 c.f. Digester	pH	Total Solids %	Vol. Solids %	Gals.	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	pH	°F #1	Produced cu. ft. X100	Wasted cu. ft.	
1	1326	21	5.8	7.5	71												31	0	Note — include gallons of sludge to beds
2	1326	20	5.7	6.8	72												33	0	
3	1326	14	5.7	4.7	73											96	26	0	
4	2652	35	5.8	6.0	73											97	30	*21	* estimated
5	3094	49	5.8	7.3	71											95	30	*30	
6	1768	29	5.7	7.0	76	12376		.30	67	1720	660					92	45	12	Transfered 41[illegible] gal
7	2210	34		7.1	71											95	31	0	from #1 to #2 [illegible]ing
8	1326	25	5.8	8.4	73											97	26	0	month. Average [illegible].0%
9	1326	15	5.7	5.1	74											98	29	0	dry solids and [illegible].1%
10	1326	22	5.7	7.5	74											99	32	0	volatile.
11																100	20	0	
12	3094	42	5.9	6.3	72											101	26	0	
13	1768	30	5.8	7.6	75											100	30	*24	
14	1768	22	5.9	5.9	70	17338		.24	62	1060	280					98	44	15	
15	2210	33	5.8	7.0	71												33	0	
16	1768	24	5.9	6.5	70											95	32	0	
17	884	12	6.0	6.1	71											96	30	0	
18																98	30	*20	
19	884	22	5.5	11.0	76												31	0	
20	1768	30	5.7	8.3	67												30	*7	
21	1326	20	5.7	7.3	69											98	30	*21	
22																98	30	*30	
23	1326	17	5.9	6.4	68											96	30	*30	
24	1768	35	5.7	10.1	65											94	30	*30	
25																92	30	*8	
26	1768	26	5.8	7.4	66	12376		.24	61	1240	300					94	32	0	
27	1326	20	5.9	7.2	68											98	30	0	
28	884	18	5.5	10.0	65												30	0	
29																	30	0	
30	1768	28	5.7	7.5	69											94	30	0	
31	1326	19	5.8	7.3	66											96	30	0	
ARITH. MEAN	1666	25	5.8	7.3	71	13997		.26	63	1340	413					96	31	8	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH June 1970 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED	REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH						
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		~~XXX~~	lbs.	KWH	*		
1	.94	78	64	R	55	2.73	4.10	2.10		1810	114	240	2		* Gas - cu. ft. X 100
2	.15	72	48	R	55	2.63	3.20	2.00	7.6	1550	117	240	1		
3		64	42	CL	54	2.54	3.00	2.10	7.6	1640	115	280	2		
4		74	54	C	54	2.50	3.00	2.00	7.6	1620	114	320	2		
5		82	48	C	54	2.53	3.10	2.10	7.6	1680	123	240	2		
6		78	52	C	54	2.47	3.00	2.00	7.5	1590	112	240	2		
7		83	57	C	54	2.42	2.90	2.00	7.6	1670	116	280	3		
8		86	60	C	55	2.58	3.20	2.00	7.6	1780	114	240	3		
9		88	62	C	56	2.55	3.10	1.90	7.6	1670	117	280	3		
10		88	62	C	56	2.61	3.20	2.00	7.7	1610	114	280	3		
11	.03	90	64	R	56	2.65	3.20	2.00	7.6	1650	115	280	3		
12		92	60	CL	56	2.59	3.20	2.10	7.5	1650	120	280	4		
13		80	58	CL	56	2.46	3.00	2.10	7.6	1610	104	240	4		
14	1.31	91	59	R	56	2.60	4.20	2.00	7.6	1730	107	280	3		
15		86	66	C	57	2.65	3.30	2.00	7.6	1540	116	240	3		
16		88	72	CL	57	2.64	3.20	2.00	7.7	1640	154	240	3		
17	.09	92	66	R	57	2.62	3.30	2.20	7.6	1600	110	280	3		
18		78	54	C	57	2.54	3.00	2.00	7.6	1620	112	240	3		
19		66	44	C	57	2.43	2.90	1.90	7.7	1840	113	280	4		
20	.49	74	52	R	56	2.42	3.00	1.80	7.6	1610	119	240	4		
21		72	44	C	55	2.38	2.80	1.80	7.8	1640	120	280	2		
22		80	54	C	57	2.52	3.20	2.00	7.7	1570	114	240	2		
23		84	58	C	56	2.47	2.90	1.90	7.6	1630	115	240	4		
24	.01	82	46	R	56	2.51	3.30	1.80		1640	114	280	4		
25	.04	82	54	R	56	2.48	3.20	1.80	7.6	1610	118	280	4		
26	.38	64	44	R	56	2.48	3.20	1.80		1600	117	280	5		
27	.12	78	48	R	56	2.37	3.00	1.80	7.6	1570	122	280	4		
28		82	56	C	56	2.35	3.00	1.80	7.7	1650	115	240	4		
29		92	72	C	57	2.55	3.40	2.10	7.7	1570	110	240	4		
30		94	70	C	58	2.60	3.30	2.00	7.6	1640	113	280	3		
31															
TOTAL	3.56										3484	7880	93		
ARITH. MEAN						2.53				1641	116				

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH June 19 70 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1																				
2	64	140	54	118	16	74	162	30	66	59	65	143	27	59						
3	72	152	54	114	25	74	157	31	66	58	70	148	30	64						
4	64	133	56	117	13	74	154	32	67	57	66	138	28	58						
5	76	160	57	120	25	69	146	36	76	48	64	135	35	74						
6	84	173	64	132	24	63	130	36	74	43	63	130	36	74						
7	56	113	56	113	0	54	109	28	57	48	47	95	25	50						
8	96	207	60	129	37	90	194	42	90	53	71	153	35	75						
9	68	145	51	108	25	81	172	38	81	53	65	138	35	74						
10	60	131	51	111	15	63	137	22	48	65	59	126	20	74						
11	69	152	51	113	26	74	164	39	86	47	69	152	38	84						
12	60	130	57	123	5	77	166	43	93	44	71	153	41	89						
13	69	142	60	123	13	55	113	39	80	29	50	103	39	80						
14	60	130	45	98	25	83	180	34	74	59	74	160	28	61						
15	64	141	59	130	8	83	183	41	91	51	66	146	36	80						
16	68	150	45	99	34	86	189	24	53	72	79	174	20	44						
17	64	140	45	98	30	77	168	26	57	66	71	155	24	52						
18	66	140	60	127	9	59	125	34	72	42	50	106	29	61						
19	54	109	51	103	6	87	176	27	55	69	84	170	27	55						
20	57	115	48	97	16	56	113	30	61	46	53	107	29	59						
21	66	131	51	101	23	88	175	34	67	61	80	159	29	58						
22	80	168	57	120	29	70	147	30	63	57	63	132	29	61						
23	68	140	60	124	12	110	227	38	78	65	97	200	64	64						
24	68	142	63	132	7	117	245	51	107	56	101	211	50	94						
25	66	136	51	105	23	127	263	44	91	65	107	221	38	79						
26																				
27	76	150	60	119	21	82	162	30	59	63	77	152	29	57						
28	64	125	54	106	13	87	171	37	73	58	72	141	30	59						
29	88	187	54	115	39	179	381	43	91	76	172	366	42	89						
30	72	156	54	117	25	116	251	43	93	63	100	217	32	69						
31																				
TOTAL		4038		3218			4960		2069			4431		1867						
ARITH. MEAN	68	144	55	115	19	84	177	35	74	57	75	158	32	67						

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH June 1970 — DIGESTER AND SLUDGE DATA — OPERATOR Robert J. Swalwell

Date	Raw Sludge					Supernatant						sludge near bottom				Temp	Gas		Remarks
	Gals	Lbs Per 1000 c f Digester	pH	Total Solids %	Vol Solids %	Gals.	pH	Total Solids %	Vol Solids %	Susp Solids Mg/l	5-Day B O D Mg/l	Total Solids %	Vol Solids %	Vol Acids Mg/l	pH	°F #1	Produced cu ft	Wasted cu ft	
1																97	*	*	Note — include gallons
2	1326	24		8.8	67											100			of sludge to beds
3	1326	25	5.7	9.5	67											98			
4	884	19	5.5	11.7	60											95			* Gas meters out of
5	1768	32	5.7	8.7	69	12376		.27		1540	380					94			service during month.
6	1326	24	5.7	8.4	70											92			Gas production
7	1326	20	5.7	6.8	73											91			estimated at 3000 cu.
8																			ft. per day.
9	1768	28	5.7	7.5	69											94			
10	1326	20		6.9	71											96			Transfered 40222 gals.
11	1768	29	5.8	7.5	72											98			from #1 digester to
12	1326	21	5.8	7.8	68	11934										99			#2 during month.
13	1326	24		9.2	66											96			Averaged 1.3% dry
14	1326	17	5.7	6.3	68														solids and 65.2%
15																93			volatile.
16	1768	23	5.9	6.2	70											93			
17	1768	32	5.9	8.5	69											91			
18	1326	23	5.7	8.5	67											95			
19	1768	22	5.8	6.3	64											94			
20	1326	22	5.7	7.6	71											92			
21	1768	24	5.7	6.4	69											91			
22																90			
23	1768	27	5.7	7.4	68											95			
24						15912		.23	61	900	200					95			
25	1768	34	5.7	9.5	67											94			
26	1768	32	5.8	8.6	69											100			
27	1326	25	5.7	8.8	69											98			
28	1326	22	5.7	7.5	73											96			
29																93			
30	1326	21	5.6	7.7	69											94			
31																			
ARITH MEAN	1492	26	5.7	8.0	69	13407		.25	61	1220	290					95			
STAT MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH July 19 70 — MISCELLANEOUS DATA — OPERATOR R. F. Sowell

DATE	WEATHER				RAW SEWAGE					GRIT Water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf~~m~~	lbs.	KWH	~~#~~						
1		96	72	C	57	2.53	3.10	2.00	7.6	1700	114	240	6						* Water Meter
2	.75	92	66	R	57	2.57	4.10	2.00	7.6	1500	112	240	4						N.T Working
3	.10	88	58	R	58	2.51	3.00	1.80	7.5	1650	74	240	5						
4	.02	66	54	R	56	2.28	2.80	1.80	7.6	1550	108	240	5						** Gain - Sw. Ft. 1/2
5		86	49	C	56	2.33	2.70	1.75	7.6	1690	115	240	1						
6		86	58	C	58	2.47	3.40	1.80	7.7	1660	112	240	1						
7	.35	86	62	R	57	2.45	3.00	1.70	7.7	1580	111	240	1						
8	.17	76	58	R	58	2.45	3.20	2.00		1610	112	240	1						
9	.02	80	60	R	58	2.40	3.00	2.00	7.5	1590	121	240	1						
10	.15	72	62	R	57	2.46	3.00	1.80	7.6	1670	106	230	1						
11		88	60	C	58	2.38	3.00	1.90	7.6	1600	112	240	2						
12		92	63	C	57	2.31	3.00	2.00	7.6	1630	107	240	2						
13		92	70	C	58	2.52	3.40	1.90	7.5	1850	119	240	2						
14	.53	88	72	R	59	2.47	4.00	2.00	7.6	1660	114	230	2						
15		82	58	C	57	2.43	3.10	1.90	7.5	1660	106	240	3						
16		82	58	C	57	2.40	3.00	1.80	7.7	1600	112	230	2						
17		86	64	C	57	2.40	3.00	1.80	7.6	1630	114	240	3						
18	.51	88	62	R	57	2.37	3.30	1.80	7.5	1640	111	240	2						
19	1.07	74	52	R	57	2.47	3.20	1.80		1600	111	238	5						
20	.01	72	44	R	58	2.43	3.10	1.80	7.6	1790	107	240	5						
21		82	48	C	57	2.37	3.00	1.90	7.5	1650	105	240	5						
22		82	54	C	58	2.37	3.00	1.90	7.6	1700	117	240	5						
23	.35	72	62	R	57	2.41	3.40	2.00	7.6	1710	112	240	5						
24	.01	82	64	R	57	2.52	3.10	2.00	7.6	1520	107	240	4						
25		92	64	C	58	2.47	3.10	2.00	7.5	1720	101	240	5						
26		92	66	CL	59	2.43	3.10	1.70	7.6	1720	114	240	5						
27		90	70	C	57	2.52	3.00	2.00	7.6	~~#~~	107	240	5						
28	1.39	92	68	R	61	2.63	3.00	2.40	7.6	~~#~~	114	240	5						
29	.23	90	70	R	60	2.74	3.80	2.10	7.5	1720	102	240	4						
30		88	68	R	60	2.60	3.00	2.10	7.6	1740	100	240	4						
31	.15	90	68	R	60	2.61	3.10	2.00	7.6	1720	107	240	5						
TOTAL	6.77										3433	7390	106						
ARITH. MEAN						2.47				1611	111								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH July 1972 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swihart

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X	Mg/l	LBS. X	%	Mg/l	LBS. X	Mg/l	LBS. X	%	Mg/l	LBS. X	Mg/l	LBS. X	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	66	139	57	120	14	106	224	41	87	61	95	200	39	82						Missing B.O.D.'s due to excessive lack of oxygen in dilution water.
2	72	154	63	135	13	107	227	39	84	64	102	217	34	73						
3	68	142	60	126	12	124	260	29	61	77	113	237	26	54						
4	69	131	63	120	9	96	183	47	89	51	81	165	46	87						
5	60	117	51	99	15	61	119	24	47	61	57	111	22	43						
6	88	181	68	140	23	107	220	34	70	59	101	209	30	62						
7	60	123	60	123	0	90	184	51	104	43	79	161	43	88						
8	68	139	60	123	13	96	196	32	65	67	86	176	28	57						
9	76	152	64	128	16	81	164	66	132	19	67	134	54	103						
10	72	148	60	124	17	93	191	27	55	71	87	183	27	55						
11	72	143	60	119	17	81	161	24	48	64	74	147	26	52						
12	62	123	57	101	18	85	168	32	63	62	79	154	26	51						
13	92	193	60	126	32	119	248	36	76	70	106	223	32	67						
14						87	181	33	69	62	71	147	30	62						
15						81	164	30	61	63	71	144	26	53						
16						97	194	39	78	60	85	170	35	70						
17						97	194	33	76	61	91	182	34	69						
18						67	132	21	42	69	63	125	20	40						
19																				
20						99	201	36	73	64	94	191	34	69						
21	78	155	72	143	8	75	149	34	68	55	69	138	32	64						
22	72	142	69	134	6	73	144	41	81	44	63	125	34	67						
23	80	164	64	131	20	73	150	35	72	52	62	127	30	62						
24	65	143	60	126	12	93	190	36	76	61	86	181	34	71						
25	80	160	64	132	20	78	161	31	64	60	74	152	31	64						
26	63	133	56	114	13	68	138	54	79	43	53	111	27	55						
27						86	181	38	80	56	83	174	34	71						
28						113	243	56	123	50	83	176	41	90						
29						72	160	33	67	47	66	151	30	58						
30						113	250	37	86	66	105	232	28	64						
31						99	221	32	72	69	96	210	27	60						
TOTAL		2764		2365			5613		2277			5057		2069						
ARITH. MEAN	72	177	61	124	15	91	181	37	76	58	82	161	33	67						

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MICHIGAN DEPARTMENT OF PUBLIC HEALTH

OPERATION REPORT of SEWAGE TREATMENT PLANT FOR Marshall, MICHIGAN

MONTH July 1970 DIGESTER AND SLUDGE DATA OPERATOR R. J. Sealwell

Date	Raw Sludge Gals.	Raw Sludge Lbs. Per 1000 c.f. Digester	Raw Sludge pH	Raw Sludge Total Solids %	Raw Sludge Vol. Solids %	Supernatant Gals.	Supernatant pH	Supernatant Total Solids %	Supernatant Vol. Solids %	Supernatant Susp. Solids Mg/l	Supernatant 5-Day B O D Mg/l	sludge near bottom Total Solids %	sludge near bottom Vol. Solids %	sludge near bottom Vol. Acids Mg/l	pH #1	Temp. °F #1	Gas Produced cu. ft.	Gas Wasted cu. ft.	Remarks
1	1326	20	5.7	7.5	67											92	*	*	Note — include gallons
2	1326	18	5.7	7.2	64											91			of sludge on beds
3				7												90			
4	1768	25	5.7	7.7	68											90			Gas meters still
5	1326	22	5.7	8.2	66											89			out of service.
6																94			Gas production
7	2210	33	5.4	7.5	67														estimated at 300
8	1326	18	5.8	6.6	69											92			cu. ft./day.
9																94			
10	1768	24	5.9	6.5	70	1064		.25	69	1200	360					97			transferred 38454
11	2210	41	5.8	9.1	67											99			gals. from #1
12	2210	35	5.8	7.4	70											99			to #2 during
13																96			month. Averaged
14	1768	34	5.7	9.3	69											96			1.4% dry solids
15	1326	25	5.6	10.5	59											95			and 60.1% volatile
16	1326	23	5.8	8.1	69											94			
17	1326	25	5.7	9.7	65	13260		.25		1120						92			
18	1768	30	5.9	8.4	66											92			
19	1326	26	5.8	10.4	62											99			
20				~~[illegible]~~												100			
21	1326	27	5.7	10.0	63											100			
22	1326	26	5.6	7.0	70											98			
23	1326	18	6.0	6.6	68											96			
24	1326	23	5.8	7.7	69											95			
25	1326	21	6.1	6.5	71											92			
26	1768	26	5.8	6.4	68											91			
27																90			
28	1326	26	5.8	7.3	71											90			
29	1768	26		7.0	70											90			
30	1326	19	5.8	6.8	70	14586		.24	65	860						90			
31	1768	31	5.7	8.2	71											94			
ARITH. MEAN	1556	25	5.8	7.9	67	12818		.25	67	1060	360					94	3000	3000	
STAT. MEAN																			

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
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Marshall, MICHIGAN

MONTH August 19 70

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~Xg~~	lbs.	KWH	*						
1		82	56	C	58	2.57	3.00	2.20	7.5	1730	111	240	6						* Gas - cu. ft. X 100
2	.16	87	64	R	58	2.50	3.00	2.10	7.6	1760	113	240	5						
3		78	48	C	59	2.51	3.10	2.00	7.6	1620	111	280	5						Primary digester taken
4		76	52	C	58	2.42	2.90	1.90	7.6	1880	111	240	5						out of service for
5		80	54	C	58	2.39	2.70	1.70	7.6	1670	111	240	5						cleaning on Aug. 18.
6		82	56	C	58	2.45	3.00	2.10	7.5	1620	114	280	5~~6~~						All gas vented and not
7		86	62	C	58	2.48	3.00	2.00	7.4	1500	130	240	5						metered.
8		84	60	C	58	2.43	3.00	1.80		1580	66	240	5						
9		88	63	C	59	2.42	2.80	1.90	7.6	1530	118	240	5						
10		84	60	C	59	2.50	3.00	2.00	7.5	1570	122	240	5						
11		86	62	C	58	2.44	3.00	2.00		2010	113	280	5						
12		88	58	C	60	2.44	3.00	2.00	7.6	1820	122	240	5						
13	.90	88	60	R	60	2.51	3.90	1.90		1830	122	240	5						
14		86	64	C		2.46	3.10	1.80		1780	117	280	8						
15		90	68	C	59	2.38	3.00	1.90	7.4	1800	115	160	4						
16		82	54	CL	60	2.31	2.80	1.80	7.5	1830	116	280	4						
17		82	56	C	59	2.36	3.00	1.90	7.5	1500	121	160	4						
18	.15	84	64	R	59	2.36	3.00	2.00	7.6	1550	111	160	4						
19	.23	82	66	R	58	2.39	3.00	2.00		1580	110	160	5						
20		80	48	C	58	2.32	3.00	1.90	7.5	1560	107	200	4						
21		78	54	C	58	2.29	2.80	1.80	7.5	1570	120	160	5						
22	.27	68	56	R	59	2.25	2.80	1.70	7.5	1600	95	200	4						
23		76	50	CL	59	2.24	2.70	1.60	7.5	1630	99	160	5						
24		78	56	C	60	2.33	2.90	1.60		1550	114	200	5						
25		84	58	C	60	2.33	3.00	1.60	7.5	1510	119	160	5						
26		86	60	C	60	2.33	3.00	1.60	7.5	1530	93	160	5						
27		86	66	C	60	2.33	2.90	1.90	7.5	1540	120	160	5						
28		88	62	C	60	2.37	2.90	1.80	7.5	1620	111	240	6						
29	.18	76	60	R	59	2.26	3.00	1.90	7.5	1490	114	240	45						
30		90	52	CL	60	2.32	2.90	1.90	7.5	1560	120	240	44						
31		70	40	C	60	2.29	3.00	1.10		1540	120	240	3						
TOTAL	1.89										3486	6800	231						
ARITH. MEAN						2.39				1641	112								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH August 1970 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1						89	191	37	79	58	81	174	33	71						
2						95	198	30	63	68	86	179	27	56						
3						119	249	40	84	66	109	228	36	75						
4	88	178	78	157	11	100	202	35	71	65	93	187	34	69						
5	84	167	72	143	14	88	175	35	70	60	81	161	32	64						
6	81	165	75	153	7	94	192	33	67	65	82	168	30	61						
7	84	174	81	168	4	114	236	41	85	64	105	217	37	77						
8	78	158	75	152	4	66	134	26	53	61	64	130	25	51						
9	104	210	84	170	19	88	178	33	67	63	77	155	27	54						
10	104	217	96	200	8	96	200	40	83	58	84	175	35	73						
11	80	163	72	147	10	96	195	33	67	66	90	183	31	63						
12						111	226	30	61	73	105	214	28	57						
13																				
14	96	197	76	156	21															
15	84	167	72	143	14	72	143	28	56	61	66	131	26	52						
16	76	146	76	146	0	77	148	50	96	35	71	137	40	77						
17	96	189	84	165	13	89	175	43	85	52	74	146	41	81						
18	88	173	80	157	9	109	215	41	81	62	100	197	36	71						
19	84	167	76	151	10	93	185	29	58	69	85	169	27	54						
20	84	163	76	147	10	94	182	37	72	61	83	161	31	60						
21	88	168	88	168	0	73	139	44	84	40	68	130	42	80						
22	72	135	68	127	6	64	120	39	73	39	54	101	28	53						
23	100	187	92	172	8	76	142	34	64	55	70	131	29	54						
24	84	163	60	117	39	119	231	55	107	54	108	210	46	89						
25	80	155	60	117	25	101	196	37	72	63	86	167	31	60						
26	80	155	68	132	15	157	305	47	91	70	139	270	36	70						
27	63	120	52	101	17	134	260	37	72	72	121	235	32	62						
28	66	130	52	103	21	102	202	35	69	66	95	188	31	61						
29	68	128	60	113	12	85	160	45	85	47	80	181	43	83						
30	80	155	64	124	20	88	170	38	74	57	80	155	31	60						
31	77	147	69	132	10															
TOTAL		4277		3761			5349		2089			4850		1838						
ARITH. MEAN	83	165	73	145	13	96	191	38	75	60	91	173	33	66						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw sewage wet well
Process Pattern Raw - pri. - second. - beds

MONTH _____ 19 ____ DIGESTER AND SLUDGE DATA OPERATOR _____

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. 10X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	221	9.4	69	43	5.7	97																		
2																								
3	221	7.9	67	35	5.5	100																		
4	221	6.7	67	30	5.9	97																		
5	133	8.3	68	23	5.8	95																		
6	133	6.1	68	17	6.3	94																		
7						92						1326		.31	63	1840			560					
8	133	5.4	69	15	5.8	91																		
9	133	8.6	61	21	5.8	90																		
10						95																		
11	221	8.1	67	37	5.6	99																		
12						96																		
13	177	5.4	71	21	5.9	96																		
14						92																		
15	133	7.4	68	20	5.8	93																		
16	133	5.6	74	17	5.8	91																		
17	221	11.0	69	51		90																		
18	177	6.1	67	22	5.9																			
19																								
20																								
21	221	3.2	47	10	5.8																			
22	177	7.0	64	24	5.8																			
23	177	7.0	67	25	5.7																			
24	133	7.8	64	20	5.6																			
25	177	7.0	67	25																				
26	133	8.5	59	20	5.5																			
27																								
28	177	9.2	64	31	5.9																			
29	221	5.5	69	25	5.8																			
30	133	62	69	17	5.7																			
31																								
TOTAL	3801											1326												
ARITH. MEAN	173	7.2	66	25		95						1326		.31	63	1840			560					

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH September 19 70

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~XX~~	lbs.	KWH	*						
1		74	48	C	59	2.22	2.80	1.80	7.5	1570	120	240	3						
2	.09	84	58	R	59	2.24	2.80	1.90	7.5	1550	113	240	3						* Gas - cu. ft. X 100
3	.25	80	62	R	60	2.32	2.80	1.90	7.5	1580	106	240	3						
4		82	58	CL	60	2.32	2.80	1.70	7.5	1540	108	240	3						
5		82	56	C	59	2.23	2.90	1.70	7.4	1670	114	280	3						
6	.06	82	66	R	59	2.19	2.90	1.70	7.5	1600	108	240	3						
7	.06	85	62	R	59	2.25	2.60	1.60	7.5	1620	102	240	3						
8		80	52	CL	61	2.32	2.90	1.80	7.5	1530	111	240	3						
9		78	58	C	59	2.25	2.90	1.30	7.4	1580	110	240	3						
10		68	38	C	60	2.15	3.00	1.80	7.5	1630	111	280	3						
11		68	44	C	58	2.27	2.70	1.70	7.4	1600	105	240	3						
12	.09	76	52	R	59	2.20	3.00	0.80	7.4	1540	115	280	3						
13	.08	54	47	R	59	2.09	2.90	1.80	7.4	1640	92	240	2						
14	.73	58	48	R	60	2.25	2.80	1.80	7.4	1520	104	280	1						
15	.27	84	54	R	59	2.39	3.20	1.90	7.5	1610	105	280	4						
16		70	50	CL	59	2.35	3.10	1.80	7.4	1560	114	240	4						
17	.36	74	56	R	60	2.36	3.00	1.70	7.6	1570	112	280	4						
18		68	48	C	60	2.34	3.00	1.70	7.5	1620	110	240	4						
19		76	52	C	60	2.28	2.90	1.60	7.5	1470	128	280	5						
20		76	62	CL	59	2.30	2.80	1.60	7.4	1570	116	240	4						
21	.10	86	64	R	60	2.45	3.10	1.90	7.4	1500	111	280	4						
22	.18	74	52	R	60	2.40	3.40	1.90	7.5	1570	122	240	4						
23	.02	72	54	R	60	2.32	2.80	1.90	7.5	1620	110	240	4						
24	.23	78	50	R	60	2.33	3.00	1.80	7.5	1570	118	240	5						
25		74	54	CL	60	2.38	3.30	1.80	7.5	1600	116	280	4						
26	.22	72	40	R	60	2.30	3.00	1.70		1530	131	240	4						
27	.03	61	41	R	59	2.22	2.80	1.50	7.5	1540	111	280	4						
28	.01	54	30	R	59	2.30	3.00	1.50	7.6	1500	112	280	5						
29		58	36	CL	58	2.23	2.80	1.50	7.7	1610	109	280	4						
30		58	36	C	59	2.23	2.90	2.10	7.4	1550	100	240	4						
31																			
TOTAL	2.78										3344	7680	107						
ARITH. MEAN						2.28				1572	111								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH September 19 70 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	70	130	62	115	11	71	131	40	74	44	57	106	38	70						
2	90	168	70	131	22	119	222	42	78	65	103	192	32	60						
3	75	145	62	120	13	114	221	55	106	42	103	199	53	103						
4	73	141	64	124	12	105	203	43	83	41	99	192	42	81						
5	76	141	61	113	20	188	350	23	43	88	118	219	18	33						
6	86	157	70	128	19	74	135	34	62	54	66	121	30	55						
7	66	124	54	101	18	69	130	32	60	54	64	120	25	47						
8	80	155	68	132	15	99	192	44	85	56	93	180	39	75						
9	75	141	55	103	27	78	146	33	62	58	71	133	29	54						
10	63	113	53	95	16	82	147	30	54	63	77	138	28	50						
11	68	129	51	97	25	78	148	35	66	55	68	129	31	59						
12	74	136	50	92	32	104	191	33	61	68	85	156	33	61						
13	94	164	50	87	47	111	193	27	47	76	100	174	23	40						
14	86	161	68	128	21	92	173	48	90	48	84	158	46	86						
15	75	149	55	110	27	84	167	35	70	58	78	155	33	66						
16	69	135	54	106	22	90	176	36	71	60	81	159	32	63						
17	74	146	67	132	9	129	254	54	106	58	119	234	46	91						
18	52	102	42	82	19	80	156	33	64	59	71	139	31	61						
19	70	133	59	112	16	71	135	42	80	41	62	118	37	70						
20	86	165	56	107	35	96	184	37	71	72	84	161	27	52						
21	76	155	60	122	21	111	226	36	73	68	84	171	22	45						
22	117	234	58	116	50	189	378	44	88	77	161	322	36	72						
23	72	139	64	124	11	76	147	50	97	34	64	124	44	85						
24	80	155	64	124	20	104	202	46	89	56	90	175	38	74						
25	60	119	60	119	0	89	177	41	81	54	79	157	36	71						
26	87	167	60	115	31	120	230	34	65	72	116	222	34	65						
27																				
28	72	138	57	109	21	101	194	40	77	60	82	157	31	59						
29	78	145	48	89	39	75	140	34	63	55	64	119	32	60						
30	84	156	59	110	30	103	192	35	65	66	86	160	35	65						
31																				
TOTAL		4243		3243			5540		2131			4790		1873						
ARITH. MEAN	77	146	59	112	22	100	191	38	73	59	87	165	34	65						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw Wastewater Wet Well
Process Pattern raw - pri. dig. - sec. dig. - bed

MONTH September 19 70

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	221	4.7	47	15	5.9		Primary digester out of service.																	
2																								
3	133	11.0	58	26	5.8		Gas production estimated at 3000 cu. ft./day										2							
4	133	6.3	65	17	6.0																			
5	133	9.2	59	22	5.9																			
6	133	7.8	67	21																				
7																								
8																								
9	221	6.3	67	28	5.8																			
10	221	6.3	93	39	5.8																			
11	133	6.6	70	19	5.8																			
12	133	8.0	66	21	5.8																			
13	133	7.1	72	21	5.7																			
14																								
15	133	7.2	73	21	5.8																			
16	133	8.6	67	23	5.8																			
17	133	7.6	63	19	5.8																			
18	133	10.0	65	31	5.8																			
19	221	5.9	70	28	5.8																			
20	133	7.0	71	20																				
21																								
22	133	7.2	70	20	5.3																			
23	133	10.5	60	25	5.5																			
24	221	6.0	71	28	5.6																			
25																								
26	265	3.4	73	20	5.6																			
27	133	10.8	66	29																				
28																								
29	133	6.9	71	20	5.9																			
30																								
31																								
TOTAL	3492																							
ARITH. MEAN	159	7.5	67	23																				

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH October 19 70 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~cooling~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED	REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD									
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/~~cc~~	lbs.	KWH	*		
1	.02	62	40	R	57	2.21	2.70	1.80	7.5	1590	140	240	8		* Gas - cu. ft. X 100
2		70	44	C	58	2.24	2.70	1.70	7.4	1570	105	160	8		
3		50	32	CL	58	2.13	2.70	1.70	7.4	1620	92	200	8		
4		59	37	CL	57	2.14	2.60	1.60	7.5	1650	95	160	10		Primary Digester back
5		68	50	CL	59	2.22	2.70	1.70	7.6	1560	106	240	7		in service Oct. 8.
6		76	52	C	59	2.19	2.80	1.70		1610	107	240	7		
7		76	56	C	59	2.21	2.80	1.70	7.5	1560	105	240	8		
8	.09	74	60	R	59	2.21	2.70	1.80	7.5	1570	108	240	8		
9	1.70	68	42	R	59	2.43	4.00	2.00		1620	111	240	7		
10		52	32	C	58	2.28	2.80	1.70	7.5	1610	96	280	7		
11		61	39	CL	57	2.22	2.70	1.60	7.5	1610	97	200	6		
12	.07	62	52	R	58	2.24	2.90	1.50	7.4	1600	108	280	9		
13	1.52	68	56	R	59	2.37	3.00	1.70	7.5	1610	109	240	10		
14	.30	60	34	R	60	2.42	3.20	1.50	7.5	1560	107	280	10		
15		50	26	CL	58	2.34	3.00	1.70	7.5	1550	111	280	7		
16		50	28	C	57	2.30	2.90	1.70	7.4	1610	114	280	50		
17		54	34	C	57	2.24	2.80	1.70	7.5	1590	107	240	13		
18		62	33	C	57	2.23	2.80	1.70	7.5	1600	110	280	20		
19		62	38	CL	58	2.34	3.00	2.00	7.6	1570	115	240	30		
20	.27	54	48	R	57	2.30	2.80	1.70	7.6	1500	110	240	30		
21		58	38	CL	58	2.24	3.20	2.30	7.5	1510	115	240	10		
22		60	40	C	58	2.13	2.70	1.80	7.5	1520	102	240	20		
23		64	42	C	58	2.21	2.60	1.50	7.5	1580	106	240	14		
24		64	46	C	57	2.19	2.70	1.50	7.4	1560	95	280	13		
25		62	42	C		2.20	2.70	1.60	7.5	1610	94	240	25		
26		60	48	C	58	2.20	2.80	1.70	7.6	1650	105	280	30		
27	.15	70	52	R	58	2.20	2.80	1.60	7.6	1520	112	240	50		
28	.51	62	50	R	58	2.24	2.70	1.80	7.6	1560	116	240	39		
29	.07	56	32	R	58	2.19	2.70	1.70	7.4	1470	114	280	50		
30		60	36	CL	57	2.19	2.70	1.70	7.5	1450	112	240	45		
31		52	28	CL	57	2.16	2.60	1.60	7.5	1670	101	280	58		
TOTAL	4.70										3326	7600	617		
ARITH. MEAN						2.24				1576	107				

