OPERATING SUMMARY

CONISTON

water pollution control plant

1967

ONTARIO WATER RESOURCES COMMISSION
Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET, TORONTO 5
OFFICE OF THE GENERAL MANAGER

Members of the Coniston Local Advisory Committee,
Town of Coniston.

Gentlemen:

We are happy to present you with the 1967 Operating Summary for the Coniston Water Pollution Control Plant, OWRC Project No. 2-0008-57.

Your co-operation with our staff throughout the year has been appreciated. Only with such co-operation can the war against water pollution be waged effectively.

Yours very truly,

D. S. Caverly,
General Manager.

#1

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
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J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

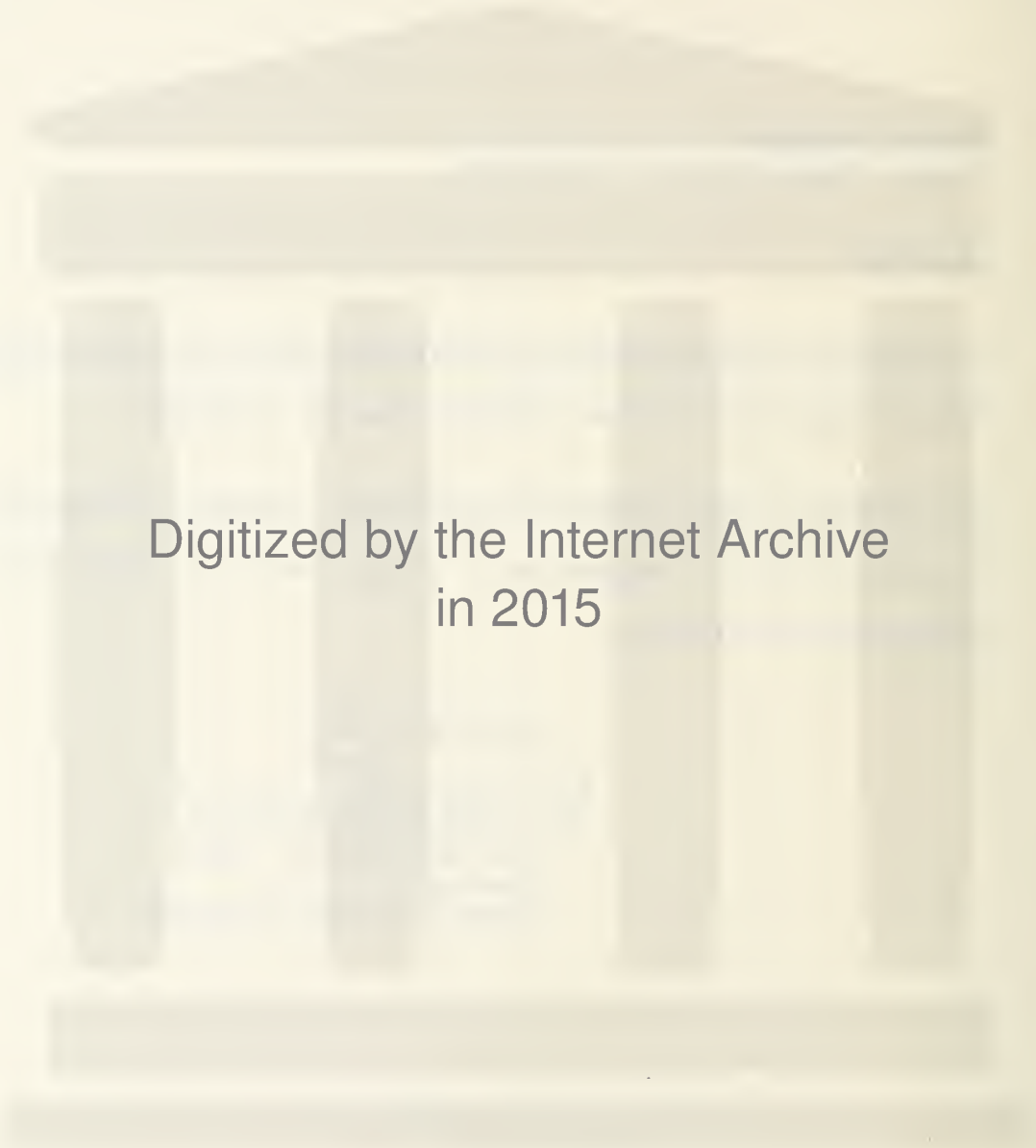
Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Coniston Water Pollution Control Plant, OWRC Project No. 2-0008-57.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.



FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

CONTENTS

CONISTON

water pollution control plant

operated for

THE TOWN OF CONISTON

by the

ONTARIO WATER RESOURCES COMMISSION

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DIRECTOR: D. A. McTavish

Assistant Director: C. W. Perry
Regional Supervisor: P. J. Osmond
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'67 REVIEW

A total of 69.296 million gallons was treated in 1967 for an average of 190,000 gallons per day. The design flow of 150,000 gallons per day was exceeded 87 percent of the time.

The plant efficiency for the year was less than that expected for the activated sludge process, being 77.2 percent and 76.3 percent in BOD and suspended solids removal respectively. This reduced efficiency reflects the overloaded condition at the plant.

The total operating cost for the year was $13,350.51 or $192.66 per million gallons treated, compared to $11,578.81 or $183.39 per million gallons treated in 1966.

Several meetings were held during the year between the Town of Coniston and the OWRC to discuss the future requirements of the Town. As a result, steps were taken to engage a consulting engineer to make a study and prepare an engineering report. The cost of the report was to be paid from the Reserve Fund.