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH October 19 70 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	84	155	72	133	14	81	149	58	107	28	75	138	46	85	5.4	100	5.4	100	0.0	
2	60	112	48	90	20	82	153	35	65	57	77	144	37	69	4.2	78	4.0	75	3.8	
3	72	128	62	110	14	73	130	38	68	48	69	123	36	64						
4	80	143	56	100	30	91	162	38	68	58	80	143	30	54						
5	76	141	64	118	16	101	187	55	102	46	82	152	39	72	5.6	104	4.6	85	18.0	
6						82	150	32	58	61	77	141	31	57	4.8	88	4.2	77	13.0	
7	78	144	57	105	27	105	194	35	65	67	103	190	35	65	5.6	103	4.2	77	25.0	
8	100	184	58	107	42	82	151	34	63	59	81	149	34	63						
9																				
10	60	114	42	80	30	110	209	34	65	69	92	175	32	61						
11	102	189	66	122	35	87	161	34	61	61	77	143	28	52						
12	96	179	48	90	50	98	183	66	123	33	89	166	63	118						
13	78	154	72	142	8	86	170	38	75	56	75	148	33	65						
14	64	129	56	113	13	121	244	41	83	66	109	220	41	83						
15	72	141	57	111	21	112	219	45	88	60	101	197	39	76						
16	78	146	53	99	19	81	151	32	60	61	76	142	30	56						
17	65	125	45	86	31	82	157	38	73	54	73	140	35	67						
18	76	141	64	119	16	78	145	35	65	55	70	130	30	56						
19	88	172	68	133	23	75	146	33	64	56	61	119	26	51						
20	72	138	60	115	17	110	211	36	69	67	102	196	32	61	4.8	92	4.4	84	8.7	
21	72	134	42	78	39	66	123	36	67	45	61	114	33	62						
22	76	135	60	107	21	77	137	41	73	47	69	123	37	66						
23	65	120	55	101	15	76	140	39	72	49	71	131	38	70						
24	56	102	54	99	4	50	91	37	68	26	48	88	34	62						
25	70	128	52	95	26	71	130	34	62	52	56	103	30	55						
26	71	130	57	105	20	98	180	34	62	65	86	158	31	57	5.6	103	5.2	95	7.8	
27	64	117	44	81	31	89	163	27	50	70	87	160	27	50						
28	54	101	48	90	11	80	149	44	82	45	62	116	33	62						
29	72	131	52	95	28	96	175	55	100	43	83	152	44	80						
30	59	108	39	71	34	80	146	42	77	48	55	100	27	49						
31	54	97	42	76	24	64	115	42	76	34	58	104	40	72						
TOTAL		3938		2971			4821		2213			4305		1960		668		593		
ARITH. MEAN	73	136	55	102	23	86	161	40	74	53	77	144	35	65	5.1	95	4.6	85	10.9	

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wastewater wet well
Process Pattern raw - pri. dig.- sec. dig. - beds

MONTH October 1970

DIGESTER AND SLUDGE DATA

OPERATOR

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. 10 X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. 10 X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1																								n
2																								o
3	133	8.4	66	22	5.6																			t
4	133	7.7	73	23	5.7																			
5	221	5.4	69	25	5.6																			m
6	221	5.2	81	28	5.7																			e
7																								t
8	133	7.8	68	21	5.6	62																		e
9	88	10.3	68	19	5.6	68																		r
10	133	7.8	70	22	5.7																			e
11	177	6.8	75	27	5.8																			d
12	221	7.7	72	37	5.6	68																		
13	265	9.6	68	53	5.7	67																		
14	133	7.2	77	22	5.7	70																		
15	177	7.9	69	29	5.6																			
16	88	9.1	69	17	5.6	73																		
17	133	7.4	70	21	5.7	77																		
18	133	7.6	71	22	5.4	77																		
19						76																		
20	265	7.0	69	39	5.7																			
21	265	5.9	71	34	5.8	78	5.9	.34	67															
22	133	5.2	68	14	5.8																			
23	221	7.2	70	34	5.8	78																		
24	133	5.2	76	16	5.8	78																		
25	133	62	71	18	5.7	77																		
26						77																		
27	177	7.7	67	28	5.6	81																		
28	88	9.5	65	17	5.8	84	5.7	.42	72			1238	6.6	.33	63	2050	56	5.8	570					
29	133	9.9	66	26	5.8	88																		
30	177	4.7	68	17	5.9	90																		
31	133	7.6	66	20		92																		
TOTAL	4243											1238												
ARITH. MEAN	163	7.4	70	25		77		.38	70			1238		.33	63	2050	56	5.8	570					

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH November 19 70

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~XXX~~	lbs.	KWH	*						
1	.05	48	32	R	58	2.18	2.70	1.60	7.6	1540	101	240	48						* Gas - cu. ft. X 100
2	.33	42	36	R	58	2.23	2.90	1.70	7.5	1450	114	280	20						
3	.19	46	38	R	57	2.20	2.70	1.80	7.5	1500	109	280	40						
4	.05	44	36	R	57	2.22	2.70	1.70	7.5	1620	109	240	41						
5		48	32	CL	57	2.19	2.80	1.60	7.6	1440	108	280	40						
6		57	34	C		2.23	2.80	1.60	7.5	1530	115	280	34						
7		48	28	C	56	2.16	2.70	1.50	7.5	1550	88	240	50						
8		54	32	C	56	2.15	2.80	1.50	7.5	1500	105	280	19						
9	.44	64	44	R	57	2.24	2.70	1.70	7.6	1490	113	240	39						
10	.02	50	44	R	57	2.18	2.60	1.60	7.5	1510	110	280	43						
11		50	44	CL	57	2.18	2.60	1.60	7.5	1590	109	280	46						
12		50	39	Cl	57	2.18	2.60	1.50	7.5	1530	104	280	48						
13		44	34	Cl	57	2.25	2.60	1.50	7.5	1540	108	240	23						
14		36	24	CL	56	2.22	2.70	1.40	7.5	1570	100	280	20						
15		34	24	C	56	2.18	2.60	1.40	7.5	1540	100	280	26						
16		38	24	C	56	2.28	2.80	1.80	7.5	1430	105	280	54						
17		46	28	C	56	2.21	2.80	1.80	7.6	1360	104	240	44						
18	.02	42	32	R	55	2.22	2.70	1.80	7.5	1350	100	280	47						
19	.50	48	36	R	56	2.28	2.80	1.70	7.6	1280	116	280	30						
20	.11	48	28	R	56	2.28	2.90	1.70	7.5	1440	101	240	12						
21		46	28	cl	55	2.25	2.80	1.70	7.5	1320	107	280	13						
22	.03	47	14	S	55	2.26	2.90	1.60	7.5	1360	99	240	50						
23	.03	22	14	S	55	2.14	3.10	1.70	7.5	1220	103	280	55						
24	.1928		12	S	55	2.09	2.70	1.70	7.6	1370	105	280	51						
25		34	18	CL	55	2.12	2.50	1.60		1490	103	280	50						
26	.19	44	32	R	55	2.03	2.40	1.50	7.5	1500	108	280	20						
27	.66	42	32	R	55	2.24	2.60	1.70	7.6	1350	117	280	18						
28		38	32	CL	55	2.25	3.30	1.70	7.5	1400	120	280	31						
29	.13	49	36	R	55	2.28	2.80	1.80	7.6	1410	112	240	37						
30		52	36	CL	55	2.30	2.70	1.80	7.5	1400	105	280	41						
31																			
TOTAL	2.94										3198	8040	1090						
ARITH. MEAN						2.21				1453	107								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH ~~Dec~~ November 1970 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	84	153	52	95	38	108	196	30	55	72	91	165	25	45						
2	88	164	64	119	27	109	203	34	63	69	80	149	25	47						
3	79	145	48	88	39	100	184	27	50	73	84	154	25	46						
4	76	141	52	96	32	95	176	34	63	64	87	161	29	54						
5	67	122	52	95	22	77	141	40	73	48	65	119	33	60						
6	82	153	47	87	43	93	173	25	47	73	84	156	21	39						
7	66	119	54	97	18	86	155	26	47	70	78	141	22	40						
8	68	122	54	97	21	89	160	44	79	51	78	140	35	63						
9	88	164	57	106	35	123	230	39	73	68	100	187	31	58						
10	80	145	68	124	15	86	156	48	87	44	68	124	36	65						
11	74	135	53	96	28	128	233	52	95	59	119	216	46	84						
12	56	102	56	102	0	96	175	55	100	43	91	165	54	98						
13	57	107	49	92	14	76	143	41	77	46	63	118	37	69						
14	71	131	47	87	34	94	174	27	50	71	88	163	27	50						
15	71	129	45	82	37	70	127	31	56	56	57	104	28	51						
16	82	156	67	127	18	95	181	30	57	68	76	145	23	44						
17	80	147	48	88	40	124	229	40	74	68	75	138	19	35						
18	50	93	30	56	40	83	154	24	44	71	74	137	18	33						
19	67	127	45	86	33	91	173	50	95	45	71	135	33	63						
20	114	217	30	57	74	120	228	30	57	75	100	190	30	57						
21	108	203	52	98	52	142	267	32	60	78	121	227	34	64						
22	84	158	52	98	38	91	172	33	62	64	74	139	26	49						
23	83	148	58	104	30	85	152	36	64	58	74	132	32	57						
24	80	139	60	105	25	82	143	33	58	60	64	112	25	44						
25	88	156	44	78	50	110	194	37	65	66	98	173	33	58						
26	88	149	44	74	50	110	186	37	63	66	98	166	33	56						
27	66	123	49	92	26	124	232	42	78	66	120	224	42	78						
28	82	154	73	137	11	91	171	34	64	63	91	171	34	64						
29	64	122	42	80	34	75	143	24	46	68	72	137	21	40						
30	84	161	58	111	31	89	171	26	50	71	77	148	20	38						
31																				
TOTAL		4285		2354			5422		1952			4636		1649						
ARITH. MEAN	78	143	51	95	32	98	181	35	65	63	84	155	30	55						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wastewater wet well
Process Pattern raw - pri. dig. - sec. dig - beds

MONTH November 1970

DIGESTER AND SLUDGE DATA

OPERATOR Robert Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. 10X	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. 10X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	133	6.5	73	19	5.8	94																		
2	177	8.0	70	30	5.8	95																		
3	221	7.7	69	36	5.9	91																		
4	133	10.2	69	28	5.7	91	5.6	.58	69															
5	133	9.1	65	24	5.6	92																		
6	133	7.2	66	19	5.8	94																		
7	133	7.6	70	22	5.8	91																		
8						94																		
9	221	8.1	64	35		92	5.7	.59	69			1414	7.0	.30	64	1570	58	6.9	780					
10	133	6.8	67	18	5.8	91																		
11	133	10.3	65	27	5.9	93																		
12	177	8.2	63	28	5.8	95																		
13						96																		
14	177	10.3	59	33	5.7	94																		
15	177	9.1	63	31	5.7	92																		
16						90																		
17	133	10.3	61	35	5.5	94	5.4																	
18	177	8.1	59	26	5.9	96																		
19						96	5.4	3.0	62			1017	6.9	.34	63	1630	50	4.3	840					
20	265	9.2	60	44	5.7	94																		
21	133	7.4	62	18	5.7	92																		
22	177	9.3	60	30	5.7	90																		
23						89																		
24	221	8.2	60	33	5.6	93																		
25	133	6.8	60	16	5.7	96																		
26						99																		
27	133	4.5	57	10	5.7	94		2.8	57			1061		.39	57	2140			780					
28	133	8.4	59	20	5.8	92																		
29	133	5.4	69	15	5.9	90																		
30	221	7.6	68	22	5.7	92	5.8																	
31																								
TOTAL	3934											3492						11.2						
ARITH. MEAN	164	8.1	64	26		93		1.7	64			1163		.34	61	1780	54	5.6	800					

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, , MICHIGAN

MONTH December 19 70 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					xxxx water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/xx	lbs.	KWH	*						
1		64	36	cl	55	2.31	2.80	1.80	7.6	1240	106	240	22						* gas - cu. ft. X 100
2		50	30	c	55	2.27	2.80	1.70	7.5	1460	112	280	15						
3	.25	58	30	r	55	2.30	2.80	1.70	7.5	1370	102	280	17						
4		34	28	cl	55	2.32	3.40	1.70	7.5	1440	111	280	44						
5	.01	42	16	s	54	2.25	2.80	1.70	7.4	1560	98	320	44						
6		29	18	cl	55	2.16	2.60	1.70	7.5	1570	101	280	48						
7		32	20	cl	54	2.28	2.80	1.80	7.5	1460	110	320	30						
8		46	26	cl	54	2.25	2.70	1.80	7.5	1460	106	280	54						
9		46	24	c	55	2.23	2.70	1.70	7.5	1460	110	280	20						
10	.84	36	24	r	54	2.28	3.40	1.70	7.5	1510	105	280	20						
11	.07	36	24	r&s	53	2.35	3.00	1.70	7.5	1520	111	320	40						
12	.24	30	26	s	53	2.29	2.70	1.70	7.4	1510	114	280	35						
13		33	17	cl	53	2.19	2.70	1.70	7.5	1490	113	320	30						
14		30	8	cl	54	2.30	2.80	1.60		1480	147	280	23						
15		30	12	cl		2.33	2.90	1.70	7.5	1540	121	320	27						
16	.17	34	28	s	54	2.32	2.70	1.70	7.6	1600	109	280	25						
17		36	20	cl	53	2.27	2.70	1.60	7.5	1590	107	320	30						
18	.01	42	32	r	53	2.32	2.80	1.70	7.4	1610	110	320	30						
19		38	22	cl	53	2.25	2.70	1.60	7.5	1620	103	280	29						
20		27	19	cl	53	2.20	2.60	1.60	7.5	1610	104	320	25						
21	.09	30	20	s	53	2.34	2.90	1.60	7.6	1590	105	280	24						
22	.04	34	22	r&s	53	2.30	2.80	1.80	7.5	1610	112	280	30						
23	.01	36	16	s	53	2.33	2.70	1.70	7.4	1570	106	280	24						
24		22	13	cl	52	2.25	2.80	1.60		1560	109	320	30						
25	.04	26	6	s	52	2.14	2.80	1.70	7.4	1620	90	280	56						
26	.05	30	12	s	52	2.24	2.70	1.30	7.5	1600	116	280	56						
27		26	6	c	52	2.19	2.70	1.60	7.6	1590	100	320	24						
28		30	15	c	52	2.29	2.90	1.80	7.5	1640	106	280	24						
29		24	-2	c	52	2.26	2.90	1.80	7.5	1630	102	280	40						
30		26	2	c	52	2.24	2.80	1.60	7.5	1600	106	320	66						
31		32	8	c	52	2.28	2.70	1.60	7.5	1690	106	280	40						
TOTAL	1.82										3358	293	33						
ARITH. MEAN						2.27				1542	108								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, , MICHIGAN

MONTH December, 19 70 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	
19.27 1	71	137	32	62	55	83	160	26	50	69	74	143	20	39						
18.93 2	78	148	48	91	38	86	163	37	70	57	59	112	24	45						
19.18 3	61	117	52	100	15	78	150	39	75	50	70	134	33	63						
19.35 4	54	104	48	93	11	50	97	22	43	56	41	79	17	33						
18.77 5	53	99	39	73	26	91	171	29	54	68	85	160	28	53						
18.01 6	78	140	40	72	49	95	171	39	70	59	84	151	33	59						
19.02 7	80	152	45	86	49	87	165	32	61	63	65	124	24	46						
18.77 8	92	173	60	113	35	104	195	37	69	65	84	158	31	58						
18.60 9	84	156	55	102	35	75	140	36	67	52	62	115	27	50						
19.02 10	65	124	55	105	15	68	129	29	55	57	55	105	22	42						
19.60 11	69	135	40	78	42	81	159	47	92	42	79	155	45	88						
19.10 12	84	161	52	99	38	100	191	32	61	68	95	181	31	59						
18.26 13	55	100	41	75	26	64	117	32	58	50	56	102	26	47						
19.18 14																				
19.43 15	72	140	48	93	33	86	167	33	64	62	76	148	31	60						
19.35 16	60	116	48	93	25	54	104	22	43	59	44	85	17	33						
18.93 17	59	112	45	85	24	70	133	28	53	60	64	121	28	53						
19.35 18	61	118	42	81	31	81	157	36	70	56	70	135	30	58						
18.77 19	64	120	46	86	28	91	171	25	47	73	78	146	24	45						
18.35 20	61	112	40	73	34	67	123	28	51	58	59	108	22	40						
19.52 21	74	144	50	98	32	86	168	30	59	65	76	148	26	51						
19.18 22	116	222	88	169	24	70	134	34	65	51	60	115	29	56						
19.43 23	78	152	44	85	44	93	181	36	70	61	80	155	31	60						
18.77 24	54	101	37	69	32	64	120	33	62	48	62	116	33	62						
17.85 25	54	96	37	66	32	59	105	26	46	56	57	102	26	46						
18.68 26	88	164	56	105	36	59	110	26	49	56	57	106	26	49						
18.26 27	75	137	46	84	39	64	117	35	64	45	58	106	30	55						
19.10 28	66	126	57	109	14	65	124	34	65	48	60	115	28	53						
18.85 29	84	158	56	106	33	105	198	33	62	69	88	166	22	41						
18.68 30	81	151	54	101	33	127	237	32	60	75	109	204	29	54						
19.02 31	68	129	55	105	19	86	164	26	49	70	78	148	25	48						
TOTAL		4044		2757			4521		1804			3943		1546						
ARITH. MEAN	71	135	49	92	32	80	151	32	60	59	70	131	27	52						

Digester Volume, ft³
Primary *14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, , MICHIGAN

MDPH
D-4.5

Supernatant To raw wastewater wet well
Process Pattern raw-pri. dig.-sec. dig.-beds

MONTH December 19 70

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X 10	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1						94	6.3													1105	10.3	46	7.0	20
2	133	7.5	65	20	5.9			2.3	52															8
3	177	7.8	65	27	5.8	91																		8
4	133	9.2	60	22	5.7	89																		1
5	133	7.6	64	20	5.8	90																		4
6	177	9.7	60	31	5.7	91																		1
7	133	9.3	65	24	5.7	92																		2
8	221	8.8	63	37	5.8	94																		0
9	133	9.0	68	25		92	6.2	2.8	44															16
10	177	9.0	68	33	5.5	91																		10
11	133	8.6	68	24	5.6	90																		14
12	133	9.7	62	24	5.6	93																		7
13	133	9.1	68	25	5.6	95																		23
14	133	6.0	67	16	5.7	95																		0
15	88	9.2	65	16	5.4	92	6.2	1.8	53			1017		.46	63	740	50	4.3	960					12
16	133	8.0	72	23		92																		6
17	133	10.1	63	26	5.6	80																		7
18	133	7.1	69	20	5.6	92																		10
19	177	5.6	82	25	5.7	93																		10
20	133	7.0	72	20	5.6	94																		9
21						93																		0
22	133	8.3	64	21	6.1	92	6.0																	0
23	133	4.9	71	14	6.0	92	6.2																	7
24	133	7.4	68	20	5.8	91	6.2																	0
25						92																		0
26	133	8.5	69	23	5.9	96	6.2	1.9	61			663		.41	62	2420			960					7
27	88	9.5	57	14	5.6	94																		0
28						92																		0
29	133	7.9	66	21	5.9	90	6.4																	0
30	177	9.4	67	34	5.9	92	6.5																	0
31	133	7.8	69	22	5.9	94	6.6																	8
TOTAL	3801											1680								1105				190
ARITH. MEAN	141	8.2	66	23		92		2.2	53			840		.43	62	1580	50		960	1105	10.3	46		6.1

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall , MICHIGAN

MONTH January 19 73 — MISCELLANEOUS DATA — OPERATOR Robert J. swalwell

DATE	WEATHER				RAW SEWAGE					~~XXXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPL'ED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~XX~~	lbs.	KWH	*						
1		28	17	CL	51	2.92	3.40	2.50	7.5	1750	113	320	27						* Gas - cu.ft. X 100
2		28	16	C	52	2.96	3.70	2.40	7.7	1840	130	360	26						
3	.71	40	20	R	51	3.06	3.80	2.60	7.7	1940	122	320	28						
4	T	32	17	S	51	2.93	3.60	2.30	7.7	1710	127	360	26						
5		19	6	CL	51	2.89	3.40	2.40		1860	127	320	22						
6		20	6	C	50	2.82	3.50	2.40	7.6	1850	120	320	20						
7		21	8	C	50	2.71	3.40	2.40	7.5	1800	120	320	24						
8	.01	26	12	S	51	2.84	3.60	2.20	7.7	1820	125	320	26						
9		18	6	CL	52	2.74	3.40	2.20	7.7	1840	116	320	25						
10	.01	14	6	S	50	2.76	3.30	2.20		1830	128	360	27						
11	.01	22	4	S	50	2.70	3.40	2.20	7.5	1790	120	320	24						
12		22	10	CL	50	2.70	3.20	2.10	7.5	1810	126	320	28						
13		34	18	C	51	2.64	3.20	2.10	7.6	1940	110	320	25						
14	.09	32	27	S	51	2.59	3.20	2.10	7.6	1770	114	320	23						
15		34	27	CL	51	2.68	3.20	2.00	7.6	1810	111	360	21						
16		44	32	C	51	2.66	3.20	2.10	7.7	1780	112	280	21						
17	.01	53	41	R	51	2.66	3.20	2.10		1830	79	240	21						
18	.04	58	38	R	51	2.69	3.30	2.10	7.7	1800	117	280	20						
19	T	38	24	S	52	2.66	3.40	2.10	7.6	1840	125	320	19						
20		30	18	C	51	2.59	3.20	2.10	7.6	1910	114	280	15						
21	.22	41	23	R	51	2.58	3.10	2.10	7.6	1800	96	320	15						
22	.24	44	32	R&S	51	2.73	3.20	2.10	7.6	1840	115	320	14						
23	.04	33	22	S	51	2.65	3.10	2.00	7.6	1830	125	320	15						
24		34	22	C	51	2.62	3.10	2.00	7.6	1850	113	320	13						
25		49	27	C	51	2.63	3.10	2.20	7.7	1860	119	320	17						
26		52	26	C	51	2.62	3.20	2.20		2220	116	320	11						
27	.01	48	32	R	51	2.57	3.20	2.20	7.5	1840	112	320	11						
28	T	33	13	S	51	2.56	3.00	2.10		1820	111	320	20						
29		26	14	C		2.65	3.20	2.00	7.6	1830	107	320	19						
30		30	20	C	51	2.61	3.20	2.00	7.6	1840	115	320	20						
31		40	22	CL	51	2.64	3.40	1.80	7.7	1830	128	320	24						
TOTAL	1.39										3613	9880	647						
ARITH. MEAN						2.71				1841	117								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH January 19 73 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1						44	107	27	66	39	33	80	20	49						
2	57	141	51	126	11	89	220	51	126	43	68	168	36	89						
3	48	122	42	107	13	57	145	33	84	42	42	107	24	61						
4	54	132	39	95	28	50	122	31	76	38	39	95	25	61						
5																				
6	66	155	51	120	23	92	216	30	71	67	74	174	20	47						
7	58	131	54	122	7	55	124	31	70	48	43	97	22	50						
8	66	156	51	121	23	85	201	36	85	58	85	201	36	85						
9	62	142	51	117	18	58	133	37	85	36	58	133	37	85						
10																				
11	54	122	54	122	0	89	200	35	79	61	75	169	28	63						
12	79	178	51	115	35	56	126	35	79	38	44	99	30	68						
13	63	139	48	106	24	54	119	24	53	56	40	88	19	42						
14	69	149	45	97	35	78	147	20	43	71	58	125	17	37						
15	60	134	42	94	30	60	134	25	56	58	49	110	21	47						
16	84	186	36	80	57	102	226	28	62	74	88	195	25	55						
17																				
18	52	117	42	94	19	81	182	45	101	45	66	148	35	79						
19	51	113	48	106	6	72	160	53	118	26	54	120	44	98						
20	56	121	39	84	30	86	186	38	82	57	63	136	22	48						
21	48	103	42	90	13	64	138	33	71	48	51	110	26	56						
22	57	130	48	109	16	73	166	34	77	53	56	128	24	55						
23	60	133	39	86	35	87	192	41	91	53	73	161	31	69						
24	56	122	45	98	20	62	135	24	52	61	47	103	18	39						
25	64	140	51	112	20	68	149	36	79	47	55	121	29	64						
26																				
27	63	135	54	116	14	55	118	33	71	40	39	84	24	51						
28	70	149	57	122	19	65	139	34	73	48	48	102	24	51						
29	78	172	64	141	18	76	168	39	86	49	59	130	30	66						
30	63	137	48	104	24	65	142	32	70	51	49	107	26	57						
31	63	139	39	86	38	53	117	30	66	43	40	88	23	51						
TOTAL		3598		2770			4212		2072			3379		1623						
ARITH. MEAN	62	138	47	107	22	69	156	34	77	50	55	125	27	60						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH January 19 73

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1						96																		19
2						97																		7
3	133	12.7	52	27	5.6	94		3.7	69			11492		1.1	62									35
4	221	11.0	56	41		112																		20
5	88	15.2	45	18	5.6	107																		22
6	88	9.8	51	13	6.0	104																		22
7	88	16.7	39	18	5.9	102																		22
8						102																		23
9	133	9.5	55	21	5.9	104																		18
10						97																		18
11	133	11.6	52	24	6.0	98																		17
12	133	10.8	50	22	6.1	96																		18
13	133	11.6	52	24	5.9	95																		18
14	133	9.7	55	22	5.9	96																		17
15						95																		15
16						96																		4
17	133	12.4	58	29	6.0	92																		
18																								26
19	133	9.8	58	23	6.0	90																		3
20	133	9.8	61	24	6.0	92		.6	56			12376		2.6	58									29
21	88	8.4	62	14	6.1	74																		16
22						76																		16
23	133	10.8	58	25	6.2	79																		4
24	133	10.7	57	25	6.3	76																		25
25	88	14.3	56	22	6.3	90																		16
26	221	4.0	96	26		95																		2
27	88	14.1	43	16	6.3	81																		27
28	133	10.1	60	24	6.2	92																		17
29						91																		19
30	133	7.0	59	17	6.3	94																		17
31	133	12.2	52	25		92																		17
TOTAL	2829											23868												464
ARITH. MEAN	129	11.0	56	23		94		2.1	62			11934		1.8	60									17

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH February 1973 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~water~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED	REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH						
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~x~~	lbs.	KWH	*		
1	.10	46	36	R	51	2.68	3.20	3.30	7.6	1820	123	320	29		*Gas - cu. ft. X 100
2	.07	48	29	R	51	2.59	3.00	2.10	7.8	1840	124	280	27		
3		34	27	CL	51	2.42	2.80	2.00	7.7	1870	119	280	27		**Both 1700 gpm pumps
4		46	29	C	50	2.40	2.80	2.00	7.6	1850	113	280	13		kicked their overload
5		36	30	CL	51	2.49	4.20	2.00	7.7	2190	117	320	20		protection about 11:15
6		40	25	CL	51	2.49	3.00	2.00	7.8	1870	112	320	15		pm. Plant bi-passed
7	.17	36	12	S	51	2.63	3.10	2.00	7.7	1890	113	280	15		flow that the 750 gpm
8		22	0	C	51	2.61	3.10	1.90	7.7	1880	107	320	18		pump couldn't handle.
9	T	16	2	S	51	2.60	3.20	2.10	7.7	1880	126	320	10		Approx. 380,000 gals.
10		24	4	C	51	2.54	3.20	2.10	7.7	1890	109	360	6		No reason could be
11		25	4	C	51	2.54	3.00	2.10	7.7	1890	113	320	10		found for the failure.
12		30	12	C	50	2.64	3.30	2.10	7.7	1950	124	320	16		
13	.31	39	15	S	51	2.60	3.10	2.00	7.6	1970	110	280	20		
14	.19	40	20	S	50	2.59	3.00	2.00	7.6	1940	112	320	23		
15	.02	24	-4	S	50	2.57	3.10	2.00	7.8	1870	111	320	27		
16		8	-13	C	50	2.53	3.10	2.00	7.6	1900	115	320	30		
17		22	4	C	50	2.52	3.30	2.00	7.6	1910	102	400	30		
18		34	16	CL	50	2.52	3.00	2.00	7.6	1950	104	320	30		
19	.05	39	30	S	50	2.64	3.20	2.00	7.6	2210	117	360	28		
20	.14	34	14	S	50	2.61	3.20	2.00	7.7	1940	124	280	27		
21	.01	34	14	S	50	2.54	3.00	2.00	7.7	1910	92	320	25		
22	.08	30	18	S	50	**2.15	4.80	0.90		1940	112	320	30		
23		36	14	CL		2.42	3.80	1.90	7.7	1910	120	320	28		
24		36	22	CL	50	2.50	3.20	2.00	7.7	1940	111	280	27		
25	.04	34	18	S	50	2.47	3.00	2.00	7.7	1960	122	320	25		
26		32	4	CL	51	2.58	3.20	2.00	7.7	1880	110	320	24		
27		30	6	C	49	2.61	3.30	1.90	7.6	1940	117	320	24		
28		44	14	C	50	2.53	3.00	2.00	7.6	1940	121	320	12		
29															
30															
31															
TOTAL	1.18										3200	8840	616		
ARITH. MEAN						2.54				1926	114				

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH February 1973 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	62	139	45	101	27	60	134	33	74	45	48	107	25	56						
2	60	130	45	97	25	63	136	38	82	40	53	114	32	69						
3	46	93	38	77	17	63	127	39	79	38	49	99	32	65						
4	51	102	39	78	24	61	122	35	70	43	46	92	23	46						
5	48	100	39	81	19	64	133	30	62	53	49	102	27	56						
6	48	100	36	75	25	58	120	27	56	53	46	96	20	42						
7	60	132	39	86	35	65	143	38	83	42	48	105	29	64						
8	68	148	45	98	34	82	179	36	78	55	66	144	30	65						
9	48	104	39	85	19	63	137	39	85	38	50	108	30	65						
10	60	127	45	95	25	81	172	37	78	54	63	133	28	59						
11	60	127	45	95	25	61	129	34	72	44	44	93	38	59						
12	63	139	51	112	19	67	148	44	97	34	51	112	31	68						
13	61	132	54	117	11	61	132	35	76	43	46	100	30	65						
14	54	117	48	104	11	88	190	34	73	61	71	153	28	60						
15	48	103	45	96	6	46	99	36	77	22	37	79	29	62						
16	54	114	45	95	17	62	131	42	89	32	48	101	32	68						
17	66	139	48	101	27	62	130	34	71	45	45	95	25	53						
18	64	134	48	101	25	61	128	33	69	46	53	111	29	61						
19	60	132	51	112	15	71	156	38	84	46	59	130	32	70						
20	60	131	48	104	20	78	170	28	61	64	68	148	22	48						
21	56	119	48	102	14	62	131	36	76	42	56	119	32	68						
22																				
23	45	91	45	91	0	61	123	35	71	43	51	103	28	57						
24	57	119	51	106	11	67	140	34	71	49	55	115	27	56						
25	60	124	51	105	15	88	181	23	47	74	74	152	20	41						
26						71	153	45	97	37	56	121	32	69						
27	56	122	48	104	14	44	96	37	81	16	37	81	32	70						
28	57	120	54	114	5	44	93	25	53	43	31	65	21	44						
29																				
30																				
31																				
TOTAL		3138		2532			3733		2012			2978		1606						
ARITH. MEAN	57	121	46	97	19	65	138	35	75	45	52	110	28	59						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH February 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X 10	Total Solids %	Vol. Solids %	pH	
1	88	11.0	54	16	6.4	92																		18
2						93		3.5	67											972	9.1	53		2
3	221	8.0	58	31	5.9	90																		23
4	133	4.5	73	13	5.8	90																		10
5	88	10.1	61	16	5.7	86																		12
6	133	9.1	67	25	5.8	86																		24
7	133	8.5	66	23	6.0	104																		
8						88																		27
9	221	9.7	61	40	6.2	95																		3
10	133	7.5	83	25	6.3	91																		25
11	88	9.1	80	19	6.3	90																		18
12						86																		
13	133	9.3	64	24	6.5	86		3.4	67			11050		.36	67	2340			1020					
14	133	9.0	63	23	6.2	82																		9
15	133	11.1	60	27	6.3	82																		18
16	133	11.0	61	27	6.2	84																		13
17	133	8.1	58	19	5.9	83																		
18	133	9.7	64	25	5.9	96																		
19	133	7.6	61	19	5.8	104																		
20	177	7.6	61	25	5.8	95																		26
21	133	6.1	68	17	5.9																			
22	88	13.0	58	20	6.1	83																		30
23						89																		
24	133	12.3	53	26	6.1	85																		27
25	133	10.5	60	25	6.1	95																		17
26	177	7.5	68	27	5.9	92																		
27	177	9.1	62	30	6.2	82																		24
28	177	10.3	59	33	6.1	88																		4
29																								
30																								
31																								
TOTAL	3359											11050								972				330
ARITH. MEAN	134	9.2	63	24		90		3.5	67			11050		.36	67	2340				972	9.1	53		12