PROJECT COSTS

NET CAPITAL COST (Estimated) Long Term Debt to OWRC	$468,190.39
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	$ 94,221.53
Net Operating	$ 13,350.51
Debt Retirement	9,448.00
Reserve	3,031.69
Interest Charged	26,402.88
TOTAL	$ 52,233.08

RESERVE ACCOUNT

Balance at January 1, 1967	$ 13,755.21
Deposited by Municipality	3,031.69
Interest Earned	847.10
	$ 17,634.00
Less Expenditures	-
Balance at December 31, 1967	$ 17,634.00

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY
JAN	1,017.06	398.98	51.24	66.51			28.86		438.00	33.47
FEB	806.85	455.17	71.57	45.52	127.09		19.58			87.92
MARCH	902.80	713.26	164.33	72.43	116.35		4.40	24.15	(376.21)	184.09
APRIL	1,133.76	624.37	94.29	51.35	96.84		155.80		11.49	99.62
MAY	1,293.40	485.44	278.69	38.87	96.14	228.38	4.40		47.01	114.47
JUNE	1,181.21	601.28	170.63	72.36	104.46		9.90			222.58
JULY	885.32	451.15	101.65	72.03	77.69		81.46		33.08	68.26
AUG	980.44	460.29			61.45		5.50	135.00	147.15	171.05
SEPT	1,279.03	894.67	162.01		65.43		22.11		14.94	119.87
OCT	1,312.40	456.01	216.30	140.04	76.64	118.13	101.98	121.38		81.92
NOV	1,237.36	524.72	202.42	34.38	87.58		8.40		38.50	341.36
DEC	1,320.88	481.16	103.39	135.28	111.97		50.80	33.61	74.59	330.08
TOTAL	13,350.51	6,546.50	1,616.52	728.77	1021.64	346.51	493.19	314.14	428.55	1854.69

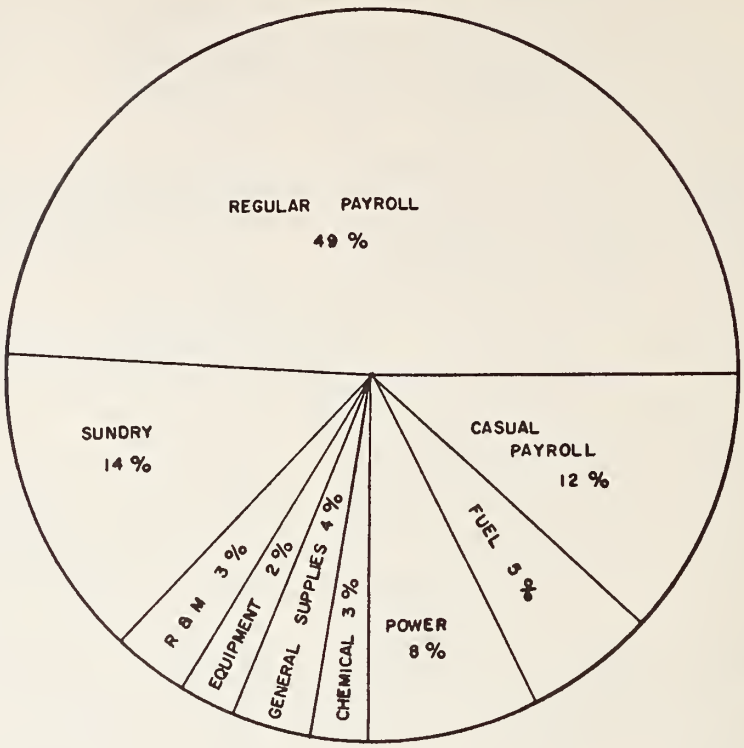
BRACKETS INDICATE CREDIT

YEARLY OPERATING COSTS

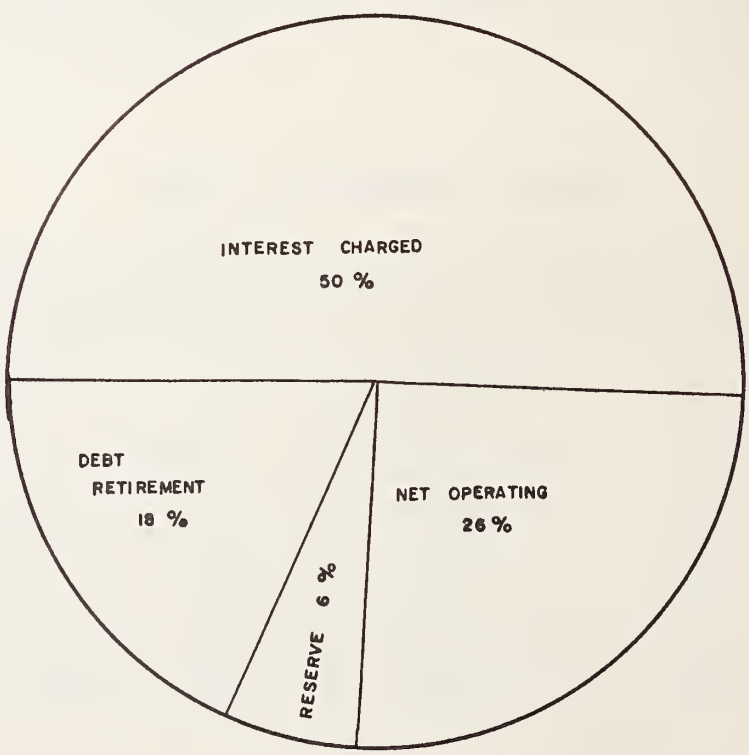
YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1962	40.150 *	$10345.20	$257.66	12 CENTS
1963	54.750 *	8669.18	158.34	8 CENTS
1964	65.844	11738.97	178.28	9 CENTS
1965	72.875	12495.59	171.47	12 CENTS
1966	63.139	11573.81	183.39	11 CENTS
1967	69.296	13350.51	192.66	13 CENTS