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH March 19 73

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/~~xx~~	lbs.	KWH	*						
1		52	32	C	50	2.63	3.20	2.00	7.7	1910	129	320	15						* Gas - cu. ft. X 100
2	.10	58	40	R	50	2.70	3.30	2.10	7.6	2210	124	320	14						
3	.02	52	37	R	50	2.61	3.30	2.10	7.5	1940	118	240	12						
4	.02	46	34	R	50	2.62	3.10	2.20	7.6	1920	122	320	15						
5	.03	44	34	R	50	2.76	3.40	2.20	7.6	1900	116	320	14						
6		64	44	CL	51	2.74	3.40	2.10	7.7	1840	115	280	13						
7	.13	62	44	R	51	2.72	3.30	2.10	7.8	1860	117	320	13						
8		54	30	C	51	2.72	3.20	2.10	7.6	1870	124	280	14						
9	.11	44	34	R	51	2.72	3.20	2.10	7.6	1920	126	320	13						
10	.64	58	38	R	51	2.71	3.20	2.40	7.6	1870	96	280	14						
11	T	68	40	R	51	2.78	3.20	2.30		1870	104	320	16						
12		44	38	CL	51	2.85	3.50	2.20	7.7	1880	117	280	17						
13	.33	52	40	R	51	2.84	3.30	2.30	7.6	1860	124	320	16						
14	.13	68	44	R	51	2.87	3.50	2.30	7.7	1880	117	320	12						
15		58	38	CL	52	2.88	3.50	2.20	7.6	2130	114	280	15						
16	.37	48	25	S	51	2.80	3.40	2.40		2160	131	360	17						
17	.06	30	24	S		2.80	3.10	2.40	7.7	1610	83	280	19						
18		36	22	CL	50	2.76	3.20	2.30	7.6	1840	115	320	19						
19		40	20	C	50	2.92	3.60	2.40	7.7	1860	129	360	21						
20		42	18	C	51	2.94	3.50	2.40	7.7	2030	125	360	21						
21		38	22	C	51	2.94	3.50	2.40	7.6	1860	130	360	16						
22		40	20	C	51	2.99	3.60	2.40	7.6	1860	125	360	14						
23		46	26	C	51	2.98	3.40	2.50		1920	128	320	13						
24		54	34	C	50	2.94	3.60	2.50	7.6	1860	128	320	12						
25		50	36	C	51	2.93	3.40	2.50	7.7	1860	120	320	14						
26		54	26	C	51	2.99	3.60	2.50	7.6	1870	115	320	15						
27		54	30	C	51	2.94	3.50	2.40	7.6	1890	95	280	14						
28	.58	50	38	R	51	2.99	3.50	2.70	7.8	2300	129	320	14						
29	.22	58	42	R	52	3.06	3.60	2.40	7.8	1870	119	240	15						
30		56	40	CL	51	2.99	3.70	2.60	7.6	1880	133	320	13						
31	.30	50	40	R	51	2.87	3.40	2.30	7.6	1900	129	320	12						
TOTAL	3.04										3697	9680	462						
ARITH. MEAN						2.84				1917	119								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH March 19 73 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	52	114	48	105	8	75	164	41	90	45	58	127	28	61						
2	63	142	39	88	38	81	182	38	86	53	64	144	31	70						
3	78	170	78	170	0	55	120	36	78	35	42	91	25	54						
4	60	131	54	118	10	63	138	34	74	46	52	114	28	61						
5	51	117	45	104	12	59	136	31	71	48	45	104	25	58						
6	58	133	42	96	28	81	185	30	69	63	60	137	25	57						
7	56	127	54	122	4	67	152	46	104	31	53	120	31	70						
8	66	150	52	118	21	86	195	53	120	38	65	147	41	93						
9	54	122	33	75	39	100	227	45	102	55	78	177	29	66						
10	66	149	45	102	32	84	190	33	75	61	65	147	26	59						
11																				
12	70	166	45	107	36	89	212	30	71	66	74	176	20	48						
13	57	135	36	85	37	82	194	24	57	71	62	147	20	47						
14	54	129	42	101	22	117	280	29	69	75	86	205	19	45						
15	60	144	42	101	30	122	293	34	82	72	104	250	22	53						
16																				
17	45	105	42	98	7	40	93	20	47	50	34	79	16	37						
18	60	138	33	76	45	62	143	25	58	60	49	113	20	46						
19	66	161	51	124	23	82	200	36	88	56	61	149	24	58						
20	64	157	54	132	16	85	208	43	105	49	50	123	25	61						
21	52	128	44	108	15	62	152	39	96	37	46	113	29	71						
22	60	150	42	105	30	83	207	42	105	49	53	132	28	70						
23																				
24	45	110	32	78	20	48	118	30	74	38	33	81	22	54						
25	48	117	39	95	19	56	137	22	54	61	43	105	18	44						
26	45	112	39	97	13	43	107	31	77	28	34	85	22	55						
27	57	140	39	96	32	132	324	31	76	77	113	277	26	64						
28	63	157	45	112	29	138	344	35	87	75	129	322	33	82						
29	40	102	33	84	18	84	214	36	92	57	56	143	26	66						
30	33	82	28	70	15	50	125	34	85	32	33	82	23	57						
31	42	101	30	72	29	66	158	25	60	62	45	108	19	45						
TOTAL		3689		2839			5198		2252			3998		1652						
ARITH. MEAN	56	132	43	101	22	78	186	34	80	53	60	143	25	59						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH March 19 73

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft
	Gals.	Total Solids	Vol. Solids		pH	Temp.	pH	Total Solids	Vol. Solids	Vol. Acids	Alkalinity	Gals.	pH	Total Solids	Vol. Solids	Susp. Solids	P	P	5-Day BOD	Gals.	Total Solids	Vol. Solids	pH	
	10	%	%	Lbs/ 1000 c.f. Digester		°F		%	%	Mg/l	Mg/l	X		%	%	Mg/l	Mg/l	Lbs.	Mg/l	10^X	%	%		10^X
1	177	9.7	63	33	6.2	83		5.2	67			11934		.49	69	3940			1980					30
2						94																		20
3	177	11.8	58	37	6.2	98																		20
4	133	7.2	69	20	6.2	96																		19
5						96																		
6	221	10.9	61	44	6.2	89																		34
7	221	9.2	62	38	6.4	98																		18
8	88	13.0	62	22	6.1	96																		7
9	133	9.4	63	24	6.4	90		1.9	56			11492		.62	66	5480			1740					35
10	133	4.2	44	7	6.4																			
11	133	8.5	66	23	6.2	86																		38
12						106																		
13	221	8.6	61	35		91																		36
14	177	9.3	63	31	6.5	101																		20
15	88	8.3	61	14	6.3	98																		19
16	177	7.2	60	23	6.4	99																		26
17						98																		18
18	133	8.5	68	23	6.1	98																		20
19						96																		7
20	221	9.3	61	38	6.4	93		3.9	68			11492		1.70	59	16840			3120					34
21	177	9.3	62	31	6.4	104																		8
22	177	9.7	65	34	6.3	86																		34
23	177	8.1	64	28	6.3	101																		23
24	88	9.4	62	15	6.3	100																		23
25	88	15.3	56	23	6.2	102																		21
26						102																		
27	133	10.6	56	24	6.3	95																		38
28	133	11.3	61	28	6.1	104																		8
29						98																		
30	133	10.6	58	25	6.0	94		2.3	61											1825	7.1	56		16
31	133	4.7	60	11	6.1	86																		8
TOTAL	3669											34918								1825				580
ARITH. MEAN	153	9.3	61	26		96		3.3	63			11639		.94	65	8753			2280	1825	7.1	56		19

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH April 1973 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf/~~xx~~	lbs.	KWH	*						
1	.01	60	42	R	87	2.87	3.50	2.50	7.8	1890	127	280	13						*Gas - cu. ft. X 100
2		50	36	CL	87	3.15	4.20	2.60	7.7	1900	120	320	15						
3	T	41	34	R	84	3.08	3.80	2.50	7.7	1900	119	360	13						
4	.05	42	32	R	82	3.05	3.60	2.40	7.7	1900	118	280	16						
5		48	32	C	81	3.06	3.80	2.40	7.7	1910	121	360	14						
6		62	40	C	83	3.05	3.70	2.40	7.7	1890	127	280	12						
7		62	32	C	86	2.95	3.60	2.40	7.6	1900	117	320	13						
8		48	30	CL	87	2.92	3.50	2.40	7.6	1910	116	320	18						
9	.50	37	28	R&S	88	3.16	3.60	2.40	7.6	1860	122	320	14						
10	.01	34	20	R&S	85	2.99	3.60	2.40	7.7	2230	124	320	14						
11	.02	44	28	S	84	2.97	3.60	2.40	7.7	1890	125	320	16						
12		46	22	C	86	2.94	3.60	2.30	7.6	1870	131	320	15						
13		46	24	C	97	3.02	3.60	2.30	7.9	1880	140	360	19						
14		56	34	C	94	2.89	3.50	2.50	7.7	1890	133	280	22						
15		69	45	C	95	2.86	3.50	2.50	7.6	1860	134	320	10						
16	.26	60	32	R	96	3.09	3.70	2.40	7.5	1920	136	320	9						
17		60	40	CL	92	2.97	3.50	2.40	7.6	1880	117	320	10						
18	.16	68	52	R		3.03	3.60	2.40	7.6	1850	131	280	10						
19		70	56	CL	90	3.02	3.60	2.40	7.6	2000	130	320	5						
20		80	60	CL	82	2.99	3.80	2.40	7.6	2080	134	280	5						
21	1.09	73	60	R	80	3.04	3.60	2.40	7.6	2140	128	320	7						
22	.03	64	40	R	91	3.06	3.60	2.60	7.5	2030	124	320	8						
23		68	38	C	90	3.26	4.00	2.50	7.6	2380	143	320	10						
24		58	38	C	86	3.15	3.80	2.50	7.7	2060	136	360	7						
25		60	40	C	101	3.12	3.80	2.50	7.7	2220	122	320	8						
26		62	42	C	94	3.09	3.70	2.50	7.7	1750	129	280	10						
27		58	34	CL		3.03	3.60	2.40	7.7	1820	132	320	9						
28		52	30	C	87	2.89	3.60	2.40		1810	54	320	10						
29	.03	58	43	R	85	2.79	3.40	2.40	7.6	1690	117	320	9						
30	.32	68	52	R	84	3.08	3.70	2.50	7.8	1830	126	320	9						
31																			
TOTAL	2.48										3733	9480	350						
ARITH. MEAN						3.02				1938	124								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH April 19 73 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	54	129	30	72	44	135	323	24	57	82	49	117	24	57						
2	66	173	45	118	32	133	349	30	79	77	116	305	27	71						
3	48	123	24	62	50	63	162	21	54	67	56	144	18	46						
4	48	122	39	99	19	83	211	22	56	74	72	183	18	46						
5	54	138	33	84	39	64	163	34	87	47	49	125	20	51						
6	48	122	36	92	25	81	206	21	53	75	57	145	28	71						
7	48	118	30	74	38	50	123	34	84	32	36	89	23	57						
8	51	124	45	110	13	80	195	28	68	65	66	161	24	58						
9	48	126	36	95	25	57	150	32	84	44	43	113	26	69						
10	57	142	42	105	26	95	237	31	77	67	77	192	25	62						
11	57	141	39	97	32	110	272	33	82	70	89	220	26	64						
12	60	147	39	96	35	118	289	38	93	68	97	238	26	64						
13	69	174	39	98	43	97	244	38	96	61	78	196	28	71						
14	45	108	36	87	20	48	116	38	92	21	30	72	28	67						
15	52	124	42	100	19	52	124	22	52	58	40	95	19	45						
16	54	134	51	126	5	87	215	41	102	53	73	181	33	82						
17	72	178	36	89	50	55	136	32	79	42	40	99	22	54						
18	48	124	42	108	13	70	180	30	77	57	56	147	26	67						
19	51	128	51	128	0	70	176	27	68	61	59	149	21	53						
20	60	150	39	97	35	125	312	32	80	74	107	267	24	60						
21	40	101	36	91	10	48	122	27	68	44	37	94	22	56						
22	52	133	42	107	19	74	189	34	87	54	55	140	22	56						
23	57	155	45	122	21	64	174	34	92	47	54	147	30	82						
24	60	158	45	118	25	73	192	38	100	48	61	160	29	76						
25	44	114	36	94	18	57	148	34	88	40	45	117	27	70						
26	39	101	33	85	15	52	134	30	77	42	41	106	25	64						
27	48	121	40	101	17	133	336	39	99	71	113	286	31	78						
28																				
29	54	126	45	105	17	58	135	28	65	52	52	121	28	65						
30	57	146	52	134	9	74	190	40	103	46	65	167	31	80						
31																				
TOTAL		3880		2894			5803		2299			4576		1842						
ARITH. MEAN	53	134	40	100	25	80	200	31	79	57	63	158	25	64						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw Wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH April 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. 10³	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	133	7.6	67	20	6.5	87																		13
2						87																		
3	221	9.0	66	40	6.2	84																		13
4						82																		
5	177	10.4	57	32	6.4	81																		14
6	133	9.5	62	24	6.3	83																		15
7	88	9.7	60	16	6.4	86																		13
8	133	11.6	60	28	6.3	87																		15
9						88																		
10	221	7.9	62	33	6.4	85																		13
11	133	13.5	55	30	6.3	84		1.6	63															17
12	133	10.1	56	23	6.4	86																		30
13	177	10.0	58	31	6.4	97																		19
14	133	9.0	57	21	6.5	94																		19
15	177	8.6	67	31	6.7	95																		22
16						96																		9
17	177	11.1	62	37	6.1	92		3.2	68			12818		.32	63	2240			1140					30
18	133	10.5	60	25	6.2																			27
19	177	11.0	63	37	6.1	90																		23
20						82																		
21	177	8.3	64	28	6.4	80																		39
22	133	14.7	57	34	6.3	91																		21
23						90		4.4	67			13260		.33	65	2220			1020					7
24	177	7.4	63	25	6.6	86																		35
25	133	10.2	63	26	6.1	101																		24
26	133	10.6	61	26	6.2	94																		6
27	133	12.4	58	29	6.1	87																		37
28																								23
29	133	8.9	64	23	6.2	85																		20
30																								
31																								
TOTAL	3359											26078												504
ARITH. MEAN	153	10.1	61	28		91		3.1	66			13039		.33	64	2230			1080					17

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH May 1973 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					xxxxx water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/xxx	lbs.	KWH	*						
1	.17	72	58	R	53	3.08	3.60	2.40	7.7	1800	136	360	5						*Gas - cu. ft. X 100
2	.04	72	36	R	53	3.11	3.60	2.50	7.9	2100	126	320	6						
3	.07	42	34	R	53	3.10	3.60	2.50	7.8	1830	127	360	7						
4		52	30	C	53	3.10	3.80	2.50	7.7	1870	129	320	15						
5		62	40	C	53	3.03	3.70	2.50	7.6	1880	125	320	15						
6		71	49	CL	53	2.96	3.60	2.50	7.7	1840	123	320	6						
7	.44	72	53	R	53	3.16	3.60	2.50	7.7	1860	127	320	6						
8	.21	70	48	R	53	3.13	3.60	2.40	7.7	1890	127	360	8						
9	.04	76	50	R	53	3.08	3.70	2.30	7.7	1870	124	320	4						
10		70	46	CL	54	3.07	3.60	2.50	7.7	1900	113	320	6						
11	.07	64	42	R	53	3.04	3.60	2.40	7.7	1850	132	360	6						
12	.05	56	36	R	53	2.96	3.60	2.50	7.6	1870	116	320	6						
13		50	30	CL	53	2.91	3.50	2.40	7.6	1760	116	320	9						
14		57	34	CL	52	3.04	3.60	2.40	7.6	2060	136	320	9						
15		60	40	CL	52	3.02	3.70	2.30	7.7	1810	121	360	10						
16		60	29	CL	53	2.99	3.60	2.40	7.7	1780	136	320	9						
17		56	30	CL	52	2.97	3.50	2.40	7.7	1810	130	360	10						
18	.06	68	46	R	53	3.00	3.60	2.40	7.6	1830	128	320	10						
19	.03	68	40	R	53	2.87	3.50	2.40	7.6	1830	122	320	10						
20		72	45	CL	53	2.89	3.50	2.40	7.7	1820	126	320	10						
21	.10	74	52	R	53	3.02	3.60	2.40	7.7	1830	116	320	8						
22	1.91	62	54	R	54	3.20	3.80	2.60	7.6	1830	128	280	8						
23	.02	60	46	R	54	3.28	3.90	2.70	7.7	1830	126	320	8						
24		76	54	C	54	3.21	4.00	2.60	7.7	1810	129	320	7						
25	2.28	72	42	R	54	3.77	5.00	3.10	7.5	1460	118	360	7						
26		72	50	CL	53	3.68	4.30	3.10	7.4	1690	151	320	6						
27	.93	66	50	R	53	3.74	4.40	3.30	7.2	1580	117	320	9						
28	.31	78	50	R	53	3.86	4.30	3.30	7.4	1640	119	320	9						
29	.15	68	48	R	54	3.94	4.50	3.30	7.6	1780	137	360	10						
30	.26	56	40	R	54	3.86	4.50	3.20	7.5	1780	96	360	10						
31		76	54	C	54	3.85	4.40	3.20	7.6	1750	144	320	5						
TOTAL	7.14										3901	10240	254						
ARITH. MEAN						3.22				1814	126								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH May 1973 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	60	154	36	92	40	73	188	21	54	71	64	164	19	49						
2	60	156	42	109	30	74	192	32	83	57	61	158	27	70						
3	54	140	45	116	17	105	271	41	106	61	93	240	32	83						
4	60	155	42	109	30	69	178	35	90	49	59	153	29	75						
5	48	121	42	106	13	67	169	38	96	43	58	147	29	73						
6	63	159	51	129	19	60	152	30	76	50	50	126	25	63						
7	60	158	48	126	20	74	195	36	95	51	58	153	30	79						
8	54	141	39	102	28	62	162	26	68	58	53	138	21	55						
9	63	162	51	131	19	120	308	48	123	60	108	277	33	85						
10	54	138	39	100	28	116	297	36	92	69	96	246	26	67						
11	70	177	45	114	36	117	297	52	132	56	102	259	43	109						
12	48	119	39	96	19	71	175	56	138	21	58	143	39	96						
13	60	146	45	109	25	55	133	32	78	42	47	114	28	68						
14	64	162	39	99	39	74	188	32	81	57	59	150	24	61						
15	74	186	42	106	43	72	181	37	93	49	61	154	30	76						
16	60	150	54	135	10															
17	66	163	51	126	23	73	181	43	107	41	57	141	33	82						
18	63	158	42	105	33	99	248	44	110	56	82	205	35	88						
19	63	151	45	108	29	85	203	38	91	55	66	158	28	67						
20	60	144	48	115	20	71	171	27	65	62	60	144	22	53						
21	63	159	39	98	38	106	267	32	81	70	92	232	25	63						
22	48	128	33	88	31	102	272	27	72	74	89	238	20	53						
23	63	172	30	82	52	93	254	32	88	66	77	211	27	74						
24	44	118	36	96	18	83	222	38	102	54	70	187	30	80						
25	45	141	36	113	20	88	277	59	185	33	63	198	41	129						
26	36	110	27	83	25	64	196	29	89	55	53	163	22	68						
27	32	100	24	75	25	35	109	16	50	54	26	81	13	41						
28	48	155	42	135	13	26	84	20	64	23	20	64	16	52						
29	67	220	51	168	24	102	352	38	125	64	79	260	29	95						
30	70	225	48	155	31	120	386	34	109	72	93	299	25	80						
31	58	186	42	135	28	97	311	23	74	76	80	257	19	61						
TOTAL		4754		3461			6619		2817			5460		2195						
ARITH. MEAN	57	153	42	112	27	82	221	35	94	55	68	182	27	73						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw Wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH May 19 73

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft
	Gals.	Total Solids	Vol. Solids	Lbs/ 1000 c.f. Digester	pH	Temp.	pH	Total Solids	Vol. Solids	Vol. Acids	Alkalinity	Gals.	pH	Total Solids	Vol. Solids	Susp. Solids	P	P	5-Day BOD	Gals.	Total Solids	Vol. Solids	pH	
	10	%	%			°F		%	%	Mg/l	Mg/l	X		%	%	Mg/l	Mg/l	Lbs.	Mg/l	X	%	%		X 100
1	133	10.9	63	27	6.4	84																		40
2	88	9.3	61	15	6.3	96																		24
3	133	9.3	60	23	6.4	100																		6
4	177	11.4	62	38	6.4	94																		27
5	88	10.8	60	17				3.4	73			12376												48
6	133	10.8	60	26	6.4	92																		28
7						87																		28
8	133	12.7	65	33	5.6	86																		27
9	88	11.8	60	19	6.3	84																		
10	88	11.1	59	18		82																		43
11	133	11.1	59	26	6.4	106																		27
12	133	12.2	55	27	6.3	106																		24
13	88	9.6	64	17	6.4	109																		23
14						109																		
15						101																		38
16	265	10.4	57	48	6.4	92																		7
17	133	9.3	61	23	6.4	91		4.9	70			11934		.41	59	3020			900					27
18	133	11.2	60	27	6.2																			54
19	88	11.4	57	17	6.3	91																		27
20	133	10.1	63	25	6.4	88																		26
21						88																		
22	221	11.4	60	46	6.4	83																		43
23						108																		27
24	177	12.5	57	38	6.3	111																		
25	133	10.3	61	25	6.2	102																		39
26	88	10.3	61	17	6.2	111																		
27	133	9.3	60	22	6.5	102																		38
28						112																		
29						107																		36
30	177	11.5	58	36	6.5	104		2.3	69			11934		.57	55	4660			1500					52
31	133	9.6	60	23		87																		22
TOTAL	3227											36244												781
ARITH. MEAN	134	10.8	60	26		97		3.5	70			12081		.49	57	3840			1200					25

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall , MICHIGAN

MONTH June 19 73 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					Plant water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/**	lbs.	KWH	**						
1		82	54	CL	54	3.80	4.30	3.10	7.7	1820	140	360	3						*Overload protection
2	.29	86	60	R	54	3.62	4.30	3.10	7.5	1820	128	320	4						on plant water system
3	.13	86	63	R	54	3.55	4.10	3.00	7.6	*530	*44	280	3						kicked out Sunday
4	.18	84	62	R	54	3.70	4.30	3.10	7.7	1760	136	320	4						afternoon. Points in
5	.62	82	61	R	55	3.69	4.30	3.00	7.6	1770	131	360	3						motor starter burned
6	.18	78	54	R	55	3.72	4.50	3.10	7.8	1630	117	360	4						away.
7		82	60	C	55	3.68	4.20	3.00	7.6	1750	136	320	3						
8		86	68	C	55	3.68	4.30	3.00	7.6	1750	144	320	4						**Gas - cu. ft. X 100
9		88	58	C	55	3.49	4.20	2.90		1730	118	280	4						
10		93	68	C	54	3.42	4.00	2.90		1620	114	240	4						PH meter not working
11	.01	92	68	R	56	3.59	4.20	2.90		1800	132	240	4						after June 8th.
12		88	58	C	55	3.56	4.10	2.90		1810	139	280	2						
13		86	54	C	55	3.47	4.00	2.90		1870	132	320	2						Primary digester taken
14		90	56	C	56	3.48	4.00	2.80		1810	129	240	3						out of service for
15	.07	86	68	R	55	3.42	4.20	2.30		1810	116	240	5						cleaning on June 10th.
16	.01	90	64	R	56	3.45	4.10	3.00		1770	130	240	3						Filled 6 beds from same
17		83	63	CL	56	3.39	4.00	3.00		1770	117	200	5						during month. 69,000 gal
18		86	64	CL	55	3.49	4.30	2.90		2040	126	240	5						at an average 11.2% dry
19		86	67	CL	56	3.43	4.20	2.80		1740	122	240	4						solids and 51% volatile
20		82	60	C	56	3.40	4.00	2.80		1740	125	240	5						
21		82	56	CL	56	3.37	4.00	2.70		1730	136	240	4						
22		76	54	C	56	3.36	4.00	2.80		1770	127	280	4						
23	.74	76	52	R	57	3.35	4.00	2.70		1750	114	240	4						
24		86	54	C	54	3.26	3.70	2.80		1860	124	240	4						
25		78	69	CL	57	3.21	4.10	2.80		1780	124	280	5						
26	.06	86	62	R	57	3.57	4.00	2.80		1720	131	280	8						
27	.70	84	60	R	57	3.45	3.80	2.80		1770	124	280	6						
28	.17	70	56	R	57	3.37	4.20	2.70		1910	133	280	6						
29	.07	74	54	R	56	3.35	4.00	2.80		2930	121	240	6						
30		80	56	CL	55	3.28	3.80	2.80		1900	103	200	2						
31																			
TOTAL	3.32										3713	8200	124						
ARITH. MEAN						3.48				1782	124								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH June 1973 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	48	152	44	139	8	51	162	38	120	25	31	98	25	79						
2	45	136	36	109	20	49	148	42	127	14	41	124	32	97						
3	80	237	48	142	40	62	184	33	98	47	53	157	26	77						
4	66	204	48	148	27	70	216	30	93	57	55	170	25	77						
5	60	185	48	148	20	96	295	33	102	66	76	234	23	71						
6	64	199	51	158	20	90	279	44	136	51	68	211	31	96						
7	60	184	51	157	15	79	242	42	129	47	60	184	28	86						
8	42	129	42	129	0	63	193	38	117	40	48	147	27	83						
9	45	131	45	131	0	55	160	36	105	35	42	122	25	83						
10	51	145	39	111	24	66	188	40	114	39	53	151	34	97						
11	57	171	48	144	16	61	183	27	81	56	48	144	21	63						
12	54	160	45	134	17	69	204	27	80	61	55	163	20	59						
13	60	139	45	130	25	147	425	31	90	79	133	385	28	81						
14	48	139	44	128	8	74	215	26	75	65	61	177	20	58						
15	60	171	51	145	15	110	314	35	100	68	90	257	27	77						
16	52	150	45	129	13	91	262	32	92	65	72	207	21	60						
17	54	153	45	127	17	47	133	30	85	36	42	119	25	71						
18	72	210	63	183	13	58	169	37	107	36	45	131	29	84						
19	72	206	54	154	25	79	226	40	114	49	59	169	32	92						
20	57	163	52	149	9	124	355	48	137	61	105	301	30	86						
21	48	135	48	135	0	70	197	42	118	40	45	126	25	70						
22	39	109	30	84	23	46	129	44	123	4	31	87	31	87						
23	68	190	54	151	21	59	165	52	145	12	40	112	34	95						
24	57	155	54	147	5	60	163	46	125	23	56	152	42	114						
25	57	153	42	112	26	50	134	28	75	44	39	104	24	64						
26	72	214	48	143	33	60	179	41	122	32	49	146	33	98						
27	70	201	56	161	20	58	167	33	95	43	47	136	28	81						
28	63	175	54	150	14	49	136	42	117	14	32	89	30	83						
29	48	134	40	112	17	35	98	16	45	54	29	81	13	36						
30																				
31																				
TOTAL		4830		3990			5921		3067			4684		2295						
ARITH. MEAN	58	167	47	138	17	70	204	36	106	44	55	162	27	79						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw wetwell
Process Pattern raw-pri.dig-sec.dig.-beds

MONTH June 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. 10^X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	133	9.6	60	23	6.3															*				3
2	133	14.1	51	29	6.3	96																		4
3	177	10.9	60	35	6.5	93																		3
4						91																		4
5	177	12.1	59	38	5.2	91																		3
6	133	11.0	58	26	6.5	86																		4
7	177	15.4	54	44		109																		3
8	88	10.5	57	16	6.4	96																		4
9	177	11.9	54	35	6.3	90																		4
10	88	6.4	66	11																				4
11																								4
12	133	9.2	58	21																				2
13	133	11.1	55	25																				2
14																								3
15																								5
16	133	10.5	57	24																				3
17	133	11.5	57	26																				5
18																								5
19																								4
20																								5
21	133	11.8	57	27																				4
22	133	10.1	60	24																				4
23	133	10.1	60	24																				4
24	177	9.1	60	29																				4
25																								5
26	133	10.0	64	26																				8
27																								6
28	133	10.4	59	25																				6
29	133	12.3	57	28																				6
30																								2
31																								
TOTAL	2785																							124
ARITH. MEAN	139	10.9	58	27		94																		4.1

* See page D-4

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall , MICHIGAN

MONTH July 1973 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXX~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH										
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf~~XXX~~	lbs.	KWH	*						
1		88	62	C		3.30	3.70	2.90	**	1730	143	200	3						
2	1.06	90	64	R		3.56	4.40	2.90		1800	114	280	4						
3	.20	88	61	R		3.47	4.10	2.90		890	131	240	3						
4		80	56	CL		3.31	4.30	2.80		1890	120	280	3						
5		82	54	C	58	3.43	4.20	2.00		2190	133	280	3						
6		88	63	C		3.44	4.30	2.80		1860	130	240	4						
7		90	68	C	55	3.31	3.80	2.80		1940	117	240	3						
8		92	70	C	56	3.32	3.80	2.80		2240	129	240	4						
9	.45	92	66	R	58	3.47	4.10	2.80		1680	128	240	3						
10		84	56	CL	57	3.47	4.10	2.80		2810	127	280	4						
11		80	52	CL	57	3.37	3.90	2.80		3030	125	280	3						
12		85	58	CL	57	3.33	3.80	2.70		1920	125	240	3						
13	.06	94	66	R	58	3.42	3.80	2.70		1940	131	280	2						
14	.01	82	54	R	57	3.28	3.70	2.80		1930	114	240	2						
15		80	53	CL	57	3.19	3.50	2.70		1980	116	280	3						
16		83	53	C		3.26	3.70	2.70		1850	128	240	3						
17		88	56	C		3.23	3.60	2.60		1970	119	280	4						
18		88	64	C		3.16	3.50	2.80		1830	128	240	5						
19		92	69	CL	57	3.24	4.00	1.90		2230	134	240	8						
20	.25	90	63	R	58	3.29	3.90	2.70		2290	130	200	3						
21	.01	80	62	R	57	3.18	3.70	2.70		1690	116	200	4						
22		84	62	CL	58	3.15	3.90	2.60		1810	108	200	4						
23		86	66	CL	58	3.28	3.90	2.70		1910	119	240	2						
24	.01	88	67	R	58	3.16	3.90	2.60		1950	123	200	3						
25		88	72	CL	58	3.23	3.90	2.40		2010	124	280	3						
26	.07	82	66	R	58	3.19	3.80	2.40		2120	130	280	3						
27	.61	84	65	R	58	3.29	3.90	2.70		2180	136	280	3						
28	.02	74	54	R	58	3.13	3.90	2.60		2090	110	280	5						
29	.07	82	54	R	58	3.11	3.60	2.50		2090	102	240	3						
30	.68	82	64	R	59	3.29	3.90	2.60		2130	128	240	5						
31	.63	78	65	R	59	3.37	4.00	2.60		2170	133	280	6						
TOTAL	4.13										3851	7760	111						
ARITH. MEAN						3.30				2005	124								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH July 19 73 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1																				
2																				
3						106	308	20	58	81	106	308	16	46						
4	54	149	38	105	30															
5	30	86	20	57	7	40	114	18	51	55	30	86	7	20						
6	54	155	33	95	39															
7	60	166	48	133	20															
8	48	139	39	113	19	39	113	32	93	18	33	96	28	81						
9	63	183	42	122	33	138	400	24	70	83	114	331	17	49						
10																				
11	72	202	45	126	38	92	259	33	93	64	69	194	25	70						
12	60	167	51	142	15	83	230	50	139	40	52	144	19	53						
13	48	137	39	111	19	115	328	30	86	74	90	257	22	63						
14	60	164	51	140	15	81	222	54	148	33	62	170	41	112						
15	66	176	51	136	23															
16	48	131	30	82	38	80	218	34	92	58	75	204	24	65						
17																				
18	45	119	24	63	47															
19	60	162	46	124	23	69	186	58	157	16	44	119	24	65						
20	80	220	43	118	46	66	181	20	55	70	53	145	14	38						
21	39	103	36	95	8	42	111	24	64	43	29	77	14	37						
22	64	168	51	134	20	80	210	53	139	34	61	160	35	92						
23	51	140	51	140	0	80	219	34	93	58	56	153	18	49						
24	44	116	33	87	25	51	134	23	61	55	36	95	16	42						
25	63	170	60	162	5	78	210	37	100	53	59	159	25	67						
26	51	136	33	88	35	64	170	40	106	31	48	128	34	90						
27	48	132	33	91	31	53	145	43	118	19	31	85	24	66						
28	52	136	42	110	19	55	144	32	84	42	47	123	26	68						
29	57	148	32	83	44	84	218	56	145	33	55	143	34	88						
30	69	189	63	173	9	77	211	51	140	34	56	154	29	80						
31	65	183	48	135	26															
TOTAL		3977		2965			4326		2092			3331		1341						
ARITH. MEAN	56	153	42	114	24	75	206	36	100	47	57	159	23	64						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH July 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. 10X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. 10X	Total Solids %	Vol. Solids %	pH	
1	133	11.4	62	29																				21
2																								24
3																								27
4																								23
5	133	11.0	66	29																1425	10.2	51		12
6																								22
7	177	9.6	61	31																				23
8	133	9.5	55	21																				25
9																								25
10	133	10.0	65	26																				36
11	133	12.0	63	31																				16
12	133	9.5	62	24																				29
13	133	9.6	70	27																				30
14	133	11.6	64	30																				31
15	133	12.3	63	31																				31
16																								31
17	133	10.2	66	27																				32
18	133	10.3	66	27																				33
19	88	13.9	62	23																				34
20	133	9.4	65	25																				33
21	133	10.3	63	26																				34
22	133	11.3	66	30																				36
23	88	17.0	53	24																				35
24																								36
25																								
26	88	14.9	58	23																				
27	133	10.4	68	28																				
28	133	11.2	61	28																				
29	133	12.6	59	30																				
30																								
31																								
TOTAL	2696																			1425				687
ARITH. MEAN	128	11.3	63	27																1425	10.2	51		29