* PRORATED ON AVAILABLE DATA

1967 OPERATING COSTS



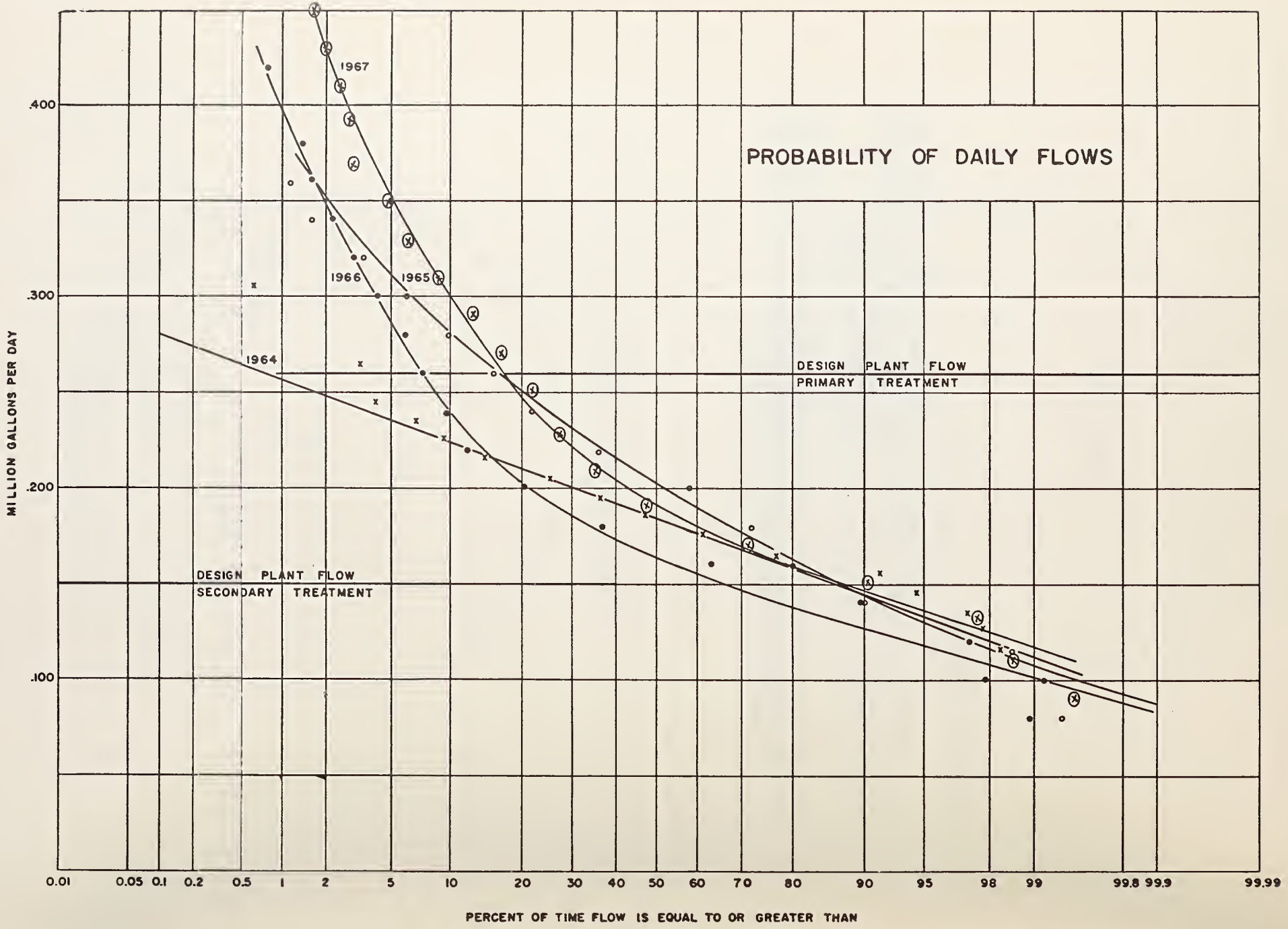
TOTAL ANNUAL COST

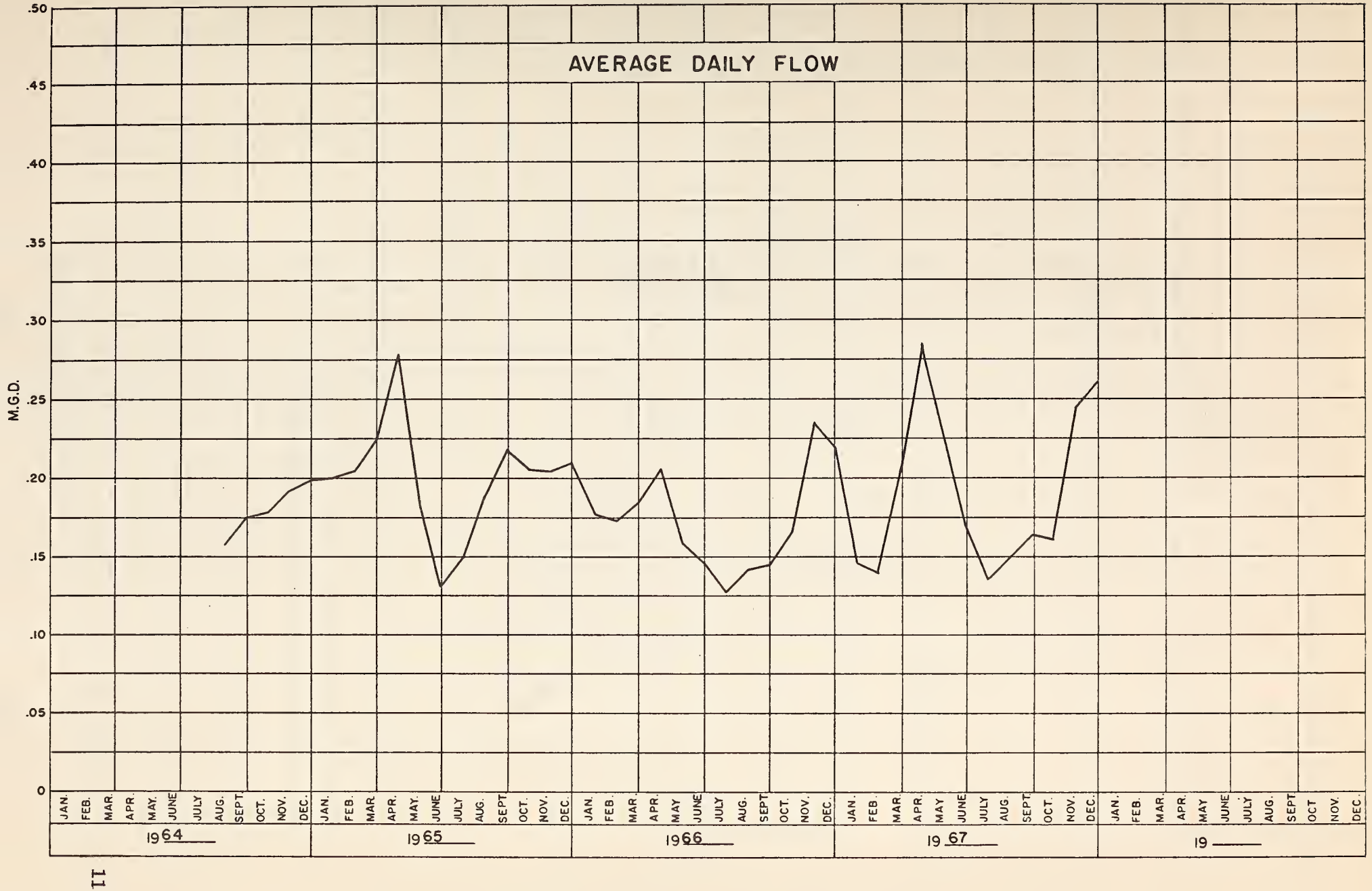


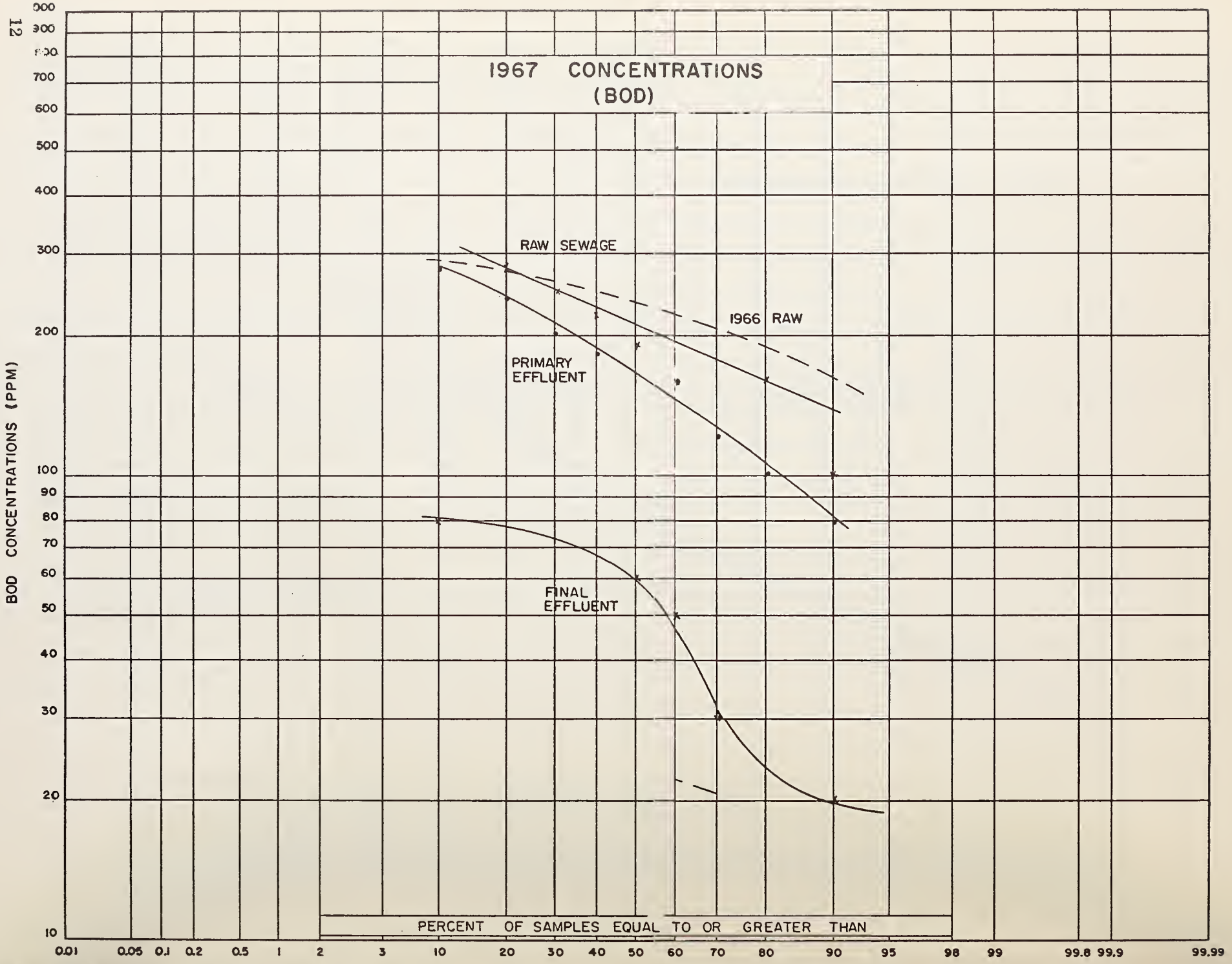
Process Data

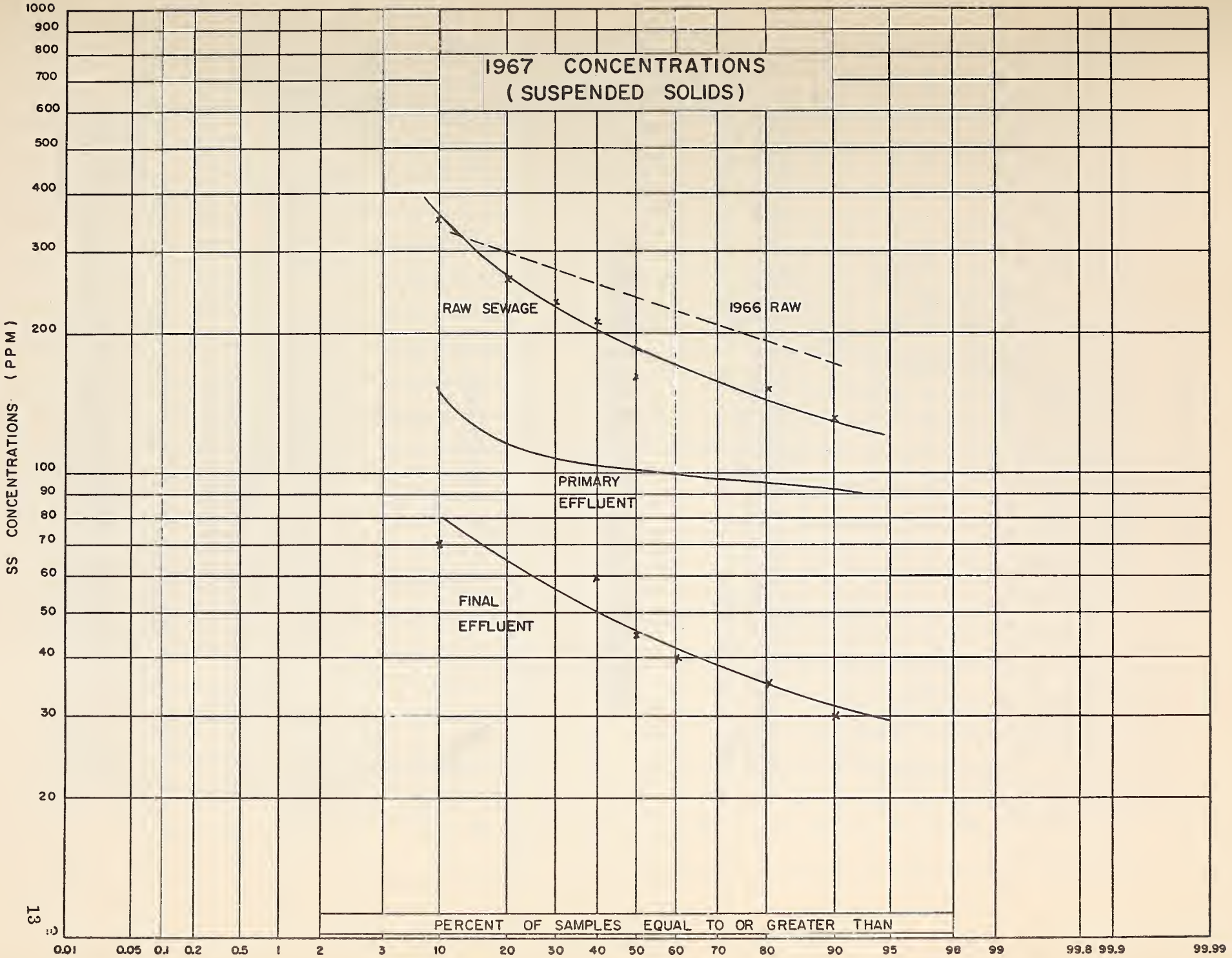
As will be noted in the following charts and graphs, a total of 69.296 million gallons was treated in 1967 for an average daily flow for the year of 190,000 gallons. This was greater than the average daily flow of 173,000 gallons in 1966 and less than the 199,000 gpd received in 1965.