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall , MICHIGAN

MONTH August 1973 MISCELLANEOUS DATA OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~XXXX~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf~~XXX~~	lbs.	KWH	*						
1		78	63	CL	58	3.31	4.00	2.70	7.8	2510	137	280	4						*Gas - cu. ft. X 100
2	.01	77	57	R	58	3.31	4.00	2.40	7.8	2180	136	280	5						
3		80	55	C	58	3.22	3.90	2.50	7.5	2140	139	280	4						
4		84	56	C	56	3.13	3.90	2.50		2170	114	280	4						
5		88	64	C	56	3.11	3.60	2.70	7.7	2190	110	240	4						
6		86	64	C	59	3.23	3.90	2.60	7.7	2130	139	320	4						
7		86	63	C	58	3.20	3.90	2.60	7.3	2160	138	280	4						
8	.31	90	71	R	59	3.19	3.90	2.60	7.1	2190	129	240	5						
9	.23	83	68	R	58	3.20	3.80	2.60	7.7	2010	129	240	2						
10		82	62	C	58	3.18	3.80	2.70	7.4	1960	137	240	3						
11		84	60	CL	57	3.08	3.70	2.60	7.7	1960	132	240	2						
12		82	56	C		3.08	3.50	2.60	7.6	2020	116	200	2						
13		85	64	C	59	3.11	3.90	2.60	7.7	1900	140	240	3						
14		81	57	CL	58	3.10	3.80	2.50	7.3	2110	136	200	4						
15		82	56	C	58	3.09	3.60	2.40	7.7	1980	127	200	4						
16		86	63	C	58	3.08	3.80	2.30		1970	140	240	4						
17	.07	82	60	R	59	3.13	3.70	2.60		1950	133	200	5						
18		84	62	CL	57	3.00	3.50	2.50	7.7	1940	101	240	6						
19	.61	81	63	R	58	3.07	3.50	2.50	7.7	2000	103	240	5						
20		77	52	C	60	3.02	3.70	2.50	7.6	1910	134	200	5						
21		71	49	C	58	2.87	3.90	2.50	7.5	1970	129	200	5						
22		74	54	C	57	2.79	3.70	2.40	7.6	1940	123	200	5						
23	.02	74	54	R	57	2.79	3.60	2.40	7.3	1980	130	200	6						
24		77	57	CL	58	2.91	3.70	2.40	7.6	1970	125	160	4						
25		86	62	C	57	2.94	3.70	2.60	7.8	1970	108	200	3						
26		91	70	C		2.92	3.50	2.50		1990	105	200	3						
27		94	71	C	60	3.00	4.20	2.40		2250	142	200	4						
28		92	67	C		2.98	3.80	2.50		2030	129	200	2						
29		92	66	C		2.91	3.80	2.40		1950	135	200	3						
30	.03	88	66	R		2.94	3.80	2.40		2010	132	200	3						
31		88	68	C	58	2.91	3.60	2.40		1970	129	200	2						
TOTAL	1.28										3957	7040	119						
ARITH. MEAN						3.06				2046	128								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH August 19 73 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	69	191	51	141	26	111	306	33	91	70	87	240	29	80						
2	72	199	57	157	21	119	329	54	149	55	87	240	27	75						
3						32	86	24	64	25	30	81	20	54						
4	69	180	45	117	35															
5	56	145	45	117	20	78	202	39	101	50	62	161	27	70						
6	57	154	42	113	26	112	302	25	67	87	96	259	13	35						
7	60	160	48	128	20	162	432	33	88	80	139	371	24	64						
8	51	136	42	112	18	82	218	40	106	51	57	152	23	61						
9	60	160	48	128	20	79	211	24	64	70	72	192	19	51						
10	76	202	39	103	47	85	225	36	95	69	60	159	22	58						
11	99	254	60	154	39	141	362	37	95	74	122	313	30	77						
12	57	146	42	108	26	61	157	38	98	38	50	128	31	80						
13	56	145	51	132	9	57	148	47	122	18	46	119	37	96						
14	62	160	57	147	8	100	259	59	153	41	77	199	42	109						
15	60	155	48	124	20	47	121	34	88	28	37	96	27	70						
16																				
17	48	125	36	94	25	71	185	28	73	61	60	157	22	57						
18						47	118	24	60	49	32	80	14	35						
19	60	154	54	138	10	87	223	45	115	48	72	184	33	84						
20	48	121	36	91	25	99	249	46	116	54	72	181	35	88						
21	54	129	39	93	28	57	136	33	79	42	44	105	24	57						
22	48	112	48	112	0	56	130	47	109	16	42	98	29	67						
23	66	154	48	112	27	48	112	34	79	29	35	81	24	56						
24	51	124	45	109	12	77	187	19	46	75	57	138	12	29						
25																				
26	60	146	48	117	20	86	209	34	83	60	80	195	29	71						
27	64	160	54	135	16	80	200	35	88	56	53	133	21	53						
28	45	112	30	75	33	40	99	39	97	3	28	70	27	67						
29	61	148	45	109	26	81	197	57	138	30	56	136	37	90						
30	69	169	51	125	26	68	167	20	49	71	48	118	16	39						
31	66	160	51	124	23	65	158	32	75	51	46	112	23	56						
TOTAL		4201		3215			5728		2591			4498		1775						
ARITH. MEAN	61	156	47	119	22	80	205	36	93	50	62	161	26	63						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH August 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X 10	Total Solids %	Vol. Solids %	pH	
1	133	10.0	65	26	6.3																			
2	133	9.2	61	23	6.5																			21
3																								31
4	133	9.5	65	25	5.8																			32
5	133	10.7	66	29																				32
6	133	11.0	66	29	6.2																			31
7	133	10.4	58	24	6.0																			32
8	133	11.6	58	27	5.5																			32
9	133	10.7	64	28	5.5																			30
10	88	13.4	71	26	5.8																			31
11	133	11.4	61	28	5.1																			34
12	88	12.2	65	21	5.5																			36
13	177	7.5	71	29	5.6																			32
14	88	12.3	66	22	5.9																			39
15	133	9.8	65	26																				6
16	133	8.6	65	22	6.1															900	11.4	67		12
17	133	8.8	50	18																				17
18	133	10.0	66	27																				17
19	133	11.6	61	29	5.6																			18
20	133	8.7	67	23	5.8																			18
21	133	10.6	63	27	6.2																			23
22	133	11.2	71	32																				22
23	133	9.3	64	24	5.5																			18
24	133	9.8	62	25	5.9																			19
25	133	11.2	47	21	6.1																			21
26	88	14.0	56	21	6.1																			22
27	133	10.2	60	25																				23
28	88	11.6	60	19																				22
29	133	10.5	64	27																				24
30	133	11.4	59	27																				24
31	133	10.4	62	26																				25
TOTAL	3801																			900				744
ARITH. MEAN	127	10.6	63	25																900	11.4	67		25

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH Sept. 19 73

MISCELLANEOUS DATA

OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~xxx~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip	Temp. (°F)		Type	Temp	Flow MGD			pH										
	Inches	Max	Min.		°F	Total MGD	Max Rate	Min Rate		cf/~~xx~~	lbs	KWH	*						
1		90	68	C	58	2.91	3.70	2.40		2040	109	160	4						Gas - cu. ft. X 100
2		92	66	C	58	2.81	3.40	2.40		2040	93	200	4						
3		92	66	C	59	2.82	3.60	2.40		2020	120	160	3						
4		89	66	C	61	2.95	3.80	2.40		1960	125	200	4						
5		84	55	CL	59	2.97	3.80	2.50		2060	131	200	4						
6		72	52	C	60	2.87	3.70	2.30	7.7	2020	139	200	3						
7	.03	73	50	R	59	2.74	3.50	2.30	7.5	1890	108	160	6						
8		72	46	CL	59	2.79	3.40	2.30	7.6	2000	105	200	6						
9		74	46	C	60	2.84	3.60	2.30	8.4	2120	132	200	4						
10		74	40	C	59	2.85	3.70	2.30	7.6	2240	128	200	6						
11		72	42	C	59	2.84	3.70	2.40	7.4	2000	129	200	6						
12		72	42	C	59	2.83	3.70	2.40	7.6	2040	137	200	6						
13		72	50	C	59	2.81	3.70	2.30	7.5	2000	126	240	6						
14		74	48	C	60	2.83	3.60	2.40	7.5	2040	131	200	6						
15		72	50	C	57	2.73	3.30	2.30	7.4	2010	107	160	9						
16		62	46	CL	58	2.71	3.20	2.30	7.5	2050	107	200	10						
17	.86	70	38	R	59	2.91	4.00	2.30	7.3	1990	130	200	11						
18		62	40	C	58	2.81	3.70	2.20	7.5	1990	138	200	14						
19		66	44	C	59	2.85	3.60	2.30	7.5	2070	122	200	12						
20		60	40	CL		2.78	3.50	2.20	7.4	2010	102	200	13						
21	.52	66	42	R	58	2.80	3.60	2.30	7.4	2360	127	200	4						
22		64	40	CL	58	2.77	3.50	2.20	7.5	2000	114	200	4						
23		78	46	C		2.75	3.20	2.30	7.5	2000	107	160	7						
24		72	48	C	58	2.82	3.40	2.30	7.5	1980	130	200	3						
25	.21	82	58	R	59	2.82	3.30	2.30	7.5	2000	121	200	2						
26		83	62	CL	60	2.81	3.60	2.20	7.5	2070	139	200	4						
27	.64	82	60	R	60	2.86	3.60	2.30	7.9	1880	126	200	3						
28	2.03	66	60	R	58	3.01	4.90	2.30	7.4	2110	122	200	5						
29	.87	65	45	R		3.17	4.10	2.70		2010	105	240	4						
30		70	50	CL		3.03	3.50	2.70	7.4	1880	96	200	3						
31																			
TOTAL	5.16										3606	5880	176						
ARITH MEAN						2.85				2090	120								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH Sept. 1973 PRIMARY TREATMENT DATA OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	40	97	24	58	40	22	53	17	41	23	17	41	13	32						
2	63	148	45	105	29	65	152	22	52	66	49	115	18	42						
3	67	158	51	120	24	107	252	45	106	58	97	228	37	87						
4						29	71	19	47	34	22	54	12	30						
5	51	126	40	99	22															
6	51	122	48	115	6	98	235	40	96	59	91	218	33	79						
7	57	135	52	123	9	40	95	26	62	35	32	76	20	47						
8	60	137	51	117	15	52	119	40	91	23	40	91	25	57						
9	63	147	52	121	17	81	188	42	98	48	63	147	31	72						
10	66	157	60	143	9	77	183	46	109	40	61	145	35	83						
11	52	123	48	114	8	75	178	46	109	39	58	137	36	85						
12	57	135	45	106	21	110	260	34	80	69	87	205	25	59						
13	54	127	44	103	19	81	190	40	94	51	64	150	27	63						
14	54	127	52	123	4	41	97	34	80	17	24	57	20	47						
15	44	100	40	91	9	41	93	32	73	22	29	66	13	30						
16	80	181	69	156	14	89	201	45	102	49	71	160	36	81						
17						42	102	36	87	14	29	70	27	66						
18	92	212	54	127	41	143	359	55	129	64	114	267	40	94						
19	60	143	48	114	20	102	242	46	109	55	85	202	32	76						
20	63	146	60	139	3	90	209	49	114	46	69	160	35	81						
21	60	140	52	121	13	77	180	53	124	31	52	121	39	91						
22	69	159	54	125	22	69	159	35	81	49	55	127	26	60						
23	60	138	51	117	15	86	197	40	92	53	68	156	30	69						
24	72	169	60	141	17	62	146	32	75	48	45	106	22	52						
25	57	134	48	113	19	70	165	20	47	71	53	125	18	42						
26	54	127	48	113	11	65	152	48	113	26	53	124	45	105						
27	80	191	54	129	33	121	289	62	148	49	96	229	47	112						
28	42	105	36	90	14	29	73	28	70	3	14	35	23	58						
29																				
30	51	129	44	111	14	79	200	44	111	44	64	162	23	58						
31																				
TOTAL		3817		3134			4840		2540			3774		1858						
ARITH. MEAN	60	141	49	116	17	73	173	38	91	42	57	135	28	66						

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH Sept. 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	133	9.1	67	24																				27
2	133	9.7	68	27																				27
3																								28
4	133	9.6	63	24																				27
5																								25
6	133	9.9	57	23																				23
7	88	11.5	56	17	5.9																			25
8	133	10.6	57	24	5.9																			24
9	133	10.3	60	25	5.7																			26
10	133	10.1	62	25	5.8																			25
11	133	10.0	64	26	5.8																			25
12	133	8.7	64	22	5.8																			25
13	133	8.8	66	23	5.9																			26
14	133	10.6	57	24	5.8																			25
15	177	6.9	44	16	5.8																			25
16	88	12.3	48	16	5.7																			26
17	133	8.0	70	23	5.8																			26
18	177	8.4	46	21	5.9																			33
19	133	9.9	55	22	6.2																			7
20	133	11.4	55	25	6.1																			30
21	88	12.6	58	20	6.0																			28
22	177	8.8	46	22	5.7																			28
23	133	10.5	66	28	6.0																			26
24	133	8.1	69	22	5.8																			26
25	133	11.1	69	31	5.9																			26
26																								26
27	88	13.2	59	21	5.8																			28
28	133	10.7	64	28	5.8																			27
29	133	10.8	63	27	6.0																			29
30	88	16.1	62	27	5.8																			28
31																								
TOTAL	3492																							777
ARITH. MEAN	129	10.3	60	23																				26

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall , MICHIGAN

MONTH October 1973 — MISCELLANEOUS DATA — OPERATOR Robert J. Swalwell

DATE	WEATHER				RAW SEWAGE					~~sec~~ water	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD													
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate	pH	cf~~x~~	lbs.	KWH	*						
1	.18	74	54	R	59	3.10	3.90	2.50	8.0	2080	133	240	2						* Gas - cu. ft. X 100
2	.18	72	52	R	59	3.04	3.80	2.50	7.7	1990	134	200	4						
3	.06	70	56	R	58	3.01	3.50	2.40	7.3	1990	131	240	3						
4	.22	68	42	R	59	2.99	3.80	2.50	7.5	2010	133	200	3						
5		56	38	C	59	2.93	3.60	2.40	7.7	2300	135	240	4						
6	.20	78	38	R	57	2.86	3.50	2.50	7.4	1950	133	200	3						
7		68	50	CL	57	2.88	3.40	2.50	7.5	2030	117	200	3						
8		72	54	CL	58	3.05	3.70	2.60	7.5	2000	134	200	4						
9		78	56	C	58	2.92	3.70	2.30	7.5	1980	134	240	3						
10		77	54	C	58	2.84	3.50	2.30		2100	124	200	4						
11		75	54	C	59	2.87	3.40	2.30	7.6	2140	133	200	3						
12	.37	70	58	R	59	2.89	3.60	2.30	7.5	2120	136	200	3						
13	.45	64	40	R	59	2.93	3.60	2.40		2110	117	200	4						
14		64	44	C	58	2.85	3.50	2.30	7.5	2090	115	200	10						
15	.02	64	37	R	58	2.92	3.70	2.40	7.7	2090	131	240	15						
16		51	33	CL	59	2.82	3.70	2.20	7.6	2080	139	240	14						
17		54	34	C	57	2.80	4.40	2.30	7.6	2200	134	280	20						
18		52	32	C	58	2.76	3.40	2.20	7.7	2620	137	320	12						
19		66	36	C	57	2.81	3.60	2.40	7.5	2240	131	320	12						
20		66	34	C	56	2.76	3.40	2.30	7.6	2250	124	280	17						
21		59	33	C	56	2.77	3.40	2.30	7.5	2290	111	280	26						
22		62	36	C	58	2.78	3.60	2.20	7.6	2250	137	360	23						
23		66	36	C	58	2.77	3.50	2.40	7.5	2230	137	280	24						
24		68	40	C	57	2.74	3.40	2.30	7.6	2210	134	280	23						
25		68	48	C	57	2.74	3.60	2.30	7.5	2260	131	280	23						
26		58	37	C	58	2.63	3.30	2.20	7.6	2240	133	280	26						
27	.28	56	37	R	56	2.70	3.10	2.20	7.6	2330	116	280	30						
28	.07	56	36	R	56	2.63	3.20	2.20	7.6	2250	108	280	28						
29	.13	48	42	R	57	2.69	3.70	2.20	7.6	2240	138	280	12						
30	.02	50	44	R	57	2.65	3.20	2.30	7.6	2280	138	320	13						
31	.46	51	38	R	57	2.66	3.50	2.30	7.7	2220	125	200	11						
TOTAL	2.64										4013	7760	382						
ARITH. MEAN						2.83				2167	129								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4 1

Marshall, MICHIGAN

MONTH October 19 73 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF		EFF.		INF.		EFF.		REM.	
	Mg l	LBS X 10	Mg/l	LBS. X 10	%	Mg l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg l	LBS. X	Mg l	LBS. X	%	
1	48	124	45	116	6	48	124	39	101	19	38	98	33	85	3.2	83	3.8	98	-15	
2	48	122	45	114	6	83	210	41	104	51	60	152	27	68	3.8	96	3.8	96	0	
3	63	158	39	98	38	88	221	38	95	57	62	156	25	63	4.0	100	3.8	95	5	
4	57	142	33	82	42	100	249	38	95	62	76	190	36	90	4.0	100	3.6	90	10	
5	51	125	36	88	29	59	144	32	78	46	40	98	19	46						
6	57	136	57	136	0	71	169	51	122	28	45	107	40	95						
7	54	130	53	127	2	69	166	53	127	23	52	125	35	84	3.8	91	3.2	77	15	
8	52	132	48	122	8	78	198	52	132	33	56	142	35	89	4.1	104	3.9	99	5	
9	56	136	45	110	20	108	263	40	97	63	82	200	32	78	3.6	88	3.6	88	0	
10																				
11	54	129	52	124	4	70	168	60	144	14	56	134	24	57	3.8	91	3.6	86	5	
12	68	164	48	116	29	65	157	50	121	23	50	121	38	92						
13																				
14						31	74	28	67	10	20	48	14	33	3.4	81	3.4	81	0	
15	50	122	28	68	44	64	156	25	61	60	50	122	18	44	4.0	97	2.8	68	30	
16	63	148	63	148	0	97	228	41	96	58	85	200	31	73	4.2	99	4.2	99	0	
17	76	177	60	140	21	125	292	45	105	64	89	208	27	63	4.2	98	4.8	112	-14	
18	69	159	42	97	39	174	401	52	120	70	129	297	38	87	4.6	106	3.8	87	17	
19	63	148	57	134	10	85	199	58	136	32	49	115	37	87						
20	51	117	51	117	0	64	147	33	76	48	52	120	16	37						
21	66	152	60	139	9	105	243	43	99	59	85	196	33	76	3.6	83	3.6	83	0	
22	108	250	69	160	36	100	232	39	90	61	69	160	16	37						
23	88	203	51	118	42	142	328	52	120	63	97	224	30	69						
24	70	160	60	137	14	101	231	42	96	58	69	158	29	66	3.6	82	3.6	82	0	
25	56	128	56	128	0	68	155	48	110	29	44	101	32	73	3.8	87	3.8	87	0	
26	56	123	51	112	9	68	149	40	88	41	51	112	21	46						
27	57	128	55	124	4	59	133	37	83	37	43	97	25	56						
28	66	145	44	96	33	129	283	44	96	66	110	241	36	79	4.0	88	3.8	83	5	
29	60	135	48	108	20	117	262	39	87	67	86	193	25	56	4.8	108	4.0	90	17	
30	63	139	57	126	10	98	217	46	102	53	68	150	32	71	3.8	84	3.6	80	5	
31	79	175	51	113	35	112	248	41	91	63	89	197	33	73	3.6	80	3.2	71	11	
TOTAL		4107		3298			6047		2939			4462		1973		1846		1752		
MEAN	62	147	50	118	18	89	209	43	101	47	66	154	29	68	3.9	92	3.7	88	4.8	

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH October 19 73

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. X 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/ 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X 10	Total Solids %	Vol. Solids %	pH	
1	133	10.2	59	24	6.0																			26
2	133	12.5	55	28	5.6																			24
3	133	10.4	66	28	6.0																			25
4	88	16.0	47	20	5.8																			24
5	133	12.2	62	31	5.7																			25
6	133	12.5	58	29	5.8																			27
7	88	14.2	55	21	5.6																			27
8																								26
9	133	12.8	59	30	5.7																			26
10	88	14.3	62	24	5.9																			22
11	133	11.1	65	29	5.9															1275	10.4	56		7
12	88	14.7	60	24	5.9																			16
13	133	11.5	71	33	5.8																			17
14	133	12.9	61	32	5.8																			16
15																								14
16																								14
17																								12
18	133	11.9	60	29	5.9																			25
19	88	13.0	63	22	5.9																			10
20	133	11.8	62	29	6.1																			16
21	88	13.9	66	25	5.9																			20
22																								19
23	177	10.0	61	33	6.1																			20
24	155	8.0	56	21	5.9																			20
25	133	13.0	60	32	5.9																			20
26	133	10.9	60	26	5.8																			20
27	199	12.9	60	47	6.0																			23
28	88	13.7	58	21	5.9																			22
29	177	9.1	60	29	6.1																			24
30	265	9.8	60	48	6.0																			19
31	221	10.7	61	44	6.0																			
TOTAL	3536																			1275				606
ARITH. MEAN	136	12.1	60	29																1275	10.4	56		20

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH November 1973 — MISCELLANEOUS DATA — OPERATOR

DATE	WEATHER				RAW SEWAGE						Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH	~~CFM~~ water									
	Inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate		cf/~~MG~~	lbs.	KWH	*						
1		50	38	CL	58	2.62	3.40	2.20	7.6	2230	119	200	11						* Gas - cu. ft. X 100
2	.20	48	30	R	57	2.63	3.50	2.20	7.5	2230	126	240	15						
3		45	32	C	55	2.56	3.20	2.20	7.5	2240	111	240	14						
4		44	28	CL	55	2.61	3.10	2.20	7.5	2210	106	160	17						
5		36	24	C	57	2.65	3.50	2.10	7.6	2290	126	320	17						
6		37	22	C	56	2.62	3.00	2.10	7.6	2280	115	320	19						
7		40	32	C	56	2.62	3.30	2.10	7.5	2240	130	320	40						
8	.03	40	26	R	56	2.58	3.00	2.10	7.6	2300	125	280	46						
9		40	24	CL	56	2.55	3.20	2.10	7.6	2310	119	320	35						
10		38	28	CL	54	2.50	3.10	2.00	7.7	2300	111	280	44						
11		44	32	C	54	2.52	3.00	2.00	7.5	2300	104	280	42						
12		54	42	C	56	2.63	3.30	2.10	7.5	2310	129	320	34						
13		60	40	CL	56	2.58	3.20	2.10	7.5	2270	125	280	27						
14	1.43	62	44	R	56	2.77	3.50	2.30	7.6	2320	122	280	27						
15	.05	48	30	R	56	2.77	3.40	2.20		2310	125	320	27						
16	T	36	27	S	56	2.72	3.50	2.20	7.5	2330	125	280	31						
17		42	30	CL	54	2.66	3.40	2.20	7.5	2360	120	280	33						
18		50	37	C	55	2.62	3.20	2.20	7.4	2270	114	320	30						
19		47	39	CL	55	2.74	3.60	2.10	7.5	2320	123	280	18						
20	.21	52	40	R	54	2.70	3.30	2.20	7.4	2340	116	320	11						
21		58	31	CL	56	2.75	3.60	2.10	7.4	2470	128	280	12						
22		54	32	C	54	2.55	3.20	2.20	7.4	2350	111	280	11						
23	.24	58	36	R	54	2.60	3.20	2.20	7.4	2280	75	280	13						
24	.13	59	36	R	55	2.72	3.20	2.20	7.5	2410	110	320	12						
25	.03	40	36	R	54	2.68	3.10	2.20	7.6	2510	102	280	13						
26	.01	48	40	R	55	2.74	3.60	2.20	7.4	2200	115	320	16						
27	.88	53	42	R	54	2.81	4.10	2.30	7.3	2440	111	280	12						
28	.17	42	30	R	54	2.92	3.80	2.30	7.3	2340	117	320	17						
29		37	30	CL	52	2.76	3.50	2.30	7.2	2330	115	320	17						
30		48	24	C	54	2.83	3.60	2.30	7.8	2340	118	320	17						
31																			
TOTAL	3.38										3377	8640	678						
ARITH. MEAN						2.67				2314	113								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH November 1973 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP. VOLATILE SOLIDS				Total PHOSPHORUS – P					REMARKS
	INF.		EFF.		REM.	INF.		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	72	157	51	111	29	69	151	27	59	61	61	133	21	46						
2	76	167	65	143	14	85	186	54	118	36	64	140	38	83						
3	60	128	48	102	20	146	312	38	81	74	143	305	18	38						
4	72	157	54	118	25	108	235	54	118	50	78	170	37	81	3.6	78	3.6	78	0	
5	72	159	57	126	21	129	285	45	99	65	92	144	29	64	4.0	88	4.0	88	0	
6	57	125	42	92	26	119	260	47	103	61	84	184	31	68	3.8	83	3.6	79	5	
7	70	153	48	105	31	112	245	43	94	62	67	146	26	57	4.4	96	3.8	83	14	
8	69	148	63	136	9	98	211	36	77	63	75	161	22	47	4.4	95	4.0	86	9	
9	54	115	51	108	6	63	134	36	77	43	44	94	24	51						
10	69	144	60	125	13	64	133	39	81	39	47	98	29	60						
11	57	120	51	107	11	77	162	46	97	40	55	116	31	65	3.4	71	3.2	67	6	
12	57	125	48	105	16	76	167	38	83	50	55	121	32	70	3.8	83	3.8	83	0	
13	45	97	39	84	13	68	146	40	86	41	49	105	27	58	3.4	73	3.2	69	6	
14	68	157	45	104	34	96	222	40	92	58	65	150	25	58	4.2	97	3.2	74	24	
15																				
16	56	127	40	91	29	71	161	33	75	54	55	125	23	52						
17	60	133	45	100	25	90	200	36	80	60	74	164	29	64						
18	60	131	42	92	30	55	120	40	87	27	40	87	26	57						
19	60	137	57	130	5	57	130	43	98	25	34	78	31	71	3.6	82	3.2	73	11	
20	68	153	51	115	25	72	162	45	101	38	49	110	34	77	3.6	81	3.4	77	5	
21																				
22	60	128	48	102	20	78	166	28	60	64	60	128	18	38						
23	80	173	51	111	36	40	87	38	82	5	37	80	26	56						
24	60	136	51	116	15	46	104	40	91	13	36	82	27	61						
25	54	121	51	114	6	75	168	37	83	51	55	123	25	56	3.4	76	3.2	72	6	
26	78	178	51	117	35	80	183	40	91	50	49	112	26	59	4.8	110	4.0	91	17	
27	51	120	45	105	12	61	143	46	108	25	43	101	32	75	3.4	80	3.4	80	0	
28	66	161	48	117	27	76	185	48	117	37	51	124	29	71	3.6	88	2.8	68	22	
29	60	138	42	97	20	56	129	24	55	57	39	90	21	48	3.8	87	3.4	78	11	
30	57	135	43	101	25	82	194	42	99	49	57	135	23	54						
31																				
		3923		3074			4981		2492			3606		1685		1368		1246		
	03	140	50	110	21	80	178	40	89	46	59	129	27	60	3.8	86	3.5	78	8.5	

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH November 1973

DIGESTER AND SLUDGE DATA

OPERATOR Robert J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals. 10	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. 10^X	Total Solids %	Vol. Solids %	pH	
1																								34
2	155	10.6	70	35	6.0																			23
3	133	12.3	53	26	5.8																			21
4	88	9.6	59	15	5.7																			18
5	221	9.2	59	36	5.9																			19
6	133	12.3	58	29	6.0																			19
7	88	10.8	48	14	5.6	74																		18
8						78														1280	8.5	48		19
9	88	14.1	53	20	5.8	80		1.1	50															16
10	88	15.8	54	23	5.9	84																		19
11	88	15.3	56	23	5.9	86																		19
12	133	9.6	51	20	6.0	90																		18
13	133	12.9	55	29	5.7	92																		19
14	221	11.1	57	42	6.0	93																		22
15	88	13.5	55	20	6.0	94																		22
16	133	12.9	56	29	5.9	94																		24
17	88	11.0	54	16	5.9	94																		24
18	88	10.5	45	13		95																		21
19	88	13.1	68	24	5.9	95																		20
20	88	14.1	54	20	5.9	95																		20
21	133	9.5	53	20	5.9	91		3.9	49			11492		.26	51	1020			495					21
22						92																		22
23	88	10.0	52	14	5.9	92																		21
24	88	13.8	54	20	6.2	94																		22
25						94																		24
26	88	12.5	52	17	6.1	95																		23
27	88	14.9	50	20	6.0	96																		22
28	133	13.0	53	28	6.0	96																		21
29	133	13.5	49	27	6.2	96																		24
30	133	14.0	51	29	5.8	96																		22
31																								
TOTAL	3028											11492								1280				637
ARITH. MEAN	117	12.3	55	23		91		2.5	49			11492								1280	8.5	48		21

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4

Marshall, MICHIGAN

MONTH December 1973 — MISCELLANEOUS DATA — OPERATOR Robert J Swalwell

DATE	WEATHER				RAW SEWAGE					~~Sludge~~ Water ~~xxxx~~	Cl_2	POWER	AUX. FUEL	CHEMICALS APPLIED					REMARKS
	Precip.	Temp. (°F)		Type	Temp.	Flow MGD			pH	~~xxxx~~ cu. ft.									
	inches	Max.	Min.		°F	Total MGD	Max. Rate	Min. Rate			lbs.	KWH	*						
1		38	26	C	53	2.75	3.30	2.30		2360	101	320	16						*Gas-Cu. Ft. X 100
2		48	27	C		2.78	3.30	2.30	7.6	2410	105	105	13						
3		56	42	C	55	2.82	3.70	2.30	7.4	2320	124	320	4						
4	.50	52	40	R	54	2.90	3.60	2.30	7.4	2380	110	280	5						
5	.07	40	24	R	54	280	3.60	2.20	7.7	2490	111	360	15						
6		30	24	Cl	54	2.75	3.20	2.20	7.5	2390	110	320	18						
7		34	24	C	54	2.72	3.60	2.10	7.3	2320	111	280	14						
8		38	22	C	54	2,68	3.30	2.10	7.6	2390	100	320	17						
9	.06	36	22	S	53	2.73	3.10	2.10	7.5	2160	93	320	34						
10	.03	38	18	S	54	2.74	3.50	2.10	7.5	2310	119	280	18						
11		37	17	Cl	54	2.71	3.30	2.10	7.5	2360	118	280	14						
12	.57	34	18	R	53	2.74	3.50	2.20	7.5	2410	96	320	20						
13	.22	32	14	R	53	2.71	3.10	2.20	7.5	2440	123	320	21						
14		20	12	Cl	53	2.72	3,60	2.10	7.5	2410	123	320	22						
15		25	10	Cl	52	2.61	3.20	2.00	7.6	2410	113	320	23						
16		18	2	C	52	2.63	3.10	2.20	7.5	2500	115	240	20						
17		18	4	C	52	2.68	3.50	2.10	7.5	2630	117	280	20						
18	.08	26	16	S	52	2.64	3.10	2.10	7.4	2480	118	280	22						
19	1.00	22	18	S	52	2.62	3.30	2.00	7.4	2540	120	320	21						
20		26	8	Cl	52	2.55	3.20	2.10	7.6	2490	113	18	18						
21		25	7	C	52	2.58	3.10	2.00	7.4	2910	118	320	20						
22		26	8	C	52	2.58	3.30	2.00		3080	111	320	34						
23		36	22	Cl	52	2.58	3.10	2.10	7.5	3110	118	~~280~~	14						
24	.58	36	22	R	52	2.63	3.20	2.10	7.7	2580	118	320	13						
25	.09	42	24	R	52	2.75	3.10	2.40	7.3	2590	113	320	16						
26	.70	38	22	R		3.03	3.90	2.50	7.2	2640	116	360	13						
27		34	26	Cl		3.05	3.80	2.50	7.6	2630	116	360	19						
28		30	24	Cl		3.00	3.70	2.40	7.9	2840	121	320	6						
29	.05	32	18	R	51	2.93	3.60	2.30	7.7	2630	77	360	6						
30	.06	24	12	R	52	2.88	3.30	2.20	7.6	2670	96	360	7						
31		22	10	Cl	51	2.90	3.60	2.10	7.5	2650	112	360	17						
TOTAL	4.01										3456	9720	520						
ARITH MEAN						2.75				2533	111								

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.1

Marshall, MICHIGAN

MONTH December 19 73 — PRIMARY TREATMENT DATA — OPERATOR Robert J. Swalwell

DATE	5-DAY BOD					SUSPENDED SOLIDS					SUSP VOLATILE SOLIDS				Total PHOSPHORUS - P					REMARKS
	INF.		EFF		REM.	INF		EFF.		REM.	INF.		EFF.		INF.		EFF.		REM.	
	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	%	Mg/l	LBS. X 10	Mg/l	LBS. X 10	Mg/l	LBS. X	Mg/l	LBS. X	%	
1	70	161	46	106	34															
2	63	146	36	83	43	123	285	28	65	77	97	225	17	39	3.8	88	3.6	83	5	
3	63	148	45	106	29	120	282	47	111	61	96	226	31	73	3.8	89	3.8	89	0	
4	51	123	39	94	24	130	314	42	102	68	87	210	21	51	3.2	77	2.8	68	12	
5	69	161	51	119	26	96	224	36	84	63	63	147	25	58	3.6	84	2.8	65	22	
6	66	151	50	115	24	69	158	32	73	54	50	115	23	53	3.2	73	2.8	64	13	
7	48	109	42	95	13	66	150	34	77	48	50	113	19	43						
8	66	148	45	101	17	51	114	24	54	53	34	76	13	29						
9	51	116	45	102	12	77	175	29	66	62	60	137	20	46	2.6	59	2.6	59	0	
10	48	110	42	96	13	62	142	37	85	40	37	85	23	53	3.6	82	3.2	73	11	
11						140	316	48	108	66	101	228	23	52	3.4	77	3.2	72	6	
12	73	167	42	96	42	111	254	42	96	62	74	169	28	64	4.2	96	4.0	91	5	
13	60	136	51	115	15	56	126	25	57	55	43	97	18	41						
14	51	116	30	68	41	52	118	30	68	42	32	73	19	43						
15	57	124	44	96	23	44	96	43	94	2	31	67	30	65						
16	66	145	36	79	45	129	283	35	77	73	87	191	23	50	3.6	79	3.0	66	17	
17	51	114	45	101	12	71	159	41	92	42	50	112	28	63	4.2	94	3.6	80	14	
18	63	139	39	86	38	68	150	31	68	54	37	81	18	40	3.8	84	3.8	84	0	
19	92	201	45	98	51	140	306	48	105	66	98	214	30	66						
20	60	128	42	89	30	78	166	36	77	54	52	111	26	55						
21	57	123	39	84	32	67	144	37	80	45	48	103	26	56						
22																				
23	60	129	42	90	30	83	179	28	60	66	69	148	21	45	3.6	77	3.2	69	11	
24	60	132	51	112	15	28	61	15	33	46	21	46	9	20						
25	48	110	32	73	33	150	344	23	53	85	121	278	15	34	3.6	83	3.2	73	11	
26	66	167	60	152	9	137	346	38	96	72	106	268	27	68						
27						50	127	46	117	8	36	92	30	76	3.2	81	3.0	76	6	
28	45	113	45	113	0	68	170	46	115	32	50	125	27	68						
29	45	110	39	95	13	50	122	45	110	11	37	90	36	88						
30	54	130	33	79	39	67	161	26	62	61	48	115	17	41	2.8	67	2.4	58	14	
31	42	102	36	87	14	55	133	24	58	56	47	114	20	48						
TOTAL		3759		2730			5605		2343			4056		1528		1290		1170		
ARITH MEAN	59	134	43	98	26	84	193	35	81	53	61	140	23	53	3.5	81	3.2	73	9	

Digester Volume, ft³
Primary 14,000
Secondary 14,000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Raw wetwell
Process Pattern raw-pri.dig.-sec.dig.-beds

MONTH December 1973

DIGESTER AND SLUDGE DATA

OPERATOR

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X 100
	Gals.	Total Solids	Vol. Solids		pH	Temp.	pH	Total Solids	Vol. Solids	Vol. Acids	Alkalinity	Gals.	pH	Total Solids	Vol. Solids	Susp. Solids	P	P	5-Day BOD	Gals.	Total Solids	Vol. Solids	pH	
	10^X	%	%	Lbs/ 1000 c.f. Digester		°F		%	%	Mg/l	Mg/l	X		%	%	Mg/l	Mg/l	Lbs.	Mg/l	X	%	%		
1	177	5.2	63	18	5.8	96																		22
2						96																		14
3	133	9.6	57	22	6.0	96																		7
4	177	12.8	51	35	6.1	94																		27
5	133	12.1	53	26	6.3	96																		22
6	133	11.1	57	26	6.2	96																		24
7	88	10.7	55	16	6.1	96																		24
8	88	10.4	49	14	6.2	96																		23
9	133	9.8	52	20	6.2	94																		23
10	133	10.3	55	23	6.1	94																		6
11	133	6.4	66	17	6.1			2.7	54			12376		.22	46	600			280					31
12	88	11.9	54	17	6.1	92																		27
13	155	8.6	56	23	6.2	94																		27
14	133	11.6	59	27	6.1	95																		28
15	88	12.1	55	18	6.1	95																		28
16	88	10.9	57	17	6.1	95																		14
17																								22
18	133	9.8	55	22	6.1	90																		5
19	177	12.9	53	37	6.1	86		5.9	57			15028		.30	59	1560			510					7
20	111	10.6	54	19	6.1	86																		12
21																								38
22	133	10.9	53	23	6.1	86																		25
23	88	11.0	51	15	6.0	86																		22
24	177	8.4	52	23	6.1	88																		23
25						88																		20
26	177	10.3	54	30	6.0	88																		19
27	177	10.5	59	33	5.9	88																		18
28	133	9.9	56	22	6.0	88		.70	80			10608		.26		1420			780					25
29	133	9.0	57	21	6.3	89																		26
30	88	10.5	57	16	6.6	90																		26
31	133	6.0	63	15	6.2	90																		23
TOTAL	3536											38012												658
ARITH. MEAN	131	10.1	56	22		92		3.1	64			12670		.26	53	1193			523					21

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.J. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTHLY OPERATING REPORT

January (MONTH) 1975 (YEAR)

THIS IS THE REPORT FORM FOR → 1.1 CPS 58500 50 District 03
Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

* DO NOT REPORT THE HIGHEST DAILY VALUE FOR PARAMETERS LIMITED BY A 7 DAY AVERAGE IN A PERMIT. INSTEAD REPORT THE HIGHEST 7 DAY AVERAGE FOR THESE PARAMETERS.

COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.
PLEASE USE UNITS SPECIFIED.

CODE NO. 89 (1-2) | STATION NO. 130029 (3-8)

REMARKS CODE 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO	23540 / 85001	23540 / 00310	23540 / 85002	23540 / 00530	23540 / 31504
NAME / UNITS	BOD-5#/D LBS/DAY	BOD-5 MG/L	SOLSUS D LBS/DAY	SOLIDSUS MG/L	COLI-TMF MF/100ML
STD.	< 1350 / 7D < 1760	< 50 / 7D < 65	< 1220 / 7D < 1620	< 45 / 7D < 60	< 1000
STD.					
MONTHLY SUMMARY	549 AVERAGE; 680 * HIGH; 229	28 AVERAGE; 34 * HIGH; 12	678 AVERAGE; 680 * HIGH; 114 LOW	32 AVERAGE; 37 * HIGH; 6	24 AVERAGE; 80 * HIGH; 10
REMARKS CODE					
	0 0	0 0	0 0	0 0	0 0
SAMPLE TYPE	2 4	2 4	2 4	2 4	G R
	5 - 7	5 - 7	5 - 7	5 - 7	3 - 7
	0 1 0 1 7 5				
	MONTH DAY YEAR				
	0 1 3 1 7 5				

ORDER NO / PARAM NO	23540 / 50050	23540 / 00400			
NAME / UNITS	FLOW-MGD MGD	PH SU			
STD		> 6.5 / < 9.5			
STD					
MONTHLY SUMMARY	2.35 AVERAGE; 2.57 * HIGH; 2.[illegible]	7.6 AVERAGE; 7.4 * HIGH; 7.4	AVERAGE; * HIGH	AVERAGE; * HIGH	AVERAGE; * HIGH
REMARKS CODE					
		0 0			
SAMPLE TYPE	1 4	2 4			
	2 0 n T	7 - 7			
	0 1 0 1 7 5				
	0 1 3 1 7 5				

SIGNATURE OF CERTIFIED OPERATOR Robert J. Swalwell

CERTIFICATION NUMBER 585

R 4515-M REV. 3/73

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

January, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Swalwell — Superintendent's Signature

1 2	3 8	9 10	11 12	13 15
ID	130029	01	75	500
	Plant No	Mo	Yr	Sampling Point Code

DAY 1 2	WEATHER TYPE 9	WEATHER PRECIP. 14	FLOW TOTAL 19	FLOW MAX RATE 24	RAW SEWAGE QUALITY TEMP 29	pH 34	BOD-5 39	BOD-5 44	SS 49	SS 54	TOTAL-P 59	TOTAL-P 64	VSS 69	NH_3-N 74 78	80	REMARKS OR O 9	14	19
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C			
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C			
SF															C			
01	3		2.18	2.50	51	7.9	51	927	62	1127					C			
02	5	.13	2.39	3.80	51	7.8	66	1315	111	2212					C			
03	5	.04	2.35	3.10	51										C			
04	3		2.24	2.60	51	7.7	51	952	64	196					C			
05	1		2.24	2.70	51	7.8	57	1065	73	1364					C			
06	3		2.36	3.90	52	7.9	51	1004	86	1692					C			
07	4	.28	2.33	2.90	52	7.8	63	1224	124	2410					C			
08	4	.78	2.54	3.20	52	7.7	45	953	133	2817					C			
09	4	.19	2.49	3.00	51	7.7	67	1391	117	2429					C			
10	4	.48	2.57	3.40	51	7.9	75	1607	62	1329					C			
11	3		2.47	2.80	52	7.9	50	1030	51	1050					C			
12	3		2.47	2.70	51	7.8	43	886	55	1133					C			
13	5	.02	2.55	4.00	51	7.8	36	765	41	872					C			
14	3		2.50	3.10	52	7.8	51	1063	111	2314					C			
15	5	.05	2.47	3.10	50	7.9	30	618	59	1215					C			
16	3		2.35	4.00	51	7.8	32	627	40	784					C			
17	5	.11	2.37	3.10	50	7.9	41	811	82	1621					C			
18	5	.03	2.30	4.00	50	7.9	28	537	50	959					C			
19	3		2.26	2.80	50	7.9	42	791	75	1414					C			
20	3		2.33	3.00	50	7.9	47	913	102	1982					C			
21	3		2.30	2.90	50	7.9	46	882	42	805					C			
22	3		2.24	3.60	50	7.9	64	1222	41	1738					C			
23	3		2.26	4.20	50	7.6									C			
24	4	.15	2.24	3.10	50	7.9	39	745	34	649					C			
25	4	.16	2.24	2.60	50	7.9	56	1046	66	1233					C			
26	5	.01	2.22	2.60	50	7.9	50	926	71	1314					C			
27	3		2.29	3.10	50	8.1	27	516	64	1222					C			
28	4	.71	2.33	2.70	50	7.5									C			
29	3		2.35	3.20	50	7.7	41	804	48	1921					C			
30	3		2.33	2.90	50										C			
31	3		2.29	3.00	50	7.8	45	860	79	1509					C			
TL		3.14	72.45					25,480		40,311					C			
ME			2.35				48	944	76	1,493					C			

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

January , 19 75
Month

Marshall , Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID | 1300029 | 01 | 75 | 600
Plant No Mo Yr Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F COLI*		T. COLI*	REMARKS
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14 19
1 2	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	LBS.	% Rem	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	(31504) 31505	
SF															C		
01	21	381	59	24	436	61						7.8			C		
02	30	598	55	60	1196	46						7.8			C		
03															C		
04	36	672	29	21	392	67						7.6			C		
05	39	729	32	26	486	64						7.6			C		
06	30	590	41	38	748	56						7.6			C	25	
07	36	699	43	51	991	59						7.7			C		
08	30	635	33	45	953	66						7.5			C	10	
09	36	747	46	29	602	75						7.5			C		
10	27	579	64	27	574	56						7.5			C		
11	38	783	24	12	247	76						7.5			C		
12	30	618	30	31	639	44						7.6			C		
13	24	510	33	12	255	70						7.6			C		
14	24	500	53	46	959	59						7.5			C	25	
15	26	535	13	41	844	31						7.6			C		
16	26	510	19	25	490	38						7.5			C	25	
17	27	534	34	33	652	60						7.6			C		
18	20	384	29	29	556	42						7.7			C		
19	27	509	36	49	924	35						7.8			C	86	
20	14	272	70	36	699	65						7.7			C	45	
21	12	230	74	6	115	85						7.7			C		
22	36	687	44	46	879	49						7.6			C		
23												7.5			C		
24	30	573	23	6	114	82						7.6			C		
25	26	486	54	23	430	65						7.5			C		
26	30	555	40	23	426	68						7.7			C		
27	12	229	56	23	439	64						7.4			C		
28												7.4			C		
29	33	647	20	49	960	50						7.5			C		
30															C		
31	33	630	27	35	669	56						7.5			C		
T-		14,822			16,680										C		
AVE	28	549	40	32	618	59						7.6			C	36	
AVG	34	680	29	37	680	48									C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

January, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Swahill — Superintendent's Signature

1 2 | 3 8 | 9 10 | 11 12 | 13 15
ID | 13,0,0,29 | 0,1 | 75 | . .
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX.FUEL 14 GAS CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		5400	360			123					
02		6100	320			126					
03		700	320			125					
04		1600	280			112					
05		1400	320			117					
06		5500	320			116					
07		4900	320			122					
08		2,100	280			117					
09		1300	280			123					
10		[illegible]00	320			117					
11		2100	280			116					
12		2500	280			115					
13		2300	360			112					
14		2200	320			119					
15		2100	320			117					
16		[illegible]00	280			114					
17		1400	320			114					
18		1600	320			99					
19		2200	320			101					
20		2100	280			113					
21		1700	320			116					
22		1700	320			118					
23		1500	280			104					
24		3100	320			111					
25		4200	280			111					
26		[illegible]00	320			112					
27		5100	320			124					
28		1300	320			114					
29		4700	280			81					
30		1600	320			116					
31		4600	280			113					
TL		81800	9560			3487					
ME		2900	308			112					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL			
Superintendent	1		176
Asst. Supt.	1		176
Shift Foreman			
Shift Operator	1		180
Maint Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL AR

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft^3
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-45

Supernatant To Wet Well
Process Pattern Raw PM Sea-Wing-Bar

MONTH January 1975

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swawell

	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				
TE	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5 Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	Gas Produced cu. ft X
1						83																		
2	884	11.0	49	15	5.9	86																		
3	884	10.2	60	16	5.8	84	4.9	1.8	54			11,412		.14	46	560			690					1
4	1768	9.7	63	33	6.0	86																		
5	1326	10.0	61	24	5.7	82																		
6						81																		1
7	2210	7.0	61	29	6.0	88																		
8	1105	8.0	64	17	6.1	91																		
9	1105	9.2	65	20	6.1	88																		
10	1768	6.7	63	23	6.2	86																		
11	884	6.2	67	11	5.8	83																		
12	1326	9.2	70	26	5.8	80																		
13						77																		
14	1768	8.7	66	30	5.8	76	4.3	.8	67			12376	7.3	.13	57	620			785					
15	884	9.4	59	16	6.1	74																		
16	884	6.9	68	13	6.2	73																		
17	1326	8.7	61	21	6.2	72																		1
18	884	5.1	65	9	6.1	71																		
19	884	7.6	62	13	6.2	70																		
20	884	8.1	65	14	6.1	69																		
21	884	8.3	60	13	6.2	68																		
22	1547	9.1	67	29	6.1	67																		
23	884	6.6	61	11	6.2	66																		1
24						65																		
25	1326	7.6	66	20	6.1	65																		
26	1326	6.8	66	18	6.2	67																		
27	1326	9.4	86	33	5.8	74																		
28	884	8.3	68	15	6.2	76																		
29	884	8.8	62	15	6.3	78	5.1	1.9	53			7072												
30	1768	6.2	60	20	6.3	80																		
31	1326	7.1	62	18	6.4	83																		
TOTAL	32924											30,931												4
ARITH. MEAN	1220	8.3	64	20		77		1.5	58			10,310		.14	52	1040			738					1

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.C. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTHLY OPERATING REPORT

February (MONTH) 1975 (YEAR)

THIS IS THE REPORT FORM FOR →

1.1 CPS 58500 50 District 03
Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

* DO NOT REPORT THE HIGHEST DAILY VALUE FOR PARAMETERS LIMITED BY A 7 DAY AVERAGE IN A PERMIT. INSTEAD REPORT THE HIGHEST 7 DAY AVERAGE FOR THESE PARAMETERS.

COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.
PLEASE USE UNITS SPECIFIED.

CARD NO 89 (1-2) | STATION NO 130029 (3-8)

REMARKS CODE: 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO (9-13) / (14-18)	23540 / 85001	23540 / 00310	23540 / 85002	23540 / 00530	23540 / 31504
NAME	BOD-5#/D	BOD-5	SOLSUS#D	SOLIDSUS	COLI-TMF
UNITS	LBS/DAY	MG/L	LBS/DAY	MG/L	MF/100ML
STD.	< 1350	< 50	< 1220	< 45	< 1000
STD.	7D < 1760	7D < 65	7D < 1620	7D < 60	
MONTHLY SUMMARY: (21-28)	26 / 604 AVERAGE (29)	26 / 32 AVERAGE (29)	26 / 648 AVERAGE (29)	26 / 34 AVERAGE (29)	67 / 16 AVERAGE (29)
(30-37)	634 *HIGH (38)	34 *HIGH (38)	720 *HIGH (38)	36 *HIGH (38)	90 *HIGH (38)
19/20 (39-46)	301 LOW (47)	15 LOW (47)	276 LOW (47)	15 LOW (47)	00 LOW (47)
REMARKS CODE					
NUMBER TIMES EXCEEDED (48-49)	0 0	0 0	0 0	0 0	0 0
SAMPLE TYPE (50-51)	2 4	2 4	2 4	2 4	G R
FREQUENCY OF ANALYSIS (52-56)	5 - 7	5 - 7	5 - 7	5 - 7	3 - 7
DUP PUNCH (57-68)					
BEGINNING DATE (57-62)	0 2 (MONTH) 0 1 (DAY) 7 5 (YEAR)				
ENDING DATE (63-68)	0 2 2 8 7 5				

ORDER NO / PARAM NO (9-13) / (14-18)	23540 / 50050	23540 / 00400			
NAME	FLOW-MGD	PH			
UNITS	MGD	SU			
STD.		> 6.5			
STD.		< 9.5			
MONTHLY SUMMARY: (21-28)	28 / 2.30 AVERAGE (29)	28 / 7.5 AVERAGE (29)	AVERAGE (29)	AVERAGE (29)	AVERAGE (29)
(30-37)	2.59 *HIGH (38)	7.9 *HIGH (38)	*HIGH (38)	*HIGH (38)	*HIGH (38)
19/20 (39-46)	2.14 LOW (47)	7.4 LOW (47)	LOW (47)	LOW (47)	LOW (47)
REMARKS CODE					
NUMBER TIMES EXCEEDED (48-49)		0 0			
SAMPLE TYPE (50-51)	N A	G R			
FREQUENCY OF ANALYSIS (52-56)	C O N T	7 - 7			
DUP PUNCH (57-68)					
BEGINNING DATE (57-62)	0 2 (MONTH) 0 1 (DAY) 7 5 (YEAR)				
ENDING DATE (63-68)	0 2 2 8 7 5				

SIGNATURE OF CERTIFIED OPERATOR Robert Swalwell

CERTIFICATION NUMBER 585

R 4515-M REV. 3/73

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

. . February , 19 75
Month

Marshall , Michigan
Municipality

Robert Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID | 130029 | 02 | 75 | 500
Plant No. Mo. Yr. Sampling Point Code

DAY 1 2	WEATHER TYPE 9	PRECIP. 14	FLOW TOTAL 19	FLOW MAX RATE 24	RAW SEWAGE QUALITY TEMP 29	pH 34	BOD-5 39 44		SS 49 54		TOTAL-P 59 64		VSS 69	NH_3-N 74 78		REMARKS OR 9	14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	80		
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C		
SF															C		
01	3		2.23	2.60	50	7.7	54	1004	70	1302					C		
02	3		2.26	2.60	50	8.0	62	1168	90	1696					C		
03	3		2.29	3.70	50	8.0	36	688	143	2731					C		
04	5	.01	2.27	2.70	50	7.7	42	795	109	2063					C		
05	5	.28	2.29	3.10	50	7.7	60	1146	156	2979					C		
06	5	.03	2.27	2.60	50	7.8	38	719	74	1400					C		
07	3		2.25	3.00	51	7.7	62	1164	80	1502					C		
08	5	.01	2.18	2.60	51	7.7									C		
09	1		2.19	2.70	50	7.6	54	986	90	1643					C		
10	3		2.25	2.90	49	7.6	30	563	75	1408					C		
11	3		2.23	3.70	50	7.7	40	744	77	1432					C		
12	3		2.22	2.90	50	7.6									C		
13	3		2.22	2.60	50	7.2	47	870	34	629					C		
14	5	.05	2.21	2.80	50	7.5	38	700	37	682					C		
15	5	.44	2.19	2.60	50	7.7	57	1041	74	1351					C		
16	4	.06	2.14	2.50	50	7.9	68	1195	63	1108					C		
17	4	.22	2.27	3.90	50	7.7	42	795	51	965					C		
18	5	.17	2.24	2.90	50	7.5	68	1270	70	1345					C		
19	3		2.23	3.70	51	7.6	54	1004	70	1301					C		
20	3		2.24	2.90	50	7.2	50	934	88	1793					C		
21	3		2.23	2.90	51	7.5	53	985	70	1301					C		
22	4	.61	2.41	2.70	51	7.7	42	844	56	1125					C		
23	4	.26	2.51	2.90	52	7.6	53	1109	128	2679					C		
24	5	.04	2.59	3.10	50	7.3	53	1145	80	1728					C		
25	5	.04	2.54	2.90	50	7.7	54	1143	62	1313					C		
26	5	.01	2.50	3.10	50	7.7	51	1063	83	1730					C		
27	3		2.46	2.80	50	7.7	28	574	42	861					C		
28	5	.01	2.45	3.10	50	7.6	60	1226	76	1553					C		
29															C		
30															C		
31															C		
TL		2.24	64.36					24875		39638					C		
ME			2.30				50	957	80	1525					C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

February, 19 75 (Month) — Marshall (Municipality), Michigan — Robert Swalwell (Superintendent's Signature)

1 2 | 3 ... 8 | 9 10 | 11 12 | 13 15
ID | 1300299 | 02 | 75 | 000
Plant No. | Mo. | Yr. | Sampling Point Code

DAY	BOD-5 9 . 14 19			SS 24 29 34			TOTAL-P 39 44 49			VSS 54	NH_3-N 59	pH 64	DO 69	F. COLI* 74	80	T. COLI* 9	REMARK 14
1 2	mg/l	LBS	% Rem.	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	46	855	15	40	744	43						7.5			C		
02	18	339	71	18	339	80						7.9			C		
03	32	611	11	42	802	71						7.5			C	90	
04	31	587	26	37	700	66						7.5			C		
05	53	1012	12	44	840	72						7.5			C	60	
06	32	606	16	37	700	50						7.5			C		
07	23	432	63	36	676	55						7.5			C		
08												7.4			C		
09	30	548	44	35	693	61						7.5			C		
10	22	413	27	20	375	73						7.5			C	20	
11	30	558	25	41	763	47						7.5			C		
12												7.5			C	30	
13	32	592	32	32	592	5						7.5			C		
14	30	553	21	15	276	59						7.5			C		
15	33	603	42	36	657	51						7.6			C		
16	35	615	48	20	352	68						7.8			C		
17	32	606	23	30	568	41						7.6			C		
18	35	654	49	38	710	47						7.4			C		
19	38	706	30	37	688	47						7.4			C	75	
20	32	598	36	48	897	50						7.4			C	0	
21	32	595	46	29	539	59						7.4			C		
22	15	301	64	23	462	59						7.5			C		
23	30	628	43	36	753	72						7.6			C		
24	26	562	51	35	756	56						7.4			C		
25	29	614	46	27	572	56						7.4			C	0	
26	39	813	23	51	1063	39						7.5			C		
27	26	533	7	32	656	24						7.5			C		
28	38	776	37	36	735	53						7.5			C		
29															C		
30															C		
31															C		
TL		15,710			16,854										C		
ME	32	604	35	34	648	54						7.5			C	16	
WA	34	634	28	36	720	45									C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

February, 19 75
Month

Marshall, Michigan
Municipality

Robert Swahnell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
D | 130029 | 02 | 75 | |
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX.FUEL 14 CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		46	280			100					
02		48	280			104					
03		46	320			110					
04		46	320			111					
05		26	320			132					
06		17	320			111					
07		19	280			105					
08		21	320			106					
09		25	240			108					
10		19	320			104					
11		58	320			103					
12		64	320			88					
13		18	320			95					
14		17	320			96					
15		18	280			98					
16		17	280			95					
17		16	320			105					
18		17	320			100					
19		15	320			118					
20		12	320			127					
21		8	280			110					
22		10	320			93					
23		14	280			94					
24		15	360			121					
25		17	320			105					
26		18	320			104					
27		15	320			117					
28		16	280			111					
29											
30											
31											
TL		67800	8600			2971					
ME		2400	307			106					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours	V
TOTAL				
Superintendent	1		160	
Asst. Supt.	1		160	
Shift Foreman				
Shift Operator	1		160	
Maint. Supervisor				
Mechanic				
Chemist				
Lab Technician				
Clerk-Typist				
Other				

GIVE THE HOURS PER DAY PLANT PERSONNEL ARE

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Wet well
Process Pattern R2w-Pri-Sec-dig-beds

MONTH February 1975

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	1326	8.8	63	22	6.2	80																		
2	884	2.7	66	14	6.0	81																		
3						91																		
4	1326	9.4	64	24	6.1	94	5.1	1.4	60			15,912	7.4	.4	56	2160			1125					
5	1768	8.8	72	34	6.2	99																		5
6	1768	8.2	53	23	5.8	90																		
7	884	9.9	58	15	6.0	86																		
8	884	7.3	68	13	6.2	81																		
9	884	7.8	66	14	6.1	77																		
10	884	6.7	67	12	6.1	75																		
11	2210	6.3	66	28	6.2	73																		
12	884	10.9	54	16	5.9	80																		
13	1326	10.9	54	24	5.9	82																		
14	884	6.4	67	12	6.3	78																		
15	884	8.6	68	16	6.2	76																		
16						76																		
17	884	7.5	65	13	6.1	75																		
18						75																		
19	1326	6.3	65	16	6.3	72																		
20	884	4.9	69	9	6.0	70	5.3	2.2	67			16796												
21	884	7.3	68	13	6.1	68																		7
22	1326	7.1	67	19	6.0	70																		
23	884	4.6	88	11	6.0	69																		
24	884	7.5	76	15	6.0	68																		
25	884	7.1	67	13	6.1	67																		
26	1768	7.5	67	29	6.3	66																		
27	884	8.0	59	13	6.1	65																		
28	1326	8.6	59	20	6.2	62																		
29																								
30																								
31																								
TOTAL	28730											32708												12
ARITH. MEAN	1149	7.8	65	18		77		1.8	64			16354		.4	56	2160			1125					6

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.J. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTH YEAR

THIS IS THE REPORT FORM FOR → Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

* DO NOT REPORT THE HIGHEST DAILY VALUE FOR PARAMETERS LIMITED BY A 7 DAY AVERAGE IN A PERMIT. INSTEAD REPORT THE HIGHEST 7 DAY AVERAGE FOR THESE PARAMETERS.

COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.
PLEASE USE UNITS SPECIFIED.

CARD NO (1-2): 89
STATION NO (3-8): 130029

REMARKS CODE: 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO	23540 / 85001	23540 / 00310	23540 / 85002	23540 / 00530	23540 / 31504
NAME / UNITS	BOD-5#/D LBS/DAY	BOD-5 MG/L	SOLSUS#D LBS/DAY	SOLIDSUS MG/L	COLI-TMF MF/100ML
STD	< 1350	7D < 1760	< 50	7D < 65	< 1220	7D < 1620	< 45	7D < 60	< 1000
STD.									
MONTHLY SUMMARY	30 742 AVERAGE	867 * HIGH	464 LOW	30 3.7 AVERAGE	41 * HIGH	2.0 LOW	30 7.21 AVERAGE	9.95 * HIGH	2.88 LOW	30 3.6 AVERAGE	4.9 * HIGH	1.4 LOW	03 45 AVERAGE	40 * HIGH	30 LOW
REMARKS CODE															
NUMBER EXCEEDS	0 C			C O			C C			C C					
SAMPLE TYPE	2 4			2 4			2 4			2 4				G R	
FREQUENCY OF ANALYSIS	5 - 7			5 - 7			5 - 7			5 - 7				3 - 7	
DATE	0 3 C 1 7 5			DUP PUNCH			DUP PUNCH			DUP PUNCH				DUP PUNCH	
	MONTH DAY YEAR														
END DATE	C 3 3 1 7 5														

ORDER NO / PARAM NO	23540 / 50050	23540 / 00400			
NAME / UNITS	FLOW-MGD MGD	PH SU			
STD		> 6.5	< 9.5							
STD.										
MONTHLY SUMMARY	31 2.42 AVERAGE	2.56 * HIGH	2.34 LOW	31 7.4 AVERAGE	7.7 * HIGH	7.2 LOW	AVERAGE	* HIGH	LOW	AVERAGE	* HIGH	LOW	AVERAGE	* HIGH	LOW
REMARKS CODE															
				0 0											
SAMPLE TYPE	N A			G R											
FREQUENCY OF ANALYSIS	C O N T			7 - 7											
DATE	0 3 C 1 7 5			DUP PUNCH			DUP PUNCH			DUP PUNCH			DUP PUNCH		
	MONTH DAY YEAR														
END DATE	C 3 3 1 7 5														

SIGNATURE OF CERTIFIED OPERATOR Robert J Swalwell

CERTIFICATION NUMBER 585

R 4015-M REV 3/73

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

March, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

ID 134029 03 75 500
Plant No Mo Yr Sampling Point Code

DAY	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS OF	
	TYPE	PRECIP.	TOTAL	MAX RATE	TEMP	pH	BOD-5		SS		TOTAL-P		VSS	NH_3-N			
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74 78	80	9	14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C		
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C		
SF															C		
01	5	.01	2.41	2.80	49	7.6	54	1085	63	1266					C		
02	5	.01	2.39	2.80	56	7.5	44	877	38	757					C		
03	5	.02	2.42	3.20	50	7.5	60	1210	129	2603					C		
04	3		2.41	2.90	50	7.6	53	1065	113	2271					C		
05	3		2.41	2.90	50	7.4	48	965	75	1506					C		
06	4	.39	2.40	3.00	50	7.6	59	1181	84	1681					C		
07	4	.12	2.43	3.10	50	7.6	44	891	51	1033					C		
08	3		2.34	2.90	49	7.7	54	1054	66	1288					C		
09	5	.10	2.35	2.80	48	7.7	69	1352	103	2018					C		
10	3		2.40	2.90	50	7.7	39	780	57	1141					C		
11	4	.08	2.38	2.90	49	7.5	45	893	67	1329					C		
12	3		2.41	2.80	49	7.5	57	1146	101	2030					C		
13	3		2.39	3.00	49	7.5	50	997	94	1873					C		
14	3		2.42	3.10	49	7.4	59	1191	60	1210					C		
15	1		2.37	2.90	48	7.5	50	988	141	2786					C		
16	3		2.36	2.70	49	7.5	60	1181	110	2165					C		
17	3		2.39	2.90	50	7.6	51	1016	106	2112					C		
18	4	.20	2.40	4.20	49	7.5									C		
19	3		2.41	2.80	50	7.3	62	1264	130	2612					C		
20	4	.06	2.39	2.90	50	7.4	51	1016	72	1435					C		
21	4	.31	2.42	3.70	50	7.7	45	908	59	1190					C		
22	3		2.38	3.00	49	7.4	54	1071	59	1171					C		
23	4	.42	2.41	2.60	48	7.4	56	1125	87	1748					C		
24	5	.05	2.49	3.10	50	7.4	50	1038	79	1640					C		
25	5	.02	2.47	3.10	50	7.4	42	865	83	1710					C		
26	3		2.56	3.00	50	7.6	51	1084	105	2242					C		
27	4	06	2.50	3.40	56	7.2	66	1367	78	1626					C		
28	4	.29	2.46	3.00	50	7.4	45	923	54	1108					C		
29	5	.03	2.45	3.00	49	7.5	42	858	59	1205					C		
30	5	.02	2.38	2.80	50	7.6	48	953	67	1330					C		
31	1		2.47	3.10	50	7.5	32	659	71	1463					C		
TL		2.19	74.87					30,990		49,549					C		
ME			2.42				51	1,033	82	1,652					C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

March, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID | 130029 | 03 | 75 | A0.d
Plant No | Mo | Yr | Sampling Point Code

DAY	BOD 5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F COLI*		T. COLI*	REMAR
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14
1 2	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	45	905	17	27	543	57						7.5			C		
02	33	658	25	20	399	47						7.7			C		
03	32	646	47	23	464	82						7.3			C		
04	27	524	49	34	683	70						7.5			C		
05	35	704	27	39	784	48						7.5			C		
06	52	1041	12	46	920	45						7.4			C		
07	29	588	34	36	729	29						7.6			C		
08	34	663	32	39	761	41						7.5			C		
09	35	686	49	33	646	68						7.5			C		
10	38	760	3	32	640	44						7.6			C	30	
11	32	635	29	28	556	58						7.2			C		
12	36	724	37	55	1105	46						7.3			C		
13	50	997	0	50	994	47						7.5			C		
14	38	767	36	26	525	57						7.3			C		
15	45	884	10	54	1067	62						7.4			C		
16	36	708	46	43	846	61						7.4			C		
17	39	777	24	58	1156	45						7.5			C	30	
18												7.4			C		
19	39	784	37	63	1266	52						7.4			C		
20	38	757	25	22	438	69						7.4			C	40	
21	20	404	56	28	565	53						7.5			C		
22	50	992	7	17	337	71						7.3			C		
23	33	663	41	32	643	63						7.4			C		
24	42	872	16	47	976	41						7.4			C		
25	38	783	6	48	984	42						7.3			C		
26	40	854	22	42	897	60						7.4			C		
27	57	1188	14	31	646	60						7.2			C		
28	35	718	22	16	328	70						7.4			C		
29	24	490	43	35	715	41						7.5			C		
30	23	457	52	36	715	46						7.5			C		
31	30	618	6	14	288	94						7.3			C		
TL		22,252			21,615										C		
ME	37	742	27	36	721	56						7.4			C	33	
WA	41	867	22	49	995	47									C	15	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

March, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 | 3 8 | 9 10 | 11 12 | 13 15
IP | 13,0,0,2,9 | 03 | 75 | ...
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX. FUEL 14 GAS CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS	39	44	49	54	59
PN											
SF											
01		1800	320			93					
02		1900	280			87					
03		1800	360			84					
04		1600	320			92					
05		1300	320			93					
06		1300	280			151					
07		1800	320			95					
08		1800	320			79					
09		1400	280			93					
10		1500	320			33					
11		1300	320			125					
12		1700	280			107					
13		1400	360			123					
14		1700	320			109					
15		1000	320			105					
16		1000	320			165					
17		800	320			110					
18		1400	280			108					
19		2200	320			117					
20		2900	320			122					
21		3000	280			115					
22		3700	320			98					
23		3100	320			101					
24		3300	280			109					
25		4000	360			110					
26		3700	320			115					
27		4300	320			121					
28		3700	360			96					
29		3800	320			97					
30		4200	320			107					
31		3200	320			112					
TL		71600	9800			3212					
ME		2300	316			104					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL			
Superintendent	1		176
Asst. Supt.	1		176
Shift Foreman			
Shift Operator	1		180
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL A

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS

SUNDAYS 4 HRS

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Wet-well
Process Pattern Pri. Sed. Dig. Beds

MONTH March 19 75

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	884	6.7	67	20	6.3	62																		
2	1326	8.9	68	36	6.0	60																		
3	884	7.2	66	19		63																		
4	884	7.2	66	19	6.1	62																		
5	1326	7.9	74	32	5.9	61																		
6	1326	8.5	65	34	6.3	60	5.4	1.7	67			13260		.38		1840			750					
7	1768	7.1	74	38	6.2	60																		
8	884	7.4	68	26	6.2	60																		
9	884	8.7	68	23	6.1	60																		
10	884	7.5	70	20		60																		
11	1326	7.5	70	30	6.2	60																		
12	7072	7.0	68	150		60																		
13	884	8.3	66	22	6.6	60	5.4	1.0	63			18122		.25		1760			760					
14	1326	6.9	66	28	6.0	59																		
15	884	9.1	58	24	6.1	59																		
16	1326	5.2	74	21	6.0	59																		
17						59																		
18	1326	6.9	82	28	6.0	59																		
19	1326	7.3	63	29	6.0	59																		
20	1768	7.9	74	42	6.1	68																		
21	1768	6.2	67	33	6.1	74																		
22	1326	7.8	78	31	6.1	70																		
23	884	7.2	72	19	6.1	72																		
24						80																		
25	2210	7.3	67	49	6.2	81																		
26	2210	7.8	63	52	6.2	81																		
27	884	7.7	75	21	6.1	81	5.4	.6	75			11934		.36		1220			570					
28						84																		
29	2652	7.4	80	60	6.0	80																		
30	884	10.0	73	27	6.1	86																		
31						88																		
TOTAL	40601											43316												
ARITH. MEAN	1503	7.6	868	34		67		1.1	68			14438		.33		1466			693					

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.J. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTHLY OPERATING REPORT

APRIL (MONTH) 1975 (YEAR)

THIS IS THE REPORT FORM FOR →

1.1 CPS 58500 50 District 03
Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

* DO NOT REPORT THE HIGHEST DAILY VALUE FOR PARAMETERS LIMITED BY A 7 DAY AVERAGE IN A PERMIT. INSTEAD REPORT THE HIGHEST 7 DAY AVERAGE FOR THESE PARAMETERS.

COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.

PLEASE USE UNITS SPECIFIED.

CARD NO 53 (1 2)

STATION NO 130029 (3-8)

REMARKS CODE 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO	23540 / 85001		23540 / 00310		23540 / 85002		23540 / 00530		23540 / 31504
NAME	BOD-5#/D		BOD-5		SOLSUS#D		SOLIDSUS		COLI-TMF
UNITS	LBS/DAY		MG/L		LBS/DAY		MG/L		MF/100ML
STD	< 1350	7D < 1760	< 50	7D < 65	< 1220	7D < 1620	< 45	7D < 60	< 1000
STD									
MONTHLY SUMMARY	21 820 AVERAGE		21 39 AVERAGE		30 745 AVERAGE		30 36 AVERAGE		65 AVERAGE
	1,119 * HIGH		53 * HIGH		933 * HIGH		45 * HIGH		30 * HIGH
	489 LOW		23 LOW		238 LOW		12 LOW		00 LOW
	REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE
NUMBER EXCEEDED	00		00		00		00		00
SAMPLE TYPE	24		24		24		24		GR
FREQUENCY OF ANALYSIS	5-7		5-7		5-7		5-7		3-7
BEGINNING DATE	04 01 75		DUP PUNCH		DUP PUNCH		DUP PUNCH		DUP PUNCH
	MONTH	DAY	YEAR						
ENDING DATE	04 30 75								

ORDER NO / PARAM NO	23540 / 50050		23540 / 00400						
NAME	FLOW-MGD		PH						
UNITS	MGD		SU						
STD			> 6.5	< 9.5					
STD									
MONTHLY SUMMARY	30 2.51 AVERAGE		30 7.1 AVERAGE		AVERAGE		AVERAGE		AVERAGE
	2.63 * HIGH		* HIGH		* HIGH		* HIGH		* HIGH
	2.38 LOW		6.8 LOW		LOW		LOW		LOW
	REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE
NUMBER EXCEEDED	00		00						
SAMPLE TYPE	NA		GR						
FREQUENCY OF ANALYSIS	CONT		7-7						
BEGINNING DATE	04 01 75		DUP PUNCH		DUP PUNCH		DUP PUNCH		DUP PUNCH
	MONTH	DAY	YEAR						
ENDING DATE	04 30 75								

NAME OF CERTIFIED OPERATOR Robert J Swalwell

CERTIFICATION NUMBER 585

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

April (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swalwell (Superintendent's Signature)

ID | 130029 (Plant No) | 04 (Mo.) | 75 (Yr) | 500 (Sampling Point Code)

DAY	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS OR	
	TYPE	PRECIP.	TOTAL	MAX RATE	TEMP	pH	BOD-5		SS		TOTAL-P		VSS	NH_3-N	C		
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74 78	80	9	14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C		
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C		
SF															C		
01	3		2.40	3.00	50	7.3	48	961	72	1441					C		
02	3		2.43	3.00	50	7.4	36	730	49	692					C		
03	5	.73	2.40	3.00	49	7.6	53	1061	49	981					C		
04	3		2.46	3.10	49	7.4	50	1026	70	1436					C		
05	3		2.38	3.00	50	7.6	42	834	37	734					C		
06	1		2.48	3.00	49	7.5	68	1406	114	2358					C		
07	1		2.50	3.10	50	7.5	33	688	81	1689					C		
08	1		2.44	3.00	50	7.5	38	789	57	1184					C		
09	1		2.55	3.30	50	7.3	50	1064	76	1617					C		
10	3		2.48	3.00	50	7.0	40	827	167	3453					C		
11	3		2.48	3.20	50	7.0	68	1406	116	2398					C		
12	1		2.43	3.10	50	6.7	42	851	44	892					C		
13	1		2.44	2.90	49	6.8	66	1343	120	2442					C		
14	1		2.45	3.10	50	7.3	69	1410	68	1389					C		
15	4	.01	2.42	2.70	50	7.0	146	2946	114	2301					C		
16	3		2.42	2.40	50	6.9			100	2018					C		
17	1		2.44	3.00	50	6.9			102	2076					C		
18	1		2.62	3.20	50	7.0			121	2644					C		
19	4	1.44	2.61	3.20	49	6.9			77	1676					C		
20	4	.03	2.59	3.00	49	7.0			127	2743					C		
21	3		2.61	3.40	50	6.9			66	1437					C		
22	3		2.58	4.20	50	6.8			96	2065					C		
23	1		2.63	3.20	51	6.7			104	2280					C		
24	4	.37	2.59	3.30	50	7.3	84	1814	98	2117					C		
25	4	.02	2.60	3.40	50	7.4	42	911	53	1149					C		
26	3		2.40	4.10	49	7.3			65	1301					C		
27	3		2.54	3.00	49	7.3	60	1271	74	1567					C		
28	4	.30	2.60	3.20	50	7.3	42	911	83	1799					C		
29	4	.18	2.56	3.30	50	7.4	54	1153	70	1495					C		
30	4	.27	2.60	3.10	51	7.2	108	2341	119	2580					C		
31															C		
TL		3.35	75.18					25,743		53,954					C		
ME			2.51				59	1226	86	1798					C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

April Month, 19 75 — Marshall Municipality, Michigan — Robert J. Swalwell Superintendent's Signature

ID 13,0029 (Plant No.) 04 (Mo.) 75 (Yr.) 6.0C (Sampling Point Code)

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMARK
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14
1 2	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	38	761	21	26	521	78						7.2			C		
02	28	568	22	28	568	43						7.4			C		
03	29	581	45	15	300	69						7.5			C		
04	41	841	18	44	903	37						7.3			C		
05	32	635	24	12	238	68						7.5			C		
06	36	744	47	28	579	60						7.4			C		
07	24	500	27	19	396	77						7.5			C		
08	35	726	8	36	748	37						7.4			C		
09	23	489	54	40	851	47						7.2			C		
10	32	662	20	43	889	76						6.8			C		
11	39	807	43	16	331	86						6.9			C		
12	33	669	21	30	608	32						6.9			C		
13	36	733	45	36	733	70						7.0			C		
14	33	674	52	26	531	62						7.2			C	20	
15	95	1917	35	66	1332	42						6.9			C	10	
16				78	1574	22						6.9			C	20	
17				25	509	75						6.9			C		
18				43	946	64						7.0			C		
19				34	740	56						6.9			C		
20				35	756	72						6.9			C		
21				33	718	50						6.9			C	0	
22				56	1205	42						6.7			C		
23	~			50	1097	52						6.6			C		
24	72	1555	14	52	1123	47						7.2			C		
25	30	650	29	27	585	49						7.3			C		
26				24	480	63						7.2			C		
27	48	1017	20	45	953	39						7.2			C		
28	30	650	29	30	650	64						7.2			C	36	
29	48	1025	11	38	747	46						7.3			C		
30	47	1019	56	35	759	71						7.2			C		
31															C		
TL		17223			22364										C		
ME	39	820	31	36	745	57						7.1			C	16	
WA	53	1119	27	45	938	49									C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

April (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swalwell (Superintendent's Signature)

1 2 ID | 3 8 13,0029 (Plant No.) | 9 10 04 (Mo.) | 11 12 75 (Yr.) | 13 15 .. (Sampling Point Code)

DAY 1 2	GRIT 9 CF	AUX.FUEL 14 625 CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		3300	320			112					
02		3600	280			121					
03		3900	280			92					
04		4000	320			119					
05		3700	280			113					
06		3600	320			117					
07		3300	280			112					
08		1400	320			124					
09		800	320			128					
10		800	320			117					
11		800	280			108					
12		700	240			108					
13		500	280			107					
14		1,00	280			115					
15		1100	240			95					
16		900	280			125					
17			280			115					
18			280			117					
19			280			102					
20			240			84					
21		1100	360			103					
22		400	280			122					
23		200	280			118					
24		900	240			115					
25		1100	280			110					
26		600	240			110					
27		800	240			110					
28		5200	280			110					
29		4300	280			110					
30		400	240			110					
31											
TL		50,000	8440			3349					
ME		1900	280			112					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL			
Superintendent	1		176
Asst. Supt.	1		176
Shift Foreman			
Shift Operator	1		176
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Wet Well
Process Pattern Raw.-Pri.-Sed.-dig.-beds

MONTH April 1975

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	1326	7.2	76	29	6.0	90																		
2	2210	6.8	74	46	6.1	92																		
3	1768	7.0	67	38	6.3	92																		
4	884	8.1	50	21	5.9	93																		
5						94																		
6	1768	5.2	73	27	6.2	88																		
7						96																		
8	1768	6.2	71	33	6.0	98																		
9	1326	5.4	66	21	5.8	94	4.8	1.1	78			17,238		.68	54	3980			1605					
10	884	5.2	72	14	5.8	86																		
11	1326	6.7	74	26	5.7	82																		
12	1326	7.2	63	29	5.4	74																		
13	1326	6.9	82	28	5.7	72																		
14						74																		
15	1768	6.0	81	32	5.2	76																		
16	1768	7.9	73	42	5.6	74																		
17	884	5.0	70	13	5.7	74																		
18	1768	8.6	79	46	5.4	74																		
19	1326	8.0	74	32	5.6	72																		
20	884	6.8	45	18	5.4	72																		
21						72																		
22	1768	6.9	80	37	5.3	72	4.9					14.144		.48	57	2600								
23	884	6.5	72	13	6.3	72		1.1	81															
24	1326	6.9	76	21	6.2	72																		
25	3094	6.2	74	43	6.4	72																		
26	2210	4.8	83	25	6.3	70																		
27	884	2.8	78	6	6.4	70																		
28						71																		
29	2210	6.2	81	34	5.9	86																		
30	2210	7.2	77	37	6.0	90						13.260		.42	55	1680			1095					
31																								
TOTAL	38,896											44,624												
ARITH. MEAN	1556	6.5	73	28		80		1.1	80			14880		53	57	2753			1350					

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.J. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTHLY OPERATING REPORT

May (MONTH) 1975 (YEAR)

THIS IS THE REPORT FORM FOR →

1.1 CPS 58500 50 District 03
Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

* DO NOT REPORT THE HIGHEST DAILY VALUE FOR PARAMETERS LIMITED BY A 7 DAY AVERAGE IN A PERMIT. INSTEAD REPORT THE HIGHEST 7 DAY AVERAGE FOR THESE PARAMETERS.

COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.
PLEASE USE UNITS SPECIFIED.

CARD NO. (1-2): 80
STATION NO. (3-8): 130029

REMARKS CODE: 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO (9-13 / 14-18)	23540 / 85001		23540 / 00310		23540 / 85002		23540 / 00530		23540 / 31504
NAME / UNITS	BOD-5#/D / LBS/DAY		BOD-5 / MG/L		SOLSUS#D / LBS/DAY		SOLIDSUS / MG/L		COLI-TMF / MF/100ML
STD.	< 1350	7D < 1760	< 50	7D < 65	< 1220	7D < 1620	< 45	7D < 60	< 1000
STD.									
MONTHLY SUMMARY	28 / 1100 AVERAGE		28 / 5.1 AVERAGE		28 / 910 AVERAGE		28 / 4.2 AVERAGE		03 / 14.0 AVERAGE
	1302 * HIGH		6.1 * HIGH		1087 * HIGH		4.9 * HIGH		26 * HIGH
	485 LOW		2.3 LOW		501 LOW		2.2 LOW		0 LOW
	REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE
NUMBER TIMES EXCEEDED	0 0		0 0		0 0		0 0		0 0
SAMPLE TYPE	2 4		2 4		2 4		2 4		G R
FREQUENCY OF ANALYSIS	5 - 7		5 - 7		5 - 7		5 - 7		3 - 7
BEGINNING DATE	0 5 (MONTH)	0 1 (DAY) 7 5 (YEAR)	DUP PUNCH		DUP PUNCH		DUP PUNCH		DUP PUNCH
ENDING DATE	0 5 (MONTH)	3 1 (DAY) 7 5 (YEAR)							

ORDER NO / PARAM NO (9-13 / 14-18)	23540 / 50050		23540 / 00400						
NAME / UNITS	FLOW-MGD / MGD		PH / SU						
STD.			> 6.5	< 9.5					
STD.									
MONTHLY SUMMARY	31 / 2.59 AVERAGE		28 / 7.1 AVERAGE		AVERAGE		AVERAGE		AVERAGE
	3.87 * HIGH		7.5 * HIGH		* HIGH		* HIGH		* HIGH
	2.44 LOW		7.0 LOW		LOW		LOW		LOW
	REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE		REMARKS CODE
NUMBER TIMES EXCEEDED	0 0		0 0						
SAMPLE TYPE	N A		G R						
FREQUENCY OF ANALYSIS	C O N T		7 - 7						
BEGINNING DATE	0 5 (MONTH)	0 1 (DAY) 7 5 (YEAR)	DUP PUNCH		DUP PUNCH		DUP PUNCH		DUP PUNCH
ENDING DATE	0 5 (MONTH)	3 1 (DAY) 7 5 (YEAR)							

SIGNATURE OF CERTIFIED OPERATOR Robert J. Swalwell

CERTIFICATION

-8-

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

May, 19 75 (Month) — Marshall, Michigan (Municipality) — Robert J. Swalwell (Superintendent's Signature)

1 2	3 8	9 10	11 12	13 15
ID	130029	05	75	5.00
	Plant No.	Mo.	Yr	Sampling Point Code

DAY 1 2	WEATHER TYPE 9	WEATHER PRECIP. 14	FLOW TOTAL 19	FLOW MAX RATE 24	RAW SEWAGE QUALITY TEMP 29	pH 34	BOD-5 39	BOD-5 44	SS 49	SS 54	TOTAL-P 59	TOTAL-P 64	VSS 69	NH_3-N 74 78	80	REMARKS OR 9	14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C		
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C		
SF															C		
01	1		2.55	3.10	51	7.3	60	1275	106	2254					C		
02	1		2.58	3.20	51	7.4	68	1463	159	3422					C		
03	4	.11	2.48	3.10	51	7.6									C		
04	3		2.54	3.00	50	7.3	66	1398	90	1906					C		
05	4	.42	2.59	3.10	52		45	972	52	1123	5.00	108			C		
06	3		2.57	3.10	51	7.6	62	1329	148	3172					C		
07	1		2.53	3.20	52	7.2	35	739	70	1477					C		
08	3		2.52	3.00	52	7.3	54	1135	104	2185					C		
09	1		2.49	3.10	51	7.0	48	996	84	1744					C		
10	1		2.45	3.00	50	7.3	50	1072	65	1393					C		
11	4	.78	2.51	3.00	50	7.2	74	1549	115	2407					C		
12	4	.05	2.57	3.30	52		60	1286	113	2422	6.75	145			C		
13	1		2.56	3.10	52	7.4	74	1580	113	2413					C		
14	1		2.54	3.00	52	7.3	84	1779	118	2499					C		
15	1		2.55	3.10	52	7.4	74	1573	99	2105					C		
16	3		2.46	3.10	52	7.5									C		
17	1		2.44	3.00	50	7.2	72	1464	52	1058					C		
18	1		2.44	2.80	50	7.3									C		
19	4	.69	2.52	3.10	52	7.3	96	2017	58	1219					C		
20	4	1.07	2.63	3.40	52	7.4	90	1974	65	1425					C		
21	4	.92	2.65	3.90	54	7.1	86	1900	99	2189					C		
22	1		2.84	3.90	53	7.5	54	1279	91	2155	3.10	73			C		
23	1		2.82	3.40	53	7.1	68	1599	71	1669					C		
24	4	.46	2.69	3.50	52	7.5	82	1839	63	1413					C		
25	4	.03	2.65	3.10	53	7.5	66	1454	50	1105					C		
26	1		2.73	3.10	53	7.4	63	1434	74	1684					C		
27	1		2.71	3.30	54	7.2	80	1808	130	2938					C		
28	1		2.66	3.40	54	7.2	69	1530	83	1841					C		
29	4	.30	2.62	3.30	54	7.2	86	1879	127	2775					C		
30	4	.56	2.68	3.20	54	7.2	68	1520	69	1542					C		
31	3		2.60	3.10	54	7.3	68	1474	67	1453					C		
TL		5.93	80.17					14,322		54988		326			C		
ME			2.59				68	1,476	91	1,964	4.95	109			C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

May, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

ID 1300029 05 75 000
Plant No Mo. Yr Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMAR
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14
1 2	mg/l	LBS.	% Rem.	mg/l	LBS	% Rem.	mg/l	LBS	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	50	1063	17	44	935	58						7.2			C		
02	52	1119	24	51	1098	68						7.0			C		
03												7.5			C		
04	60	1271	9	67	1419	26						7.2			C		
05	34	734	24	43	929	17	3.9	84	22						C		
06	26	557	58	36	771	76						7.1			C		
07	23	485	34	36	760	49						7.1			C		
08	26	546	52	39	819	63						7.2			C		
09	26	540	46	31	644	63						7.1			C		
10	42	900	16	31	664	52						7.1			C		
11	62	1298	16	38	795	67						7.1			C		
12	42	900	30	26	557	77	5.0	107	26						C	0	
13	59	1260	20	36	769	68						7.1			C	260	
14	60	1271	29	42	890	64						7.1			C		
15	64	1360	14	50	1063	49						7.1			C		
16												7.1			C		
17	54	1098	25	31	631	40						7.1			C		
18												7.1			C		
19	56	1177	42	48	1008	21						7.1			C		
20	74	1623	18	55	1206	15						7.2			C		
21	60	1326	30	35	774	65						7.3			C	70	
22	42	995	22	78	1847	14	4.1	97	-32			7.1			C		
23	52	1223	24	46	1081	35						7.2			C		
24	57	1279	30	45	1009	29						7.0			C		
25	53	1171	20	30	663	40						7.0			C		
26	54	1229	14	22	501	70						7.3			C		
27	66	1492	18	62	1401	55						7.3			C		
28	59	1309	14	26	577	69						7.0			C		
29	57	1245	34	53	1158	58						7.0			C		
30	58	1296	15	33	738	52						7.0			C		
31	58	1257	15	35	759	48						7.2			C		
TL		31,024			25,466			288							C		
ME	51	1108	25	42	910	50	4.3	96	5.3			7.1			C	110	
WA	61	1302	19	49	1087	31									C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

MAY, 19 75
Month

MARSHALL, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 ID | 3 8 1300029 Plant No | 9 10 05 Mo | 11 12 75 Yr | 13 15 Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX.FUEL 14 GAS CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		400	160			110					
02		400	160			110					
03		300	200			90					
04		700	160			80					
05		300	160			100					
06		400	200			100					
07		300	160			100					
08		300	200			90					
09		200	160			110					
10		100	160			100					
11		100	160			60					
12		200	200			100					
13		100	160			120					
14		200	160			120					
15		300	200			100					
16		400	160			90					
17		100	200			70					
18		200	160			60					
19		100	200			100					
20		100	160			90					
21		200	200			100					
22		200	200			100					
23		100	200			80					
24		100	200			80					
25		200	160			100					
26		100	160			80					
27		100	200			110					
28		200	200			90					
29		100	160			80					
30		200	200			100					
31		100	200			120					
TL		7300	5560			2940					
ME		235	179			95					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL			
Superintendent	1		168
Asst. Supt.	1		168
Shift Foreman			
Shift Operator	1		180
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL

WEEKDAYS 9 HRS

SATURDAYS 4 HRS

SUNDAYS 4 HRS

HOLIDAYS 4 HRS

Digester Volume, ft³
Primary 140000
Secondary 140000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D 45

Supernatant To Wet-well
Process Pattern Raw Pri-Sed. Dig-Beds

MONTH May 19 75

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	RAW SLUDGE pH	DIGESTING SLUDGE Temp. °F	DIGESTING SLUDGE pH	DIGESTING SLUDGE Total Solids %	DIGESTING SLUDGE Vol. Solids %	DIGESTING SLUDGE Vol. Acids Mg/l	DIGESTING SLUDGE Alk. Limity Mg/l	SUPERNATANT Gals. X	SUPERNATANT pH	SUPERNATANT Total Solids %	SUPERNATANT Vol. Solids %	SUPERNATANT Susp. Solids Mg/l	SUPERNATANT P Mg/l	SUPERNATANT P Lbs.	SUPERNATANT 5-Day BOD Mg/l	DIGESTED SLUDGE Gals. X	DIGESTED SLUDGE Total Solids %	DIGESTED SLUDGE Vol Solids %	DIGESTED SLUDGE pH	Gas Produced cu ft X
1	844	5.6	90	11	6.2																			
2	844	8.4	72	16	5.9																			
3																								
4	1326	5.9	71	17	6.2																			
5	1326	6.7	73	20	6.1																			
6	1326	6.7	73	20	5.8							1768												
7	884	5.4	71	10	5.9																			
8	1326	7.6	75	23	5.8																			
9	884	7.3	66	13	5.4							5304												
10	884	8.9	70	17	6.0																			
11	1768	7.6	73	30	5.9																			
12																								
13	884	6.9	79	15	5.8																			
14	884	7.2	76	15	5.9							5304												
15	1326	9.2	77	29	5.7																			
16	884	6.7	71	13	6.0																			
17	1326	7.4	73	22	5.8																			
18	884	8.7	80	19	5.9																			
19	884	8.1	72	16	5.9																			
20	1768	7.8	76	32	5.8							3536		.21	61	330			645					
21																								
22	884	8.0	74	16	5.8																			
23	884	7.1	73	14	5.7																			
24	884	7.4	70	14	5.8																			
25	884	7.9	76	16	5.8																			
26																								
27												2956		.42	49	2140			687					
28	1326	7.8	72	23	5.6																			
29	1768	8.8	76	36	5.4																			
30	884	7.1	77	15	5.6																			
31	884	8.8	65	15	5.6																			
TOTAL	28730											23,868												
ARITH MEAN	1105	7.5	74	19								4774		.32	55	1235			666					

Marshall, City of
Mayor
323 W. Michigan Ave.
Marshall, Michigan 40068

Marshall W.W.T.P.
R.J. Swalwell, Supt.
323 W. Michigan Ave.
Marshall, Michigan 40068

MONTHLY OPERATING REPORT

June (MONTH) 1975 (YEAR)

THIS IS THE REPORT FORM FOR →

1.1 CPS 58500 50 District 03
Discharge to Kalamazoo River 001
Marshall, City of
Waste Water Treatment Plant

PLEASE COMPLETE THIS PAGE AND SUBMIT IT WITH YOUR OTHER FORMS AT THE END OF EACH MONTH. THE REPORTS MUST REACH OUR LANSING OFFICE BY THE 10th OF THE MONTH.

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COLIFORM AVERAGES SHOULD BE COMPUTED AS A GEOMETRIC MEAN.
PLEASE USE UNITS SPECIFIED.

CARD NO: 89 (1-2)
STATION NO: 130029 (3-8)

REMARKS CODE 1=LESS THAN, 2=GREATER THAN

ORDER NO / PARAM NO	23540 / 85001	23540 / 00310	23540 / 85002	23540 / 00530	23540 / 31504
NAME	BOD-5#/D	BOD-5	SOLSUS#D	SOLIDSUS	COLI-TMF
UNITS	LBS/DAY	MG/L	LBS/DAY	MG/L	MF/100ML
STD	< 1350	7D < 1760	< 50	7D < 65	< 1220	7D < 1620	< 45	7D < 60	< 1000
STD.									
MONTHLY SUMMARY	27 1213 AVERAGE	27 58 AVERAGE	27 786 AVERAGE	27 37 AVERAGE	06 100 AVERAGE
	1228 *HIGH	63 *HIGH	946 *HIGH	44 *HIGH	91 *HIGH
	908 LOW	45 LOW	448 LOW	22 LOW	45 LOW
	REMARKS CODE	REMARKS CODE	REMARKS CODE	REMARKS CODE	REMARKS CODE
NUMBER EXCEEDED	C O	0 0	0 0	0 0	0 0
SAMPLE TYPE	2 4	2 4	2 4	2 4	G R
FREQUENCY OF ANALYSIS	S - 7	S - 7	S - 7	S - 7	3 - 7
DUP PUNCH	6 6 0 1 7 5	DUP PUNCH	DUP PUNCH	DUP PUNCH	DUP PUNCH
	MONTH DAY YEAR				
END DATE	0 6 3 0 7 5				

ORDER NO / PARAM NO	23540 / 50050	23540 / 00400			
NAME	FLOW-MGD	PH			
UNITS	MGD	SU			
STD		> 6.5	< 9.5						
STD									
MONTHLY SUMMARY	30 2.52 AVERAGE	30 7.1 AVERAGE	AVERAGE	AVERAGE	AVERAGE
	2.69 *HIGH	7.2 *HIGH	*HIGH	*HIGH	*HIGH
	2.42 LOW	6.9 LOW	LOW	LOW	LOW
	REMARKS CODE	REMARKS CODE	REMARKS CODE	REMARKS CODE	REMARKS CODE
	C C	0 0			
	N A	G R			
	C O N T	7 - 7			
	0 6 0 1 7 5	DUP PUNCH	DUP PUNCH	DUP PUNCH	DUP PUNCH
	MONTH DAY YEAR				
END DATE	0 6 3 0 7 5				

SIGNATURE OF CERTIFIED OPERATOR Robert J Swalwell

CERTIFICATION NUMBER 585

R 4515 M REV. 3/73

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

June (Month), 19 75

Marshall (Municipality), Michigan

Robert J. Swahnel (Superintendent's Signature)

1 2 | 3 8 | 9 10 | 11 12 | 13 15
10 | 1300029 | 06 | 75 | 500
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS OR
	TYPE 9	PRECIP 14	TOTAL 19	MAX 24 RATE	TEMP 29	pH 34	BOD-5 39 44		SS 49 54		TOTAL-P 59 64		VSS 69	NH_3-N 74 78	80	9 14 1
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS	mg/l	LBS	mg/l	mg/l	C	
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C	
SF															C	
01	4	.08	2.59	3.10	52	7.3	72	1555	72	1555					C	
02	3		2.61	3.20	52	7.2	72	1567	78	1689					C	
03	4	.04	2.64	3.20	54	7.2	72	1585	73	1607					C	
04	4	.29	2.58	3.80	54	7.3	70	1506	116	2496					C	
05	4	.02	2.44	3.90	54	7.2	72	1465	54	1099					C	
06	1		2.49	3.00	54	7.2	63	1309	56	1163					C	
07	1		2.44	2.90	53	7.2	78	1587	93	1893					C	
08	1		2.42	2.90	53	7.1	60	1211	63	1271					C	
09	1		2.49	3.10	54	7.2	66	1264	116	2285					C	
10	1		2.45	4.10	54	7.1	48	981	43	878					C	
11	4	.53	2.53	3.90	54	7.2	56	1182	79	1667					C	
12	4	.01	2.44	3.00	54	7.2	77	1567	51	1038					C	
13	4	.06	2.50	3.20	54	7.2	62	1293	74	1543					C	
14	4	.23	2.44	2.90	54	7.1									C	
15	4	.43	2.48	3.10	54	7.2									C	
16	1		2.54	3.30	56	7.2	86	1821	59	1250	4.95	105			C	
17	4	.37	2.51	3.20	56	7.3	82	1716	62	1298					C	
18	4	.03	2.55	3.80	56	7.2	74	1574	102	2170					C	
19	3		2.56	3.10	56	7.1	66	1409	56	1195					C	
20	3		2.60	3.40	56	7.1	80	1734	47	1019					C	
21	1		2.45	3.00	55	7.1	62	1267	84	1716					C	
22	1		2.43	3.10	55	7.2	70	1419	44	892					C	
23	3		2.53	4.40	58	7.1	80	1688	87	1836					C	
24	4	1.76	2.47	4.90	60	7.0									C	
25	4	.74	2.69	4.40	56	7.3	78	1750	81	1817					C	
26	1		2.64	3.20	56	7.2	88	1938	92	2026					C	
27	1		2.59	4.40	56	7.2	98	2117	131	2830					C	
28	1		2.48	3.00	55	7.1	63	1302	72	1484					C	
29	1		2.46	2.80	56	7.2	76	1559	116	2379					C	
30	1		2.47	3.10	58	7.2	80	1648	62	1277					C	
31															C	
TL		4.59	7.551					41,050		43387		105			C	
ME			2.52				72	1520	76	1607	4.95	105			C	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

June, 19 75 (Month) — Marshall, Michigan (Municipality) — Robert J. Swalwell (Superintendent's Signature)

1 2	3 8	9 10	11 12	13 15
ID	130029	06	75	000
	Plant No	Mo.	Yr.	Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMARK
	9	14	19	24	29	34	39	44	49	54	59	64	69	74	80	9	14
1 2	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	62	1339	14	49	1058	32						7.2			C	160	
02	68	1480	5	48	1045	38						6.9			C		
03	66	1453	8	35	771	52						6.9			C		
04	60	1291	14	63	1356	46						7.1			C		
05	64	1302	11	38	773	30						6.9			C		
06	60	1264	5	40	831	29						6.9			C		
07	59	1201	24	22	448	76						6.9			C		
08	45	908	25	29	585	54						7.0			C		
09	58	1205	3	31	644	72						7.1			C		
10	48	981	0	24	490	44						7.1			C	120	
11	50	1055	11	36	760	54						7.1			C		
12	54	1099	30	26	529	49						7.2			C	125	
13	53	1105	15	36	751	51						7.2			C		
14												7.2			C		
15												7.2			C		
16	66	1398	23	24	508	59	5.75	122				7.2			C	55	
17	76	1591	7	34	712	45						7.2			C		
18	57	1212	23	28	596	73						7.1			C		
19	50	1067	24	38	811	32						7.0			C	45	
20	56	1214	30	35	759	25						7.0			C		
21	51	1042	18	42	858	50						7.0			C		
22	52	1054	26	42	851	5						7.0			C		
23	66	1393	18	60	1266	31						7.0			C		
24												7.0			C		
25	72	1615	8	54	1211	33						7.2			C		
26	57	1255	35	32	705	65						7.1			C		
27	51	1102	48	45	972	66						7.1			C		
28	45	930	29	31	641	57						7.2			C		
29	50	1026	34	36	738	69						7.1			C		
30	57	1174	29	27	556	73						7.1			C	95	
31															C		
TL		32738			21,225			122							C		
ME	58	1213	19	37	786	49	5.75	122				71			C	100	
WA	63	1228	11	44	946	34									C	91	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

June (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swallen (Superintendent's Signature)

1 2 | 3 ... 8 | 9 10 | 11 12 | 13 15
ID | 1300219 (Plant No.) | 06 (Mo.) | 75 (Yr.) | .. (Sampling Point Code)

DAY 1 2	GRIT 9 CF	AUX. FUEL 14 6 2 5 CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		100	160			90					
02		200	200			90					
03		200	200			80					
04		100	200			80					
05		200	200			90					
06		100	160			140					
07		200	160			100					
08		200	200			120					
09		100	160			120					
10		200	200			100					
11		100	160			130					
12		200	200			110					
13		200	200			100					
14		100	160			100					
15		100	160			100					
16		200	200			80					
17		100	240			120					
18		200	200			90					
19		100	200			110					
20		100	200			120					
21		100	200			80					
22		100	200			110					
23		200	200			90					
24		100	200			130					
25		200	200			100					
26		100	200			110					
27		100	160			100					
28		200	160			100					
29		100	200			120					
30		100	200			90					
31											
TL		4300	5680			3100					
ME		143	189			103					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	3		500
Superintendent	1		168
Asst. Supt.	1		168
Shift Foreman			
Shift Operator	1		164
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL A-

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-45

Supernatant To Wet Well
Process Pattern Raw-Pri-Sed. Dig. Beds

MONTH June 1925

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs./1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	1768	7.0	71	27	5.7											1200			1230					
2																								
3	1768	8.4	76	34	5.9																			
4	1768	6.7	72	26	5.8																			
5																								
6	1768	7.1	71	27	5.7																			
7	1768	7.2	59	23	5.5																			
8	1768	7.2	94	36	5.6																			
9																								
10	1768	6.9	69	26	5.6																			
11	1768	5.9	77	24	5.6																			
12	1768	7.4	75	30	5.5																			
13																								
14	1768	8.9	74	35	5.4																			
15	1768	6.5	69	24	5.6																			
16																								
17	1768	6.3	68	23	5.7																			
18	1768	7.7	70	24	5.6																			
19	1768	8.8	71	34	5.6																			
20	1768	8.6	65	30	5.6																			
21	1768	7.7	71	29	5.9																			
22	1768	8.2	73	32	5.7																			
23																								
24	1768	5.4	44	13	5.3																			
25	1768	9.0	69	33	5.4																			
26	1768	7.4	78	31	5.5																			
27	1768	9.4	69	35	5.3																			
28	1768	7.8	73	31	5.3																			
29	1768	8.1	72	31	5.4																			
30																								
31																								
TOTAL	42432																							
ARITH MEAN	1768	7.2	68	28												1200			1230					

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

July Month, 19 75

Marshall Municipality, Michigan

Robert J. Swalwell Superintendent's Signature

1 2 | 3 8 | 9 10 | 11 12 | 13 15
ID | 130,039 | 07 | 75 | 500
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	WEATHER TYPE 9	WEATHER PRECIP. 14	FLOW TOTAL 19	FLOW MAX RATE 24	RAW SEWAGE QUALITY TEMP 29	pH 34	BOD-5 39 44		SS 49 54		TOTAL-P 59 64		VSS 69	NH_3-N 74 78	80	REMARKS OR 9	14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS	mg/l	LBS	mg/l	LBS.	mg/l	mg/l	C		
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C		
SF															C		
01	1		2.46	3.00	57	6.9			105	2153					C		
02	1		2.42	4.10	57	7.0	100	2018	95	1917					C		
03	3		2.43	3.10	57	6.9	96	1944							C		
04	1		2.26	2.70	57										C		
05	1		2.26	2.80	57	7.0									C		
06	1		2.25	2.70	58	7.1									C		
07	3		2.31	2.90	58	7.2	120	2312	105	2033					C		
08	1		2.13	2.70	57	7.1	124	2202	137	2433					C		
09	4	.04	2.06	3.40	57	7.1	112	1924	99	1700					C		
10	3		1.65	3.30	58		94	1293	94	1293					C		
11	4	.10	2.68	4.10	57		94	2100	83	1855					C		
12	3				57										C		
13	4	.16			58	7.2									C		
14	4	.02			59										C		
15	1				58										C		
16	1				58										C		
17	1				59										C		
18	1				58		108	2036	66	1244					C		
19	4	.15			58	6.3	76	1433	80	1508					C		
20	1				58		65	1225	75	1414					C		
21	1				58		98	1847	70	1320					C		
22	1				58		69	1301	80	1508					C		
23	3				58				99	1866					C		
24	1				58				65	1225					C		
25	1				58				74	1395					C		
26	1				58	6.5			64	1206					C		
27	1				58				70	1320					C		
28	1				59	6.5			81	1527					C		
29	1				60	7.2	78	1470	75	1414					C		
30	1				59	7.2	65	1282	89	1678					C		
31	1				59	7.4	72	1357	84	1583					C		
TL		.47	70.06					25,741		33,582					C		
ME			2.26				92	1,716	85	1599					C		

2.26 E

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

JULY Month, 19 75

Marshall Municipality, Michigan

Robert J Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID | 1300,29 | 0.7 | 7.5 | 000
Plant No Mo Yr Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F COLI*		T. COLI*	REMARKS
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14
1 2	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	LBS	% Rem.	mg/l	mg/l	SU	mg/l	# / 100 ml	C	# / 100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01				34	697	68						6.9			C		
02	45	923	55	40	807	58						6.9			C		
03	64	1297	33									6.8			C		
04															C		
05												7.0			C		
06												7.1			C		
07	83	1599	31	51	983	51						7.1			C		
08	72	1279	42	91	1616	34						7.0			C		
09	56	962	50	50	859	49						7.1			C		
10	66	908	30	66	908	30									C		
11	66	1475	30	36	805	57									C		
12															C		
13												7.2			C		
14															C		
15															C		
16															C		
17															C		
18	58	1093	46	46	867	30									C		
19	72	1357	5	71	1338	11						6.2			C		
20	60	1131	8	48	905	36									C		
21	68	1282	31	49	924	30									C		
22	57	1074	17	54	1018	33									C		
23				91	1715	9									C		
24				58	1093	11									C		
25				58	1093	22									C		
26				39	735	39						6.7			C		
27				47	886	33									C		
28				50	943	38						6.4			C		
29	76	1433	3	51	961	32									C		
30	64	1206	6	42	792	53						7.3			C		
31	51	961	29	53	999	37						7.3			C		
TL		17,980			20,944										C		
ME	64	1194	28	54	997	36						6.9			C		
WA	65	1230	14	61	1155	22									C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

July (Month), 19 75 — Marshall (Municipality), Michigan — Robert F. Swalwell (Superintendent's Signature)

1 2 ID | 3 8 130029 (Plant No) | 9 10 07 (Mo) | 11 12 75 (Yr) | 13 15 ... (Sampling Point Code)

DAY 1 2	GRIT 9 CF	AUX. FUEL 14 GAS CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01		100	200			110					
02		100	200			100					
03		200	240			100					
04		100	160			80					
05		100	160			120					
06		200	160			100					
07		100	200			80					
08		100	160			100					
09		100	200			140					
10		100	80			160					
11		200	80			100					
12		200	40			100					
13		100				100					
14		100	80			100					
15		200	80			100					
16		100	40			100					
17		200	80			100					
18		200	40			100					
19		200	40			100					
20		100				100					
21		100	40			110					
22		200				90					
23		100	80			100					
24		100	40			100					
25		100				100					
26		100	720			90					
27		100	1800			100					
28		200	1920			100					
29		100	1560			100					
30		100	1440			100					
31		200	1560			80					
TL		4200	11,400			3160					
ME		129	368			102					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	4		584
Superintendent	1		176
Asst. Supt.	1		176
Shift Foreman			
Shift Operator	2		232
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL WORKED

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D 45

Marshall, MICHIGAN

Supernatant To Wet well
Process Pattern Raw - Pri - Sed. Dig. - Beds.

MONTH JULY 1975

DIGESTER AND SLUDGE DATA

OPERATOR R. J. Swalwell

DATE	RAW SLUDGE Gals X	RAW SLUDGE Total Solids %	RAW SLUDGE Vol. Solids %	RAW SLUDGE Vol. Solids Lbs 1000 c.f. Digester	RAW SLUDGE pH	DIGESTING SLUDGE Temp. °F	DIGESTING SLUDGE pH	DIGESTING SLUDGE Total Solids %	DIGESTING SLUDGE Vol. Solids %	DIGESTING SLUDGE Vol. Acids Mg/l	DIGESTING SLUDGE Alkalinity Mg/l	SUPERNATANT Gals. X	SUPERNATANT pH	SUPERNATANT Total Solids %	SUPERNATANT Vol. Solids %	SUPERNATANT Susp. Solids Mg/l	SUPERNATANT P Mg/l	SUPERNATANT P Lbs.	SUPERNATANT 5 Day BOD Mg/l	DIGESTED SLUDGE Gals. Y	DIGESTED SLUDGE Total Solids %	DIGESTED SLUDGE Vol. Solids %	DIGESTED SLUDGE pH	Gas Produced cu. ft X
1	1326	9.1	68	25	5.2																			
2	1326	9.4	76	28	5.5																			
3																								
4																								
5	1326	6.9	81	22	5.3																			
6	1326	8.2	74	42	5.4																			
7																								
8	1326	6.3	74	19	5.2																			
9	1326	7.4	58	11	5.3																			
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24	1326	5.1	69	14	4.5																			
25	1326	6.2	71	18	4.5																			
26	1326	11.9	66	32	4.8																			
27	1326	6.7	74	20	5.5																			
28																								
29	1326	4.8	61	12	6.0																			
30	1326	4.7	83	16	6.2																			
31	1326	6.5	82	21	5.8																			
TOTAL	17238																							
ARITH MEAN	1326	7.0	72	20																				

Due to plant improvements and changing over to new equipment some of the information for the July report was not available.

All primary treatment units except flow meter were back in service as of August 1, 1975.

Digester Volume, ft³.
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

MDPH
D-4.5

Marshall, MICHIGAN

Supernatant To Wet Well
Process Pattern Raw-Pri-Sed. Dig-Beds

MONTH AUGUST 19 75

DIGESTER AND SLUDGE DATA

OPERATOR R J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1																								
2	2652	5.3	77	33	5.8																			
3	2652	2.3	55	10	5.8																			
4	2652	4.2	75	25	5.3																			
5	2652	4.0	74	24	6.4	63																		
6	2652	4.0	74	24			5.4					10608		0.23	90	2280								
7	2652	3.2	67	17				4.0	74															
8	2652	3.1	67	17	6.5																			
9	2652	2.3	88	16	6.3																			
10	2652	1.4	60	7	6.5																			
11	2652	2.3	83	15	6.4			2.2	72			11,492												
12	2652	2.3	83	15	6.5		5.4																	
13	1326	3.0	75	9	6.3																			
14	4420	5.4	86	62	6.1		5.2												960					
15	2652	3.5	80	23	6.3			3 9	63			11,934		0.[illegible]	64	1920								
16	2210	5.2	80	28	6.3																			
17	884	4.2	89	10	6.2																			
18	3536	2.6	81	28	6.3																			
19	3094	3.2	87	30	6.3																			
20	1105	5.0	72	18	6.2			3 4	66			14,144												
21	4862	5 2	86	77	6.0																			
22	4862	3 8	79	56	6.5																			
23	2210	4.3	78	29	6.1																			
24	442	4.8	73	6	6.0																			
25	2652	5.4	86	43	5.9			3 4	66															
26	3094	4.5	75	42	6.1							10,608												
27	3536	5.6	73	60	6.0									.45	62	1520								
28	2652	3.8	78	31	6.2		5.6	3.5	53															
29	4862	2 9	74	43	6.0							10,166												
30	4420	4.7	82	63	6.3																			
31	1326	2.9	64	12	6.2																			
TOTAL	83313											68452												
ARITH. MEAN	2773	3.8	77	29		63		3.4	66			11,492		.39	72	1906			960					

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

August, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Swalwell — Superintendent's Signature

1 2	3 8	9 10	11 12	13 15
ID	13.0029	08	75	
	Plant No	Mo	Yr	Sampling Point Code

DAY 1 2	GRIT 9	AUX. FUEL 14	POWER CONSUMPTION 19 #1	24 #2	29 #3	CHEMICALS APPLIED 34 Cl_2	39	44	49	54	59
	CF	GAS	KWH	KWH	KWH	LBS.					
PN		C.F.									
SF											
01			1320			100					
02		200	1200			100					
03		100	1320			100					
04		100	1440			100					
05		100	1440			80					
06		200	1320			120					
07		200	1440			60					
08		100	1320			80					
09		100	1320			90					
10		100	1440			90					
11		100	1440			90					
12		200	1440			90					
13		100	1440			100					
14		100	1440			100					
15		200	1440			120					
16		100	1320			100					
17		200	1320			100					
18		100	1440			100					
19		200	1440			90					
20		100	1560			100					
21		200	1440			140					
22		100	1320			100					
23		100	1320			120					
24		100	1440			80					
25		200	1440			80					
26		100	1440			100					
27		100	1440			110					
28		100	1560			50					
29		200	1560			80					
30		100	1560			80					
31		100	1560			120					
TL		4000	43,920			2970					
ME		129	1417			96					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	4		680
Superintendent	1		168
Asst. Supt.	1		168
Shift Foreman			
Shift Operator	2		344
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS

SUNDAYS 4 HRS

HOLIDAYS 4 HRS.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

AUGUST (Month), 19 75

MARSHALL (Municipality), Michigan

Robert J. Swalwell (Superintendent's Signature)

ID 130029 (Plant No) 08 (Mo) 75 (Yr) 000 (Sampling Point Code)

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMAR
	9 14 19			24 29 34			39 44 49			54	59	64	69	74	80	9	14
1 2	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	mg/l	SU	mg/l	# /100 ml	C	# /100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	(31504) 31505	
SF															C		
01	62	1164	8	38	713	35						7.4			C		
02	58	1089	26	38	713	50						7.4			C		
03	66	1239	11	49	920	30						7.1			C	165	
04	90	1684	25	30	563	55						7.4			C	30	
05	70	1314	17	59	1107	44	4.2	79	8			7.3			C		
06	74	1389	14	53	995	50						7.3			C		
07	87	1633	30	51	957	52	5.0	94	31			7.2			C	210	
08	59	1107	20	62	1164	39	4.6	86	21			7.3			C		
09	62	1164	18	53	995	29						7.3			C		
10	66	1239	20	48	901	44						7.2			C		
11	60	1126	34	57	1070	47	4.6	86	36			7.3			C	140	
12	54	1014	27	46	863	60	4.4	83	12			7.1			C		
13	48	901	27	49	920	46	3.8	71	10			7.1			C	285	
14	56	1051	20	50	939	47						7.2			C	70	
15												7.1			C		
16	78	1464	19	54	1014	48						7.1			C		
17	42	788	30									7.1			C		
18	36	675	14	66	1239	16						7.3			C		
19	52	967	13	59	1107	24						7.2			C	170	
20	50	939	17	67	1257	25						7.2			C		
21	52	976	7	52	976	35	4.0	75	20			7.3			C		
22	44	1101	29	47	1175	40						7.2			C		
23	48	1201	20	39	1201	35						7.3			C		
24	54	1351	16	51	1276	35						7.1			C		
25	35	875	15	35	876	46									C	95	
26	39	976	17	45	1126	38						7.3			C		
27	38	951	6	18	450	67						7.1			C		
28	35	876	27	35	876	27						7.2			C		
29	28	701	12	41	1026	36						7.4			C		
30	26	651	46	28	701	24						7.3			C		
31	5	125	81	23	575	48						7.1			C		
TL		31745			27695			574							C		
ME	52	1658	22	46	955	40	4.4	82	20			7.2			C	146	
WA	73	1362	16	57	1176	30	4.4	82	20						C	121	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

August (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swahn (Superintendent's Signature)

ID 130029 (Plant No) 08 (Mo) 75 (Yr) 500 (Sampling Point Code)

DAY	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS
	TYPE	PRECIP	TOTAL	MAX RATE	TEMP	pH	BOD-5		SS		TOTAL-P		VSS	NH_3-N		
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74	78	80
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l		C
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610		C
SF																C
01	1		2.25		60	7.5	68	1276	64	1201						C
02	4	.08	"		58	7.4	78	1464	76	1427						C
03	4	1.46	"		59	7.2	74	1389	70	1314						C
04	4	.07	"		60	7.5	120	2252	66	1239						C
05	1		"		60	7.4	84	1577	105	1971	4.6	86				C
06	4	.59	"		58	7.3	86	1614	107	2008						C
07	1		"		57	7.3	110	2065	107	2008	7.2	135				C
08	1		"		60	7.5	74	1389	102	1915	5.8	109				C
09	1		"		56	7.3	76	1427	75	1408						C
10	1		"		58	7.4	82	1539	86	1614						C
11	4	.06	"		59	7.3	90	1689	108	2027	7.2	135				C
12	4	.10	"		58	7.2	74	1389	115	2159	5.0	94				C
13	4	.02	"		58	7.2	66	1239	90	1689	4.2	79				C
14	3		"		58	7.3	70	1314	94	1764						C
15	4	.09	"		58	7.3										C
16	4	.37	"		57	7.2	96	1802	103	1933						C
17	1		"		56	7.2	60	1126								C
18	1		"		58	7.3	42	788	79	1482						C
19	1		"		58	7.2	60	1126	78	1464						C
20	1		"		59	7.2	60	1126	89	1671						C
21	4	.02	"		58	7.3	56	1051	80	1502	5.0	94				C
22	4	3.38	3.00		58	7.2	62	1551	78	1951						C
23	4	.10	"		57	7.3	60	1501	60	1501						C
24	3		"		60	7.1	64	1601	78	1952						C
25	3		"		60		41	1026	65	1626						C
26	4	.19	"		59	7.3	47	1175	72	1801						C
27	4	.05	"		58	7.1	45	1125	54	1351						C
28	1		"		59	7.2	48	1201	48	1276						C
29	4	.81	"		59	7.4	32	801	64	1601						C
30	4	2.40	"		58	7.3	48	1201	37	926						C
31	4	1.71	"		59	7.1	27	676	44	1101						C
TL		11.50						40,500		46618		732				C
ME							67	1350	79	1608	5.6	103				C

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

September (Month), 19 75

Marshall (Municipality), Michigan

Robert J. Swabell (Superintendent's Signature)

ID | 13.0029 (Plant No) | 09 (Mo) | 75 (Yr) | 5.0C (Sampling Point Code)

DAY	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS OR C
	TYPE	PRECIP	TOTAL	MAX RATE	TEMP	pH	BOD-5		SS		TOTAL-P		VSS	NH_3-N		
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74 . 78	80	9 14 19
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C	
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C	
SF															C	
01	4	.05	3.08		58	7.5	24	617	46	1182					C	
02	1		3.08		54	7.4	52	1336	79	2030					C	
03	4	.01	3.08		60	7.4	48	1233	44	1130					C	
04	1		3.08		54	7.5	48	1233	70	1798					C	
05	4	.47	3.08		54		43	1618	67	1721					C	
06	1		3.08		58	7.5	76	1952	72	1850					C	
07	1		3.08		57	7.5	68	1747	65	1670					C	
08	1		3.08	3.40	60	7.4	72	1850	61	1567					C	
09	1		3.08	4.00	58	7.5	63	1618	85	2183					C	
10	1		3.08	4.00	58	7.4	76	1952	96	2466					C	
11	4	.16	3.04	3.80	54	7.5	66	1673	71	1800					C	
12	3		3.02	3.80	58	7.2	68	1713	127	3199					C	
13	1		2.90	4.00	56	7.3	60	1451	36	871					C	
14	1		2.88	3.80	56	7.3	57	1369	54	1297					C	
15	4	.05	2.95	3.30	58	7.3	72	1771	65	1599					C	
16	3		2.90	4.00	58	7.2	64	1548	55	1330					C	
17	4	.02	2.92	3.70	59	7.5	68	1656	59	1437					C	
18	4	.09	2.90	3.60	58	7.2	69	1668	74	1789	4.4	106			C	
19	4	.18	2.89	3.70	56	7.5	72	1735	72	1735					C	
20	4	.03	2.83	3.60	56	7.2	69	1628	91	2148					C	
21	4	.03	2.85	3.30	58	7.2	64	1521	58	1378					C	
22	1		2.89	3.70	58	7.5	80	1928	83	2000	4.0	96			C	
23	1		2.74	3.70	57	7.5	72	1675	65	1513	4.0	93			C	
24	4	.04	2.81	3.60	57		104	2438	94	2203	3.4	80			C	
25	3		2.78	4.00	57	7.0	88	2041	77	1785					C	
26	3		2.72	3.60	57	7.1	88	1996	61	1383					C	
27	1		2.70	3.20	57	7.4	74	1666	53	1194					C	
28	1		2.71	3.00	57	7.5	76	1718	81	1831					C	
29	4	.14	2.79	3.50	58	6.9	90	2094	106	2467					C	
30	4	.06	2.80	3.50	57	7.7	70	1635	52	1214					C	
31															C	
TL		1.33	8787					50080		51,770		375			C	
ME			2.93				72	1669	71	1726	4.0	94			C	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

September, 19 75 (Month) — Marshall (Municipality), Michigan — Robert J. Swalwell (Superintendent's Signature)

ID 1,3,0,0,2,4 (Plant No.) 0,9 (Mo) 7,5 (Yr) 0,0,0 (Sampling Point Code)

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMARK
1 2	mg/l	LBS	% Rem.	mg/l	LBS	% Rem	mg/l	LBS.	% Rem	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	22	561.5	8	31	796	33						7.4			C		
02	48	1233	8	51	1310	35						7.3			C		
03	45	1156	6	30	771	32						7.3			C		
04	48	1233	0	42	1079	40						7.4			C		
05	48	1233	24	56	1439	16									C		
06	57	1464	25	53	1362	26						7.5			C		
07	60	1541	12	44	1130	32						7.5			C	70	
08	51	1310	29	39	1002	36						7.4			C		
09	52	1336	17	53	1362	38						7.4			C		
10	60	1541	21	62	1593	35						7.3			C		
11	54	1369	18	60	1521	13						7.4			C		
12	51	1284	25	74	1864	42						7.3			C		
13	48	1161	20	34	822	6						7.3			C		
14	45	1081	21	54	1297	0						7.2			C		
15	51	1255	29	48	1181	26						7.2			C		
16	54	1306	16	50	1210	9						7.1			C	540	
17	48	1164	29	33	804	44						7.4			C		
18	63	1523	9	56	1354	24	4.0	97	10			7.3			C		
19	51	1229	29	39	940	46						7.3			C	235	
20	57	1345	17	64	1510	30						7.3			C		
21	52	1236	19	33	784	43						7.3			C		
22	66	1591	18	51	1229	39	9.0	77	20			7.4			C		
23	42	977	42	26	605	60	2.6	61	35			7.5			C	50	
24	84	1969	19	46	1078	51	3.0	70	12						C		
25	54	1252	39	40	928	48						7.2			C		
26	57	1293	31	35	794	43						7.1			C		
27	59	1328	20	29	653	45						7.3			C		
28	63	1424	17	54	1220	33						7.6			C		
29	70	1629	22	45	1047	58						7.1			C		
30	56	1305	20	42	981	19						7.6			C	260	
31															C		
TL		34,341			33,666			305							C		
ME	54	1311	20	46	1122	33	3.2	76	19			7.3			C	163	
WA	63	1406	12	55	1377	19	3.2	76	19						C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

September, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID 130629 09 75 ...
Plant No Mo Yr. Sampling Point Code

DAY 1 2	GRIT 9	AUX. FUEL 14	POWER CONSUMPTION 19 #1	24 #2	29 #3	CHEMICALS APPLIED 34 Cl_2	39	44	49	54	59
	CF		KWH	KWH	KWH	LBS.					
PN											
SF											
01		100	1560			100					
02		100	1560			80					
03		100	1560			160					
04		1500	1560			110					
05		1500	1680			110					
06		1400	1440			100					
07		1500	1440			90					
08		1500	2040			130					
09		1400	1560			100					
10		1500	1440			80					
11		200	1420			120					
12		100	1920			120					
13		100	1920			100					
14		100	1920			80					
15		100	2040			80					
16		200	1800			100					
17		100	1920			80					
18		100	1680			80					
19		200	1680			100					
20		100	1560			100					
21		200	1560			80					
22		100	1800			100					
23		200	2760			100					
24		100	2880			100					
25		300	2880			60					
26		100	2880			80					
27		100	3000			70					
28		100	2760			90					
29		200	2880			60					
30		100	2760			70					
31											
TL		13400	60360			2770					
ME		446	2012			92					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	4		676
Superintendent	1		168
Asst. Supt.	1		168
Shift Foreman			
Shift Operator	2		340
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL A

WEEKDAYS 9 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³.
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To wet well
Process Pattern Raw-Pri.-Sec.-Dig-Beds

MONTH September 1975

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs 1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	1326	5.2	70	21	5.9																			
2																								
3	2210	5.4	73	36				3.2	77											7514				
4	2652	4.0	73	32	6.4																			
5																								
6	2652	5.9	76	47	6.0																			
7	2210	5.4	87	36																				
8	884	3.7	79	10	6.0																			
9	1326	7.4	67	29	5.7			3.2	77											16796				
10	3094	6.8	70	64	6.2			3.2	77											4862				
11	2210	5.4	65	36	6.0																			
12	2210	4.3	73	29	6.5																			
13	2652	7.3	78	59	6.2																			
14	1326	4.8	85	19	6.4																			
15	4420	6.4	47	86	6.4																			
16	6188	5.4	67	101	6.3																			
17	3978	5.2	77	63	6.3																			
18	2652	5.7	76	46	6.0		5.6	3.0	76															
19	3978	4.6	85	56	6.2																			
20	3094	5.8	77	54	6.2																			
21	1768	3.8	81	20	6.1																			
22	3978	5.0	80	60	6.1																			
23	5746	4.8	77	84	6.1			2.7	75			10166		0.3	63	1040								
24	3978	4.5	83	54	6.3														2760					
25	2652	4.2	86	34	6.2			3.0	76			6188												
26	3978	3.8	81	46	6.3																			
27	2210	4.1	86	28	6.5																			
28	1326	4.8	74	19	6.4																			
29	2652	4.9	83	40	6.0		5.9					8840		0.3	63	560			2520					
30	3689	6.1	81	68	6.0																			
31																								
TOTAL	79050											25194								29172				
ARITH. MEAN	2823	5.2	76	46				2.8	7.7			8398		.3	63	800			2640	9724				

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

October, 19 75 (Month) — Marshall (Municipality), Michigan — Robert J. Sinclair (Superintendent's Signature)

ID 130029 (Plant No) 1.0 (Mo) 75 (Yr) 50.0 (Sampling Point Code)

DAY	WEATHER TYPE	WEATHER PRECIP	FLOW TOTAL	FLOW MAX RATE	RAW SEWAGE QUALITY TEMP	pH	BOD 5		SS		TOTAL-P		VSS	NH_3-N		REMARKS OR C		
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74 78	80	9	14	19
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS	mg/l	LBS	mg/l	LBS	mg/l	mg/l	C			
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C			
SF															C			
01	1		2.78	3.50	57	7.1	76	1762	86	1993			79		C			
02	1		2.79	3.50	57	7.6	60	1396	63	1466			44		C			
03	1		2.89	4.00	57	7.7	82	1976	59	1422			35		C			
04	1		2.75	3.80	55	7.7	92	2110	63	1445			60		C			
05	1		2.79	3.90	55	7.2	72	1675	72	1675			62		C			
06	1		2.81	3.70	57	7.2	112	2625	117	2742			93		C			
07	1		2.73	4.00	57	7.6	88	2004	93	2118			63		C			
08	4	.30	2.80	4.00	57	7.7	106	2475	123	2872	3.8	89	92		C			
09	1		2.75	4.00	57	7.6	92	2110	125	2868			101		C			
10	1		2.67	4.00	56	7.3	80	1782	49	1091			39		C			
11	1		2.65	3.70	56	7.5	94	2077	63	1392			47		C			
12	1		2.62	3.50	56	7.7	69	1508	64	1398			51		C			
13	1		2.83	4.00	57	7.6	65	1534	50	1180			39		C			
14	1		2.65	4.00	58	7.6	80	1768	93	2055			78		C			
15	3		2.68	3.80	57	7.6	72	1609	86	1922			68		C			
16	3		2.70	4.00	57	7.4	78	1757	105	2365			92		C			
17	3		2.84	3.70	57	7.5	78	1848	61	1445			51		C			
18	4	.28	2.71	3.40	57	7.5	70	1582	55	1243			36		C			
19	4	.25	2.75	3.70	55	7.7	70	1606	70	1606			54		C			
20	1		2.80	4.00	56	7.6	72	1681	96	2242			67		C			
21	1		2.74	3.50	56	7.8	60	1371	73	1668			62		C			
22	1		2.74	3.60	56	7.7	70	1600	68	1554			52		C			
23	1		2.73	3.60	57	7.7	129	2936	108	2458			101		C			
24	4	.23	2.67	3.40	58	7.6	74	1648	60	1336			26		C			
25	1		2.72	3.30	57	7.7	72	1634	84	1905			42		C			
26	1		2.63	3.20	58	7.6	70	1535	66	1447			72		C			
27	1		2.76	3.50	56	7.7	70	1611	63	1450			52		C			
28	1		2.66	3.50	56	7.8	80	1774	54	1198			42		C			
29	1		2.69	3.50	57	7.8	72	1615	69	1548			57		C			
30	1		2.67	3.50	56	7.7	76	1693	69	1537			61		C			
31	4	.08	2.71	3.50	56	7.7	120	2712	154	3480	3.6	81	81		C			
TL		1.14	84.71					56,978		56,121		170			C			
ME			2.73				81	1838	79	1810	3.7	85	61		C			

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

Primary Effluent Sheet

(For Secondary or Tertiary Plants Only)

OCTOBER, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

ID 130029 10 75
Plant No Mo Yr Sampling Point Code

DAY	BOD-5		SS		TOTAL-P		VSS	NH_3-N	REMARKS OR OTHER PARAMETERS										
	9 - 14		19 - 24		29 - 34		39	44	49	54	59	64	69	74 - 78	80	9	14	19
1 2	mg/l	LBS	mg/l	LBS	mg/l	LBS	mg/l	mg/l							C			
PN	00310	85001	00530	85002	00665	85004	00535	00610							C			
SF															C			
01	66	1530	66	1530			57								C			
02	42	977	29	675			25								C			
03	64	1542	34	940			15								C			
04	70	1666	31	711			29								C			
05	62	1443	47	1044			41								C			
06	57	1336	47	1102			41								C			
07	70	1544	44	1002			20								C			
08	72	1681	52	1214	3.6	84	28								C			
09	90	2065	82	1881			70								C			
10	53	1180	27	601			22								C			
11	72	1591	38	840			24								C			
12	60	1311	51	1114			46								C			
13	56	1322	44	1038			37								C			
14	70	1547	63	1392			55								C			
15	54	1319	39	872			36								C			
16	70	1576	52	1171			49								C			
17	45	1066	38	900			37								C			
18	43	972	28	633			17								C			
19	48	1101	43	986			27								C			
20	47	1097	36	841			20								C			
21	50	1143	44	1005			37								C			
22	56	1280	40	914			28								C			
23	80	1821	60	1366			55								C			
24	69	1537	38	846			15								C			
25	66	1497	60	1361			36								C			
26	65	1425	51	1118			42								C			
27	62	1427	51	1174			39								C			
28	63	1397	38	843			27								C			
29	53	1189	35	785			29								C			
30	68	1541	36	802			33								C			
31	112	2531	44	994	3.6	81	36								C			
TL		44,644		31,745		165									C			
ME	63	1440	45	1024	3.6	83	34								C			

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

ACTIVATED SLUDGE SHEET

October 19 75
Month

Marshall Michigan
Municipality

Robert J. Swahel
Superintendent's Signature

1 2 | 3 8 | 9 10 | 11 12 | 13 15
ID | 130029 | 10 | 75 |
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	AERATION SYSTEM					MIXED LIQUOR						SECONDARY SLUDGE					Process Modification 14	F 19
	Aeration Volume 9	Reaeration Volume 14	Detention Time 19	Sludge Age 24	Organic Loading 29	MLSS 34	MLVSS 39	SETTL 44	SDI 49	DO 54	Air Applied 59	SS 64	VSS 49	Percent Return 74	80	Waste Sludge 9		
	KCF	KCF	HRS	DAYS	F/M	mg/l	mg/l	%	%	mg/l	Cu Ft	%	%	%	C	KGal	See Code*	
PN	80993	80994	81001	80990	80992	70323	70324	81004	81007	00300	81000	81006	70325	81014	C	80991	80889	
SF											3				C			
01	48		3.1	.59	1.70	300						.084			C			
02			3.1	2.7	.53	617						.123			C			
03			3.0		.84	615		4.5	1.37			.160			C			
04			3.1												C			
05			3.1												C			
06			3.2	3.1	.40	1126		8.0	1.41		1098	.268			C			
07			3.1	4.0	.39	1348	1094	11.5	1.17		1065	.321	80		C			
08			3.1	3.7	.37	1512	1202	12.0	1.26		1114	.378	80		C			
09			3.1		.39	1768	1387	15.0	1.18		1112	.449	79	72	C			
10			3.2	9.7	.20	1954	1542	12.5	1.12	3.9	1111	.437	78		C			
11			3.3								1111				C			
12			3.3								1111				C			
13			3.0	6.7	.19	2335	1851	22.0	1.06		1089	.642	79	61	C			
14			3.3								1111		78	74	C			
15			3.2	7.4	.15	2868	2264	30.0	.96		1154	.543		72	C			
16			3.2	7.6	.18	2956	2273	30.0	.99		1173	.606	77	69	C			
17			3.0	10.1	.12	3027	2359	30.0	1.01		1190	.623	77		C	240		
18			3.2								1184				C	262		
19			3.1								1184				C	268		
20			3.1								1125			70	C			
21			3.1								1122				C			
22			3.1								1122				C			
23			3.2	2.4		1081	894	10.0	1.08		1125	.233	82	66	C			
24			3.2	5.2		1464	1195	13.5	1.08		1081	.367	82	65	C			
25			3.2								1225			65	C			
26			3.3								1185			65	C			
27			3.1	4.9	.25	1937	1525	24.0	.81		1134	.483	81	69	C			
28			3.2	7.7	.23	2168	1737	24.5	.88	3.0	1164	.479	80	69	C			
29			3.2	8.9	.19	2333	1844	25.0	.93	1.0	1134	.594	79	57	C			
30			3.2	9.4	.19	2507	1967	25.0	1.00	2.3	1169	.640	78	59	C	30		
31			3.2	6.7	.24	2228	1746	21.0	1.06			.542	78		C			
TL															C	800		
ME	48		3.2	5.9	.39	1897	1655	19.0	1.08	2.6	1136	.412	79	67	C	200		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

October, 19 75 (Month) — Marshall (Municipality), Michigan — Robert J. Swahnell (Superintendent's Signature)

1 2	3 – 8	9 10	11 12	13 15
ID	1300.29	1.0	75	00.0
	Plant No	Mo	Yr	Sampling Point Code

DAY	BOD 5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F COLI*		T. COLI*	REMARKS	
	9	14	19	24	29	34	39	44	49	54	59	64	69	74	80	9	14	19
1 2	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	LBS	% Rem	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml		
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505		
SF															C			
01	16	371	79	30	695	65				28					C			
02	16	372	73	13	303	79									C			
03															C			
04															C			
05															C			
06	16	375	86	9	211	92				7		7.7			C			
07	8	182	91	15	342	84				3		7.6			C	20		
08	9	210	92	22	514	82	3.2	75	16	6		7.6			C			
09	8	184	91	23	528	82				22		7.6			C			
10	14	312	83	9	200	82				5		7.5			C			
11	5	111	95	3	66	95				2		7.6			C			
12	9	197	87	21	459	67				16		7.6			C			
13	1	24	98	7	165	86				6		7.6			C			
14	7	155	91	25	553	73				20					C			
15	6	134	92	6	134	93				5		7.8			C			
16	3	68	96	22	495	79				19					C			
17	4	95	95	14	331	77				16		7.7			C			
18															C			
19															C			
20	2	47	97	23	537	76						7.8			C			
21	4	91	93	21	480	71				20		7.8			C			
22	7	160	90	7	160	90				5		7.8			C			
23	6	137	95	17	387	84				13		7.8			C			
24	1	22	99	5	111	92				4		7.8			C			
25	3	68	96	18	408	90				13		7.7			C			
26	4	88	94	13	285	80				10		7.6			C			
27	12	276	83	3	69	95				1		7.8			C			
28	7	155	91	4	89	93				2		7.8	5.9		C	130		
29	5	112	93	8	179	88				5		7.8	4.5		C			
30	11	245	86	15	334	78				12		7.6			C	215		
31	15	339	88	4	90	97	3.6	81	0	2		7.6			C			
TL		4530			8125			156							C			
ME	7	174	91	14	313	83	34	78	8	11		7.7	52		C	82		
WA	12	286		17	399										C	82		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

October, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Swalwell — Superintendent's Signature