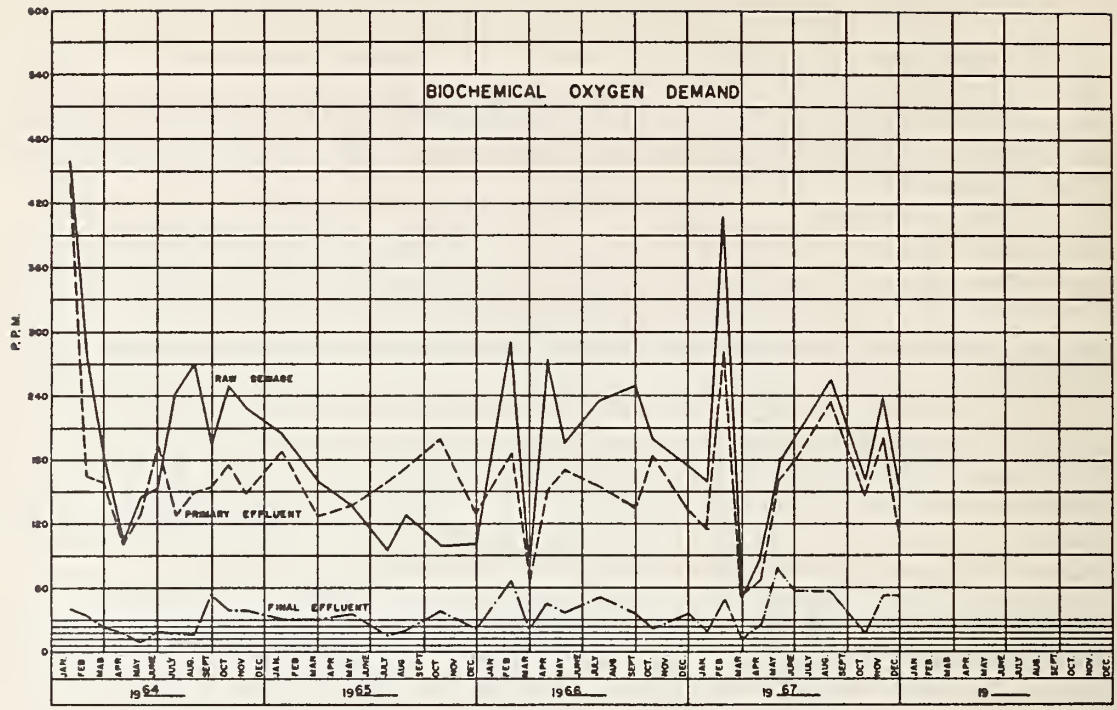
Also, 87 percent of the time the flow was greater than the design capacity for secondary treatment of 150,000 gallons per day. In 1966, the plant was hydraulically overloaded 66 percent of the time.


PROBABILITY OF DAILY FLOWS
1967
1966
1965
1964
DESIGN PLANT FLOW
PRIMARY TREATMENT
DESIGN PLANT FLOW
SECONDARY TREATMENT
MILLION GALLONS PER DAY
.400
.300
.200
.100
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN

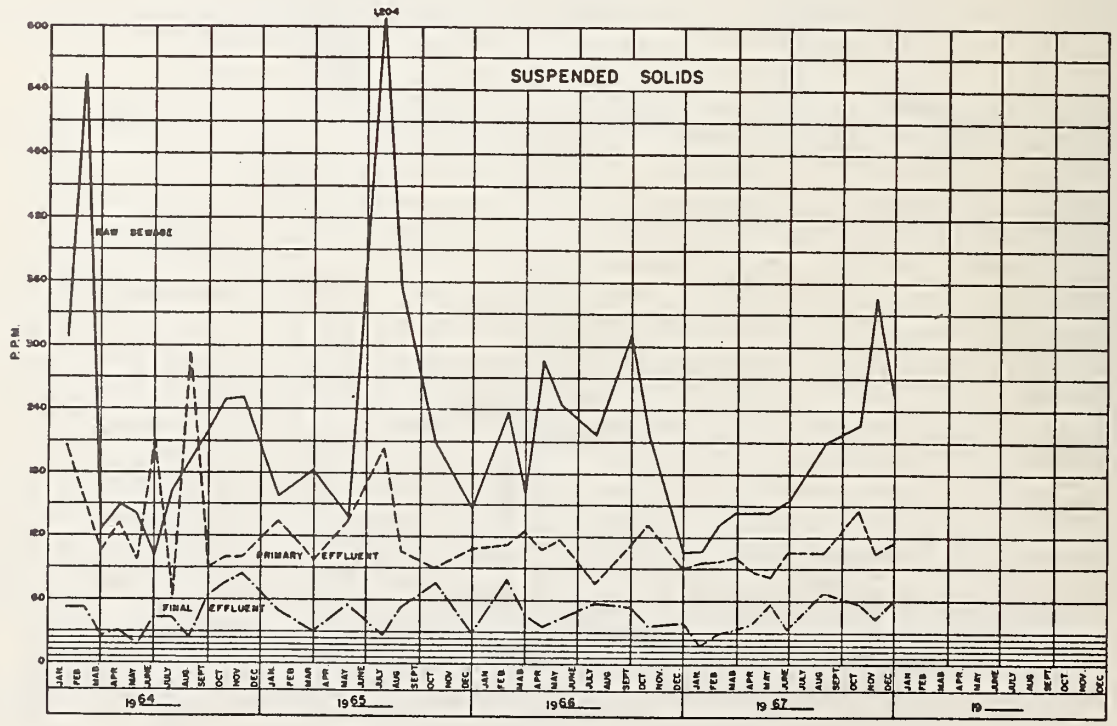

AVERAGE DAILY FLOW
M.G.D.
.50
.45
.40
.35
.30
.25
.20
.15
.10
.05
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1964
1965
1966
19 67
19


1967 CONCENTRATIONS
(BOD)
RAW SEWAGE
1966 RAW
PRIMARY
EFFLUENT
FINAL
EFFLUENT
BOD CONCENTRATIONS (PPM)
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
0.01
0.05
0.1
0.2
0.5
1
2
3
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99


1967 CONCENTRATIONS
(SUSPENDED SOLIDS)
SS CONCENTRATIONS (PPM)
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
RAW SEWAGE
1966 RAW
PRIMARY
EFFLUENT
FINAL
EFFLUENT
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN
0.01
0.05
0.1
0.2
0.5
1
2
3
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

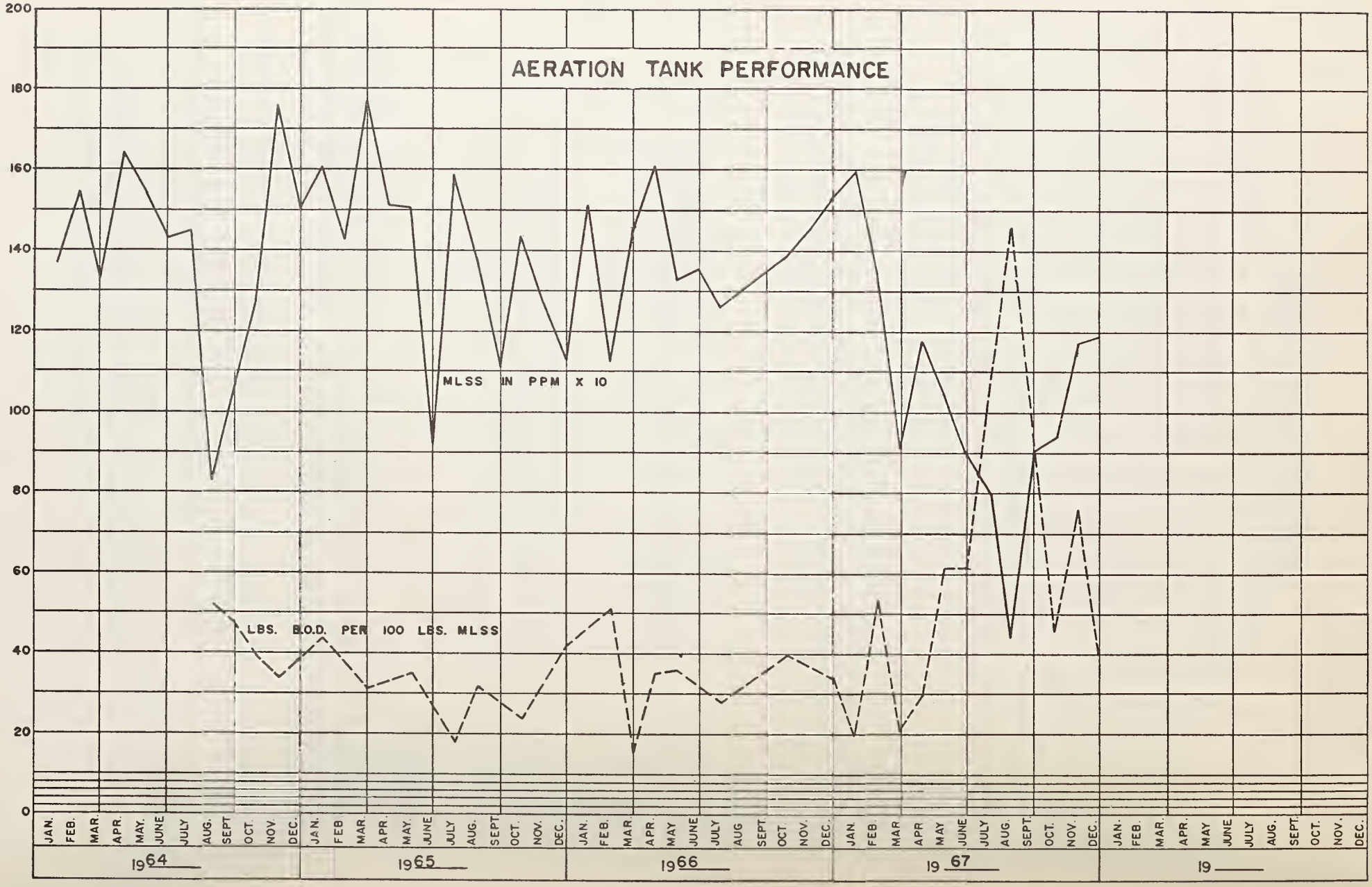
MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	160	18	88.8	3.21	104	16	84.6	1.99	45
FEB.	405	48	88.1	6.95	130	27	79.2	2.00	30
MAR.	49	9.4	80.8	1.26	142	31	78.2	3.52	30
APR.	88	23	73.9	2.77	142	37	73.9	4.48	60
MAY	175	77	56.0	3.39	142	56	60.6	2.97	45
JUNE	200	56	72.0	3.66	154	32	79.2	3.25	60
JULY	-	-	-	-	-	-	-	-	60
AUG.	255	55	78.4	4.62	208	66	68.3	3.28	60
SEPT.	-	-	-	-	-	-	-	-	60
OCT.	160	16	90.0	3.56	226	58	74.3	4.16	60
NOV.	236	51	78.4	6.77	344	42	87.8	11.05	30
DEC.	150	51	66.0	3.98	254	58	77.2	12.56	60
TOTAL	-	-	-	51.63	-	-	-	49.55	600
AVG.	188	39	77.2	43.02	185	42	76.3	4.12	50

COMMENTS

The raw sewage had average concentrations of 188 ppm BOD and 185 ppm suspended solids. The average concentrations in the final effluent were 39 ppm BOD and 42 ppm suspended solids. This indicated a 77.2 percent BOD reduction and a 76.3 percent suspended solids reduction.