ID 130029 — Plant No; 10 — Mo; 75 — Yr; Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX. FUEL 14	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl2 LBS.	39	44	49	54	59
PN											
SF											
01	1	200	2450			70					
02	1	100	2210			60					
03	1	200	2910			60					
04		100	2820			50					
05		200	2850			50					
06	2	100	2930			80					
07	1	200	2910			60					
08	1	100	2850			80					
09	1	200	3020			60					
10	1	100	2880			40					
11		300	2920			80					
12		200	2910			40					
13	2	200	2950			40					
14	1	100	2880			40					
15	1	200	2880			80					
16	1	200	3120			60					
17	1	200	3120			40					
18		300	3120			60					
19		200	3120			50					
20	2	200	3120			40					
21	1	200	3120			50					
22	1	100	3000			50					
23	1	100	3000			30					
24	1	100	3120			40					
25		200	3360			40					
26		200	3120			40					
27	2	100	3360			40					
28	1	200	3240			30					
29	1	100	3600			50					
30	1	200	3840			50					
31	1	100	3600			30					
TL	27	5200	94330			1590					
ME	1.17	168	3042			51					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours	N Va
TOTAL	4		728	
Superintendent	1		184	
Asst. Supt.	1		184	
Shift Foreman				
Shift Operator	2		360	
Maint. Supervisor				
Mechanic				
Chemist				
Lab Technician				
Clerk-Typist				
Other				

GIVE THE HOURS PER DAY PLANT PERSONNEL ARE

WEEKDAYS 9.5 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To Wet well
Process Pattern

MONTH October 1975

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids — %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg. l	P Mg. l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	5362	5.3	83	48	6.1																			
2	3039	5.3	86	42	6.2			2.7	78															
3	2529	5.4	80	33																				
4	2564	5.8	61	28	6.5																			
5	1128	4.1	84	12	6.4																			
6	3789	6.3	77	56	6.3			4.3	82															
7	2526	6.2	81	39	6.2							22542		.36	60	1480			2880					
8	4861	5.0	79	58	6.3																			
9	2574	3.8	82	24	6.2																			
10	1880	3.9	81	18	6.3																			
11	1127	1.6	80	4	6.6																			
12	930	4.9	65	9	6.6																			
13																								
14	1128	3.6	71	9	6.3																			
15	1989	3.6	71	15	6.3																			
16	1939	6.2	73	27	6.3																			
17	2525	5.5	73	31	6.5																			
18	2747	6.3	74	39	6.4																			
19	1963	5.8	78	27	6.3																			
20	4469	5.7	77	60	6.3																			
21	5645	5.6	80	77	6.3																			
22	9816	5.4	69	111	6.3																			
23	4492	5.6	77	59	6.2																			
24	3924	5.8	76	53	6.2		6.0	8.6	68															
25	2505	5.1	82	32	6.2																			
26	1643	5.9	72	20	6.0																			
27	3595	5.6	74	44	6.1																			
28	3912	5.1	81	48	6.0																			
29	3905	5.5	79	50	6.1																			
30	3910	5.5	81	52	6.0																			
31	4031	5.5	80	53	6.0																			
TOTAL	94696											22542												
ARITH. MEAN	3157	5.2	77	40				5.2	76			22542		.36	60	1480			2880					

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

November (Month), 19 75 — Marshall (Municipality), Michigan — Robert J Swalwell (Superintendent's Signature)

1 2 | 3 8 | 9 10 | 11 12 | 13 15
IP | 1300249 | 11 | 75 | 500
Plant No | Mo | Yr. | Sampling Point Code

DAY 1 2	WEATHER TYPE 9	WEATHER PRECIP. 14	FLOW TOTAL 19	FLOW MAX 24 RATE	RAW SEWAGE QUALITY TEMP 29	pH 34	BOD-5 39 44		SS 49 54		TOTAL-P 59 64		VSS 69	NH_3-N 74 78	80	REMARKS OR C 9	14	19
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C			
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C			
SF															C			
01	4	.05	2.66	4.00	55	7.8	86	1908	85	1886			36		C			
02	4	.18	2.71	4.00	55	7.6	84	1899	58	1311			47		C			
03	4	.11	2.76	3.60	57	7.8	66	1519	75	1726			62		C			
04	4	.03	2.67	3.70	57	7.7	156	3474	96	2138			84		C			
05	1		2.66	3.50	56	7.6	88	1952	66	1464			49		C			
06	4	.22	2.71	3.50	56	7.9	114	2577	97	2192			73		C			
07	4	.66	2.66	3.60	57	7.9	108	2394	114	2529			96		C			
08	1		2.59	3.50	57	7.8	70	1512	56	1210			17		C			
09	4	.23	2.59	3.20	57	7.6	60	1296	61	1318			56		C			
10	1		2.75	3.60	56	7.4	116	2661	108	4129			144		C			
11	1		2.67	3.80	56	7.9	130	2894	194	4318			162		C			
12	4	.03	2.32	3.60	56	7.4	106	2051	89	1722			77		C			
13	1		2.82	3.60	56	7.7	116	2728	132	3104			58		C			
14	1		2.78	4.00	55	7.8	104	2411	142	3292			122		C			
15	1		2.70	3.30	55	7.8	150	3378	98	2207			63		C			
16	1		2.69	3.30	54	7.7	60	1346	69	1548			54		C			
17	1		2.78	3.50	55	7.9	98	2272	84	1948			37		C			
18	1		2.76	3.60	55	7.9	56	1289	62	1427			55		C			
19	1		2.72	3.30	55	7.7	72	1633	67	1520			51		C			
20	4	.52	2.80	3.70	56	8.0	104	2429	166	3876			114		C			
21	4	.05	2.73	3.20	55	7.9	74	1685	70	1544			62		C			
22	3		2.67	3.50	55	7.8	112	2494	72	1603			26		C			
23	1		2.68	2.80	54	7.7	71	1587	64	1430			59		C			
24	5	.15	2.77	3.70	54	7.3	142	3280	74	1710			67		C			
25	3		2.71	3.60	54	7.8	88	1988	92	2079			78		C			
26	5	.72	2.53	3.50	54	7.7	136	2870	112	2363			40		C			
27	3		2.36	3.80	54	7.7	74	1456	72	1417			56		C			
28	5	.15	2.48	3.20	54	7.6	77	1593	58	1200			51		C			
29	4	.69	2.64	3.20	53	7.7	80	1761	49	1079			32		C			
30	5	.05	2.70	4.00	54	7.8	108	2432	98	2207			72		C			
31															C			
TL		3.24	80.07					64769		61547					C			
ME			2.67				97	2159	80	2051								

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

Primary Effluent Sheet

(For Secondary or Tertiary Plants Only)

November, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID | 130029 | 11 | 75 | |
Plant No. Mo. Yr. Sampling Point Code

DAY	BOD-5 9-14		SS 19-24		TOTAL-P 29-34		VSS 39	NH_3-N 44	REMARKS OR OTHER PARAMETERS 49	54	59	64	69	74	78 80	9	14
1 2	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l							C		
PN	00310	85001	00530	85002	00665	85004	00535	00610							C		
SF															C		
01	82	1819	54	1198			13								C		
02	84	1899	37	836			30								C		
03	53	1220	50	1151			42								C		
04	100	2227	62	1381			42								C		
05	60	1331	47	1043			35								C		
06	69	1559	34	768			22								C		
07	74	1642	52	1154			43								C		
08	60	1296	38	821			19								C		
09	56	1210	44	950			33								C		
10	66	1514	60	1376			50								C		
11	88	1959	74	1647			62								C		
12	76	1470	51	987			42								C		
13	74	1740	52	1223			43								C		
14	64	1600	56	1298			50								C		
15	92	2072	54	1216			19								C		
16	70	1570	41	920			36								C		
17	71	1646	48	1113			41								C		
18	59	1358	46	1059			44								C		
19	68	1542	49	1112			33								C		
20	82	1915	68	1588			44								C		
21	68	1548	46	1047			42								C		
22	63	1403	56	1247			14								C		
23	60	1341	52	1162			43								C		
24	80	1848	52	1201			34								C		
25	100	2260	31	701			26								C		
26	108	2379	68	1435			58								C		
27	72	1417	50	984			36								C		
28	75	1551	48	993			43								C		
29	68	1497	31	683			14								C		
30	75	1684	58	1306			48								C		
31															C		
TL		49422		33550											C		
ME	74	1647	50	1118			37								C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

ACTIVATED SLUDGE SHEET

November (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swalwell (Superintendent's Signature)

1 2 3 8 9 10 11 12 13 15
IP | 1300129 | 11 | 75 | ..
Plant No. | Mo. | Yr. | Sampling Point Code

DAY 1 2	AERATION SYSTEM					MIXED LIQUOR						SECONDARY SLUDGE					Process Modification 14
	Aeration Volume 9	Reaeration Volume 14	Detention Time 19	Sludge Age 24	Organic Loading 29	MLSS 34	MLVSS 39	SETTL. 44	SDI 49	DO 54	Air Applied 59	SS 64	VSS 49	Percent Return 74	80	Waste Sludge 9	
	KCF	KCF	HRS.	DAYS	F/M	mg/l	mg/l	%	%	mg/l	Cu. Ft.	%	%	%	C	KGal	See Code*
PN	80993	80994	81001	80990	80992	70323	70324	81004	81007	00300	81000	81006	70325	81014	C	80991	80889
SF											3				C		
01	48		3.2								1099			65	C		1
02			3.2								1093			66	C		
03			3.1	7.3	.24	2822	2212	28.5	.99		1067	.685	79	63	C	23.0	
04			3.2	5.7	.27	2657	2084	27.0	.98		1067	.635	78	65	C	35.0	
05			3.2	7.4	.28	2584	2045	29.0	.89		1091	.600	80	65	C	36.0	
06			3.2	9.3	.28	2386	2047	25.5	.94		1029	.564	73	68	C	27.0	
07			3.2	6.4	.29	2293	1818	24.0	.96		1047	.513	79	72	C	35.0	
08			3.3								1075			74	C	21.6	
09			3.3								1048			74	C		
10			3.1	6.2	.28	2286	1810	29.0	.78		1126	.534	76	45	C	41.0	
11			3.2	5.6	.31	2084	1609	25.0	.83		1892	.718	78	37	C	22.5	
12			3.7	5.7	.31	2128	1678	27.0	.79		1890	.665	78	47	C	23.0	
13			3.1	5.0	.36	2070	1633	25.0	.83		1890	.645	79	42	C	37.0	
14			3.1	4.4	.37	1856	1474	22.0	.84		1890	.548	79	42	C	14.0	
15			3.2								1890			43	C	14.6	
16			3.2								1890			43	C	14.0	
17			3.1	5.2	.34	2186	1737	26.0	.84	1.5	1890	.658	79	42	C	23.0	
18			3.1	5.7	.32	2187	1766	28.0	.78		1890	.682	81	28	C	29.1	
19			3.2	5.3	.36	1956	1547	23.0	.85		1890	.840	80	25	C	10.9	
20			3.1	4.9	.37	2008	1597	23.0	.87		1890	.869	79	24	C	10.2	
21			3.2	5.5	.33	2133	1706	23.0	.93		1890	.935	80	25	C	11.9	
22			3.2								1890			25	C	12.0	
23			3.2	4.8	.39	1844	1460	21.0	.88		1890	.939	79	24	C	12.0	
24			3.1	4.5	.33	2044	1633	22.0	.93		1890	.988	79	22	C	9.9	
25			3.2	3.9	.50	1388	1118	20.0	.69		1890	1.000	80	23	C		
26			3.4	6.0	.32	2240	1763	25.0	.40		1322	1.280	77	25	C		
27			3.7								1376			26	C		
28			3.5	6.7	.30	2338	1843	26.0	.89		1403	1.290	80	26	C		
29			3.3								1313			25	C	10.1	
30			3.2	6.7	.33	2410	1893	27.5	.88		1407	1.350	80	25	C	8.8	
31															C		
TL															C	480	
ME	48		3.2	5.8	.33	2191	1737	25.1	.87	1.5	1521						

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

November, 19 75
Month

Marshall, Michigan
Municipality

Robert J. Swalwell
Superintendent's Signature

1 2 3 8 9 10 11 12 13 15
ID 1300.29 11 75 000
Plant No. Mo Yr. Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMARKS
1 2	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem	mg/l	LBS.	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	13	288	85	16	355	81				11		7.8			C		
02	13	294	85	12	271	79				2		7.7			C		
03	8	184	89	17	391	77				11		7.7			C		
04	15	334	90	18	401	81				10		7.8			C		
05	13	288	85	19	422	71				11		7.8			C		
06	10	226	91	8	181	92				4		7.9			C		
07	5	111	95	17	377	85				12		7.9			C		
08	4	86	94	2	43	96				1		7.7			C		
09	8	173	87	20	432	67				17		7.7			C		
10	13	298	89	35	803	24				81		7.9			C		
11	7	156	95	40	890	79				38		8.0			C		
12	5	97	95	10	194	89				9		7.7			C		
13	24	564	79	21	494	84				16		7.9			C		
14	10	232	90	8	185	94				6		7.9			C		
15	11	248	93	11	248	89				3		7.8			C		
16	9	202	83	16	359	77				14		7.8			C		
17	14	325	86	17	394	80				13		7.9	5.8		C		
18	6	138	89	21	483	66				17		7.9			C		
19	10	227	86	20	454	70				10		7.6			C		
20	7	163	93	16	374	90				13		7.8			C		
21	6	137	92	13	296	81				9		7.8			C		
22	8	178	93	20	445	72				10		7.8			C		
23	7	156	90	25	559	61				23		7.8			C		
24	7	162	95	19	439	74				16		7.8			C		
25	17	384	80	21	475	88				17		7.9			C		
26	13	274	90	26	599	77				25		7.7			C		
27	8	157	89	22	433	69				17		7.7			C		
28	13	269	83	25	517	57				21		7.7			C		
29	13	286	83	4	88	92				3		7.9			C		
30	8	180	93	16	360	84				17		7.9			C		
31															C		
TL		6817			11,912										C		
ME	10	227	89	18	397	78				15		7.8	5.8		C		
WA	12	277		23	453										C		

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

November (Month), 19 75

Marshall (Municipality), Michigan

Robert J. Swalwell
Superintendent's Signature

1 2 | 3 8 | 9 10 | 11 12 | 13 15
ID | 130029 | 11 | 75 |
Plant No | Mo | Yr | Sampling Point Code

DAY 1 2	GRIT 9 CF	AUX.FUEL 14 Gas	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39	44	49	54	59
PN											
SF											
01	2	200	3240			30					
02	2	200	3000			30					
03	2	100	3120			40					
04	2	100	3240			50					
05	2	200	3240			40					
06	2	100	3240			30					
07	2	200	3360			20					
08	2	100	3120			60					
09	2	100	3000			40					
10	2	200	3240			80					
11	2	100	3240			40					
12	2	200	3240			80					
13	2	7900	3600			60					
14	2	7400	3720			40					
15	2	5000	3480			50					
16	2	3200	3360			40					
17	2	2600	3360			30					
18	2	300	3240			60					
19	2	200	3240			40					
20	2	4500	3600			50					
21	2	7000	3600			50					
22	2	9400	3720			50					
23	2	8300	3600			30					
24	2	7600	3720			60					
25	2	9400	3720			60					
26	2	9000	3480			60					
27	2	7300	3360			40					
28	2	8000	3360			60					
29	2	4400	3120			40					
30	2	6300	3360			90					
31											
TL	60	109800	100920			1450					
ME	2	3660	3364			48					

MANPOWER

POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	4		556
Superintendent	1		144
Asst. Supt.	1		144
Shift Foreman			
Shift Operator	2		312
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL A

WEEKDAYS 9.5 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marshall, MICHIGAN

MDPH
D-4.5

Supernatant To
Process Pattern

MONTH November 19 75

DIGESTER AND SLUDGE DATA

OPERATOR R.J. Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids %	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X.	Total Solids %	Vol. Solids %	pH	
1	2547	6.2	70	34	6.2																			
2	1287	7.1	80	22	6.0																			
3	3858	6.2	74	62	6.1																			
4	3875	5.7	75	53	6.1																			
5	2922	6.8	76	46	6.1																			
6	3876	5.5	71	46	6.2																			
7	5015	5.8	70	62	6.2																			
8	1631	5.5	78	21	6.4																			
9	1611	5.6	62	26	6.2																			
10	3914	5.3	67	42	6.2		5.8	6.3	6.9															
11	2981	5.4	74	36	6.2																			
12	6260	5.9	78	87	6.3																			
13	5310	5.2	72	60	6.4																			
14	5310	5.8	77	72	6.3																			
15	4974	4.9	71	52	6.4																			
16	3534	5.4	74	42	6.3																			
17	5412	4.4	70	56	6.2																			
18	3144	5.6	71	34	6.2																			
19	1984	4.5	77	21	6.2																			
20	2978	3.4	81	25	6.1																			
21	3796	5.8	66	44	6.2			7.6	6.6			9724												
22	986	4.3	71	19	6.2																			
23	4857	5.0	69	50	6.2																			
24	2991	4.8	70	30	6.2							6630												
25	2871	4.9	82	35	6.2																			
26	1037	4.9	82	13								9724												
27																								
28	2772	5.0	70	24																				
29	998	5.4	71	11	6.0																			
30	993	5.4	76	12	6.1																			
31																								
TOTAL	93224											26078												
ARITH. MEAN	3215	5.4	73	39				7.0	6.8			8692												

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

PLANT INFLUENT SHEET

December, 19 75
Month

Marion, Michigan
Municipality

Robert J. Sinclair
Superintendent's Signature

ID 1300291 12 75 500
Plant No. Mo Yr Sampling Point Code

DAY	WEATHER		FLOW		RAW SEWAGE QUALITY											REMARKS OR
	TYPE	PRECIP.	TOTAL	MAX RATE	TEMP	pH	BOD-5		SS		TOTAL-P		VSS	NH_3-N		
1 2	9	14	19	24	29	34	39	44	49	54	59	64	69	74 78	80	9 14
	See Code*	Inches	MGD	MGD	°F	SU	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l	C	
PN	00033	00045	50050	50051	00011	00400	00310	85001	00530	85002	00665	85004	00535	00610	C	
SF															C	
01	5	.01	2.77	3.80	53	7.9	62	1432	78	1802	2.6	60	50		C	
02	3		2.64	3.40	53	7.9	93	2086	64	1436			48		C	
03	1		2.68	3.60	54	7.9	116	2593	104	2325	3.5	78	62		C	
04	1		2.67	3.60	52	7.6	100	2227	126	2806			92		C	
05	4	.88	2.78	3.70	54	7.9	142	3292	216	5008	3.8	88	144		C	
06	3		2.78	3.50	54	7.9	68	1577	50	1159			30		C	
07	1		2.70	3.80	53	7.8	64	1441	57	1283	3.0	68	54		C	
08	5	.46	2.77	3.60	53	7.9	84	1940	46	1063	3.3	76	34		C	
09	5	.01	2.76	3.60	53	8.0	100	2302	156	3541	5.1	117	124		C	
10	5	.06	2.70	3.50	53	7.9	58	1306	47	1058	3.2	72	36		C	
11	5	.28	2.69	3.60	53	7.8	128	2872	138	3096			80		C	
12	5	.07	2.71	3.70	53	7.8	72	1627	57	1288			55		C	
13	4	.39	2.81	3.60	52	7.8	68	1594	88	2062			34		C	
14	4	.82	2.83	3.60	53	7.9									C	
15	5	.32	3.13	4.00	54	8.0	51	1331	52	1357			40		C	
16	3		3.11	4.00	53	8.0	78	2023	80	2075	3.2	83	52		C	
17	5	.02	3.06	4.00	52	8.1	86	2195	92	2348	3.6	92	70		C	
18	5	.01	3.02	3.80	52	8.0	72	1783	72	1783			60		C	
19	5	.08	2.97	3.70	52	8.0	54	1297	90	2162			32		C	
20	5	.03	2.88	3.60	53	7.8									C	
21	1		2.87	4.00	53	7.8	60	1436	88	2106			86		C	
22	3		2.96	4.00	52	8.0	78	1925	102	2518	3.2	79	62		C	
23	3		2.89	4.00	52	7.9	87	2096	140	3379			116		C	
24	1		2.76	3.60	51	8.0	62	1427	76	1744			70		C	
25	5	.18	2.63	3.20	51	8.0	24	526	40	877	2.3	50	37		C	
26	5	.05	2.78	3.70	52	7.9	53	1229	40	927			38		C	
27	5	.02	2.76	3.40	51	7.8	56	1289	62	1427			40		C	
28	3		2.73	3.30	50	7.9	37	842	50	1895			48		C	
29	4-5	.28	2.84	4.00	51	8.0	59	1397	80	1844	3.8	90	70		C	
30	3		2.80	3.70	51	8.0	45	1051	76	1775	4.6	107	72		C	
31	3		2.75	3.60	51	8.0	74	1697	58	1330			56		C	
TL		3.97	87.28					49,833		57,574		1060			C	
ME			2.82				73	1718	84	1985	3.5	82	62		C	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

Primary Effluent Sheet

(For Secondary or Tertiary Plants Only)

December, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Sunbell — Superintendent's Signature

1 2	3 8	9 10	11 12	13 15
ID	13,0029	12	75	..
	Plant No	Mo	Yr.	Sampling Point Code

DAY	BOD-5		SS		TOTAL-P		VSS	NH_3-N	REMARKS OR OTHER PARAMETERS								
	9	14	19	24	29	34	39	44	49	54	59	64	69	74 78	80	9	14
1 2	mg/l	LBS.	mg/l	LBS.	mg/l	LBS.	mg/l	mg/l							C		
PN	00310	85001	00530	85002	00665	85004	00535	00610							C		
SF															C		
01	52	1201	48	1108	2.6	60	28								C		
02	81	1817	48	1077			30								C		
03	69	1542	64	1430	3.0	67	24								C		
04	68	1649	60	1336			48								C		
05	74	1715	58	1345	3.0	70	44								C		
06	66	1530	44	1020			34								C		
07	60	1351	43	968	3.3	74	42								C		
08	60	1386	13	300	3.0	69	13								C		
09	66	1519	12	267	2.9	67	11								C		
10	41	923	29	653	2.9	65	23								C		
11	65	1458	66	1481			36								C		
12	48	1084	42	949			40								C		
13	51	1195	60	1406			35								C		
14															C		
15															C		
16															C		
17	68	1735	74	1889	3.0	77	46								C		
18															C		
19	64	1585	72	1783			60								C		
20															C		
21															C		
22	70	1728	96	2370	3.4	84	58								C		
23	72	1735	112	2699			82								C		
24	70	1611	103	2371			88								C		
25	30	658	42	921	3.3	72	78								C		
26	46	1067	92	2133			74								C		
27	76	1749	65	1496			40								C		
28	54	1279	68	1611			48								C		
29	62	1469	56	1326	3.8	90	50								C		
30	52	1214	70	1635	3.2	75	51								C		
31	96	2201	65	1491			51								C		
TL		36,401		35,065		870									C		
ME	62	1456	60	1403	3.1	73	45										

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

ACTIVATED SLUDGE SHEET

December (Month), 19 75 — Marshall (Municipality), Michigan — Robert J. Swahnell (Superintendent's Signature)

1 2 3 8 9 10 11 12 13 15
ID | 130029 (Plant No) | 12 (Mo) | 75 (Yr) | .. (Sampling Point Code)

DAY 1 2	AERATION SYSTEM					MIXED LIQUOR						SECONDARY SLUDGE					Process Modification 14
	Aeration Volume 9	Reaeration Volume 14	Detention Time 19	Sludge Age 24	Organic Loading 29	MLSS 34	MLVSS 39	SETTL 44	SDI 49	DO 54	Air Applied 59	SS 64	VSS 49	Percent Return 74	80	Waste Sludge 9	
	KCF	KCF	HRS.	DAYS	F/M	mg/l	mg/l	%	%	mg/l	Cu Ft.	%	%	%	C	KGal	See Code*
PN	80993	80994	81001	80990	80992	70323	70324	81004	81007	00300	81000	81006	70325	81014	C	80991	80889
SF											3				C		
01	48		3.1								1474			25	C		
02			3.2	6.6	.29	2475	1954	25.0	.88		1458	1,330	80	32	C	18.3	
03			3.2	6.1	.30	2262	1735	29.0	.78		1466	.909	77	36	C	20.0	
04			3.2	6.1	.30	2316	1763	27.0	.86		1418	.923	76	37	C	12.0	
05			3.1	5.6	.32	2268	1678	28.0	.81		1434	.826	74	46	C	19.9	
06			3.1								1502			44	C	12.9	
07			3.2								1503			45	C	11.5	
08			3.1	6.9	.31	2497	1725	29.0	.86		1438	.838	69	66	C	14.9	
09			3.1	8.6	.27	2774	1848	34.0	.82		1417	.688	68	76	C	22.4	
10			3.2								1416			51	C	18.0	
11			3.2	10.2	.23	3040	2018	36.0	.84		1409	.684	66	87	C	46.0	
12			3.2	11.0	.22	3004	1452	35.0	.86		1424	.671	65	86	C	61.0	
13			3.1								1435			86	C	37.6	
14			3.0								1319			80	C		
15			2.8	5.9	.29	2436	1857	33.0	.84		1408	.726	63	80	C	38.5	
16			2.8	5.5	.30	2888	1745	33.6	.88		1418	.651	62	81	C	34.6	
17			2.8	5.4	.25	3025	1905	33.0	.92		1482	.674	62	82	C	46.0	
18			2.9	6.0	.27	3049	1949	30.0	1.02		1502	.682	64	83	C	49.7	
19			2.9	7.1	.26	2983	1815	31.0	.96		1500	.684	68	76	C	45.4	
20			3.0								1497			76	C	14.8	
21			3.0								1504			76	C	36.6	
22			2.9	5.6	.25	2914	1878	26.5	1.10		1506	.705	64	74	C	36.2	
23			3.0	4.8	.27	2884	1875	27.5	1.05		1497	.718	64	75	C	46.6	
24			3.1								1444			78	C	39.3	
25			3.3								1469			83	C	30.5	
26			3.1	7.1	.21	3302	2172	29.5	1.12		1450	.729	66	83	C	55.6	
27			3.1								1483			84	C	43.1	
28			3.2								1488			84	C	35.8	
29			3.0	4.8	.22	3187	2097	28.5	1.12		1450	.712	66	81	C	74.7	
30			3.1					26.0			1452			81	C	85.3	
31			3.1	5.2	.23	2931	1983	23.0	1.27		1468	.689	68	83	C	61.8	
TL															C	1069	
ME	48		3.1	6.8	.27	2819	1892	32	.95		1454	.771	68	69	C	36.8	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

FINAL EFFLUENT SHEET

December, 19 75 — Month

Marshall, Michigan — Municipality

Robert J. Swalwell — Superintendent's Signature

1 2	3 8	9 10	11 12	13 15
ID	13.00.19	12	75	0.00
	Plant No	Mo.	Yr.	Sampling Point Code

DAY	BOD-5			SS			TOTAL-P			VSS	NH_3-N	pH	DO	F. COLI*		T. COLI*	REMARKS
	9	14	19	24	29	34	39	44	49	54	59	64	69	74	80	9	14 19
1 2	mg/l	LBS.	% Rem	mg/l	LBS.	% Rem.	mg/l	LBS.	% Rem.	mg/l	mg/l	SU	mg/l	#/100 ml	C	#/100 ml	
PN	00310	85001	81010	00530	85002	81011	00665	85004	81012	00535	00610	00400	00300	31616 31615	C	31504 31505	
SF															C		
01	12	277	80	24	554	69	2.40	55	8	15		7.9			C	130	
02	9	202	90	27	606	58				14		7.9			C		
03	9	201	92	30	670	71	1.40	31	60	9		7.9			C	130	
04	10	223	90	31	690	75				24		7.8			C		
05	11	255	92	19	441	91	1.30	30	66	16		7.8			C		
06	15	348	76	26	603	48				9		7.9			C		
07	12	270	81	27	608	53	1.00	23	67	27		7.9			C		
08	6	139	93	10	231	72	.90	21	73	7		7.9			C	200	
09	7	161	93	15	345	92	.62	14	88	11		7.9			C		
10	5	113	91	5	113	89	.50	11	84	1		8.3			C		
11	13	291	90	21	471	85				8		7.7			C	110	
12	12	271	83	18	407	68				15		7.8			C		
13	6	141	91	22	516	75				11		8.0			C		
14												7.8			C		
15	5	131	90	8	209	84				5		8.1			C	5	
16	3	78	96	15	389	81	.60	16	81	9		7.8			C	5	
17	3	77	97	17	434	82	.57	15	84	5		7.9			C		
18												7.9			C		
19	5	124	93	27	669	63				17		7.9			C		
20	3	72	94	30	721	60				15		7.8			C	5	
21	4	96	93	26	622	70				15		7.8			C		
22	2	49	97	20	493	80	.46	11	86	7		7.9			C		
23	10	241	86	21	506	85				18		7.9			C		
24	11	253	82	16	368	79				13		7.9			C		
25	8	175	67	14	307	65	.36	8	84	13		7.9			C		
26	11	255	79	16	371	60				14		7.9			C		
27	11	253	80	23	529	63				7		7.8			C		
28	7	166	81	18	426	64				13		7.9			C		
29	9	213	85	11	261	86	.58	14	85	8		8.0			C		
30	8	187	82	9	210	88	.30	7	93	7		8.1			C		
31	8	183	89	3	69	95				2		8.0			C		
TL		5445			12,839			256							C		
ME	8	188	87	19	443	74	.84	20	74	12		7.9			C	33	
WA	11	254	80	26	596	71	1.20	26	64	16					C	33	

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS SHEET

December, 19 75 (Month) — Marshall (Municipality), Michigan — Robert J. Swalwell (Superintendent's Signature)

1 2	3 8	9 10	11 12	13 15
ID	130029	12	75	..
	Plant No	Mo	Yr.	Sampling Point Code

DAY 1 2	GRIT 9 - CF	AUX. FUEL 14 GAS CF	POWER CONSUMPTION 19 #1 KWH	24 #2 KWH	29 #3 KWH	CHEMICALS APPLIED 34 Cl_2 LBS.	39 $FeCl_3$ LBS.	44 Polymer LBS.	49	54	59
PN											
SF		2									
01	2	91	3600			70	298				
02	2	88	3360			60	457				
03	2	78	3600			100	437				
04	2	52	3360			90	437				
05	2	29	3240			80	627				
06	2	80	3480			70	623				
07	2	66	3480			90	546				
08	2	66	3720			100	992	5.86			
09	2	107	3840			120	695	5.86			
10	2	94	3720			140	695	5.86			
11	2	82	3720			140	596	5.86			
12	2	68	3720			100	596	5.86			
13	2	33	3480			200	596	5.86			
14	2	31	3240			140	596	5.86			
15	2	61	3600			160	1389	5.86			
16	2	84	4080			140	695	5.86			
17	2	116	5160			130	596	5.86			
18	2	130	2760			90	596	5.86			
19	2	100	3720			60	596	5.86			
20	2	97	3480			100	596	5.86			
21	2	113	3720			80	1588	5.86			
22	2	106	3840			100	1390	5.86			
23	2	30	4080			60	596	5.86			
24	2	83	3840			50	546	5.86			
25	2	82	3840			30	496	5.86			
26	2	84	3720			50	546	5.86			
27	2	100	3720			30	496	5.86			
28	2	101	3840			50	1191	5.86			
29	2	94	4080			50	1390	5.86			
30	2	82	3840			40	496	5.86			
31	2	96	3840			50	496	5.86			
TL	64	2524	114,720			2770	22040	141			
ME	2	81	3701			89	711	5.86			

MANPOWER POSITION TITLE	No. Full Time	No. Part Time	Total Hours
TOTAL	4		716
Superintendent	1		176
Asst. Supt.	1		176
Shift Foreman			
Shift Operator	2		364
Maint. Supervisor			
Mechanic			
Chemist			
Lab Technician			
Clerk-Typist			
Other			

GIVE THE HOURS PER DAY PLANT PERSONNEL

WEEKDAYS 9.5 HRS.

SATURDAYS 4 HRS.

SUNDAYS 4 HRS.

HOLIDAYS 4 HRS.

Digester Volume, ft³
Primary 14000
Secondary 14000

OPERATION REPORT OF WASTEWATER TREATMENT PLANT

Marion, MICHIGAN

MDPH
D 45

Supernatant To

Process Pattern

MONTH December 1975

DIGESTER AND SLUDGE DATA

OPERATOR Robert J Swalwell

DATE	RAW SLUDGE					DIGESTING SLUDGE						SUPERNATANT								DIGESTED SLUDGE				Gas Produced cu. ft X
	Gals. X	Total Solids %	Vol. Solids %	Vol. Solids Lbs/1000 c.f. Digester	pH	Temp. °F	pH	Total Solids %	Vol. Solids –	Vol. Acids Mg/l	Alkalinity Mg/l	Gals. X	pH	Total Solids %	Vol. Solids %	Susp. Solids Mg/l	P Mg/l	P Lbs.	5-Day BOD Mg/l	Gals. X	Total Solids %	Vol. Solids %	pH	
1	1721	5.8	74	22	6.1																			
2	2374	5.9	76	32	5.9																			
3	2734	5.6	73	34	6.1																			
4	2288	5.7	75	30	6.1																			
5	2974	5.2	76	36	6.1																			
6	998	5.7	63	10	6.0																			
7	752	6.0	79	10	6.2																			
8	2732	6.0	80	41	6.1																			
9	1756	5.6	72	22	6.3																			
10	2496	5.4	74	30	6.3																			
11	3193	5.8	70	39	6.4																			
12	2662	6.0	78	37	6.3																			
13	1534	5.4	75	19	6.4																			
14	750	5.7	74	9	6.4																			
15	2551	5.3	75	31	6.3																			
16	2396	4.7	73	25	6.2																			
17	2394	5.4	70	27	6.6																			
18	2451	5.5	77	31	6.6																			
19	2424	5.3	73	28	6.6																			
20	750	5.9	73	10	6.5																			
21																								
22	1615	5.6	69	19	6.5																			
23	2406	5.6	70	29	6.6																			
24	2462	5.2	63	25	6.5																			
25	823	5.4	68	9	6.5																			
26	1738	5.4	72	21	6.4																			
27	819	5.7	74	11	6.4																			
28	820	5.1	61	8	6.4																			
29	2385	5.5	64	26	6.5																			
30	2360	6.2	71	32	6.6																			
31	2436	6.2	71	33	6.7																			
TOTAL	59796																							
ARITH. MEAN	1993	5.6	72	25																				