The quality of the effluent was not within OWRC objectives of 15 ppm for BOD and suspended solids for plants with secondary treatment.

A total of 600 cubic feet of grit was removed at an average of 8.7 cubic feet per million gallons.


AERATION TANK PERFORMANCE
MLSS IN PPM X 10
LBS. B.O.D. PER 100 LBS. MLSS
200
180
160
140
120
100
80
60
40
20
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
1964
1965
1966
1967
19

AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	114	1583	19
FEBRUARY	280	1321	53
MARCH	50	901	20
APRIL	66	1169	29
MAY	159	1040	61
JUNE	180	897	61
JULY	-	800	-
AUGUST	235	438	145
SEPTEMBER	-	899	-
OCTOBER	145	935	45
NOVEMBER	200	1165	76
DECEMBER	100	1183	39
TOTAL	-	-	-
AVERAGE	153	1028	45 *

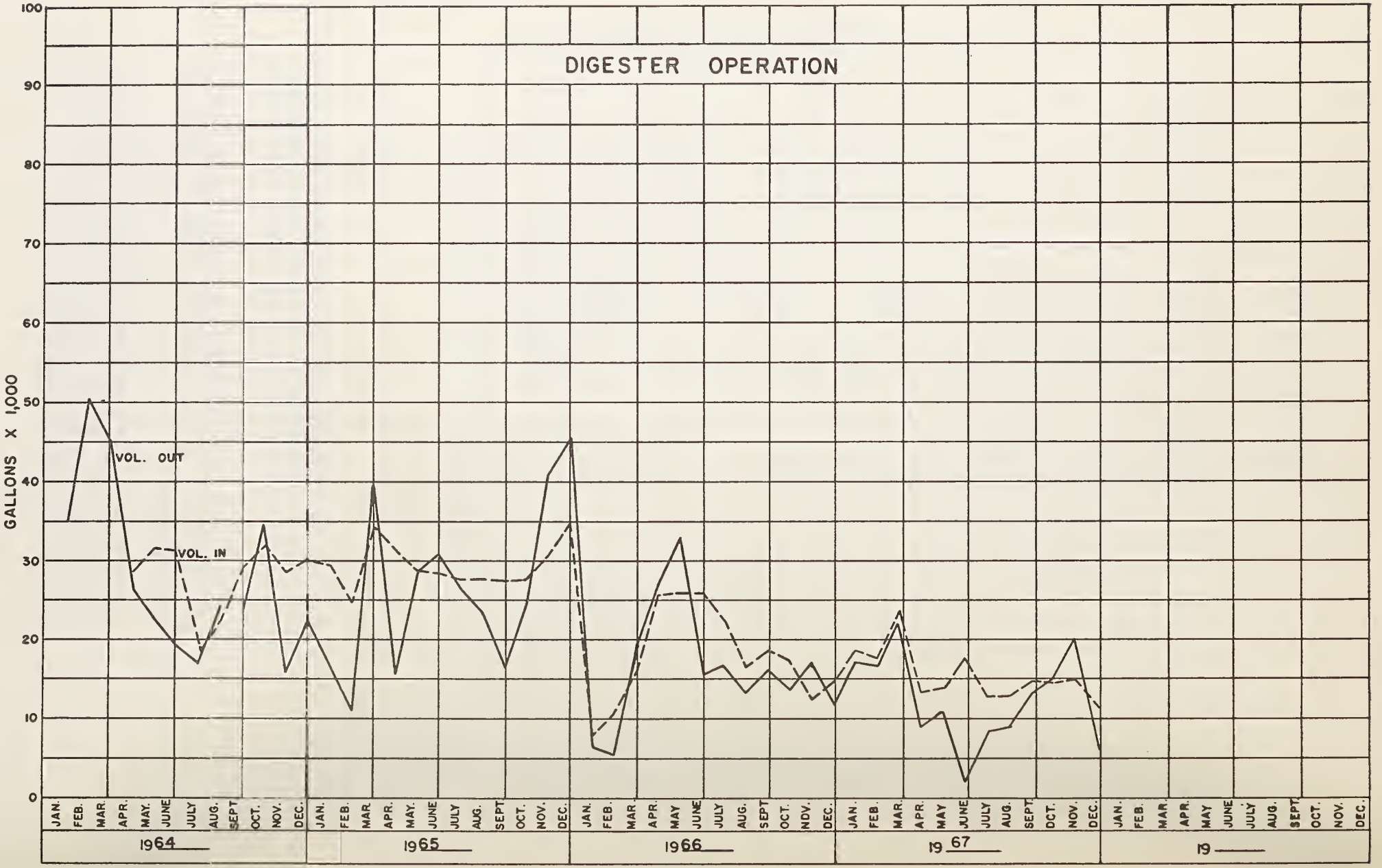
* August data not used.

COMMENTS

Since mechanical aeration is used at the plant, there is no direct means of measuring the air used. Tests taken regularly indicated satisfactory dissolved oxygen in the aeration section.

The average mixed liquor suspended solids concentration was 1028 ppm and the loading was 45 pounds of BOD per 100 pounds MLSS.

The average primary effluent BOD of 153 ppm indicates a 19 percent reduction of BOD in the primary tank. This is lower than the anticipated efficiency of a primary tank and has a significant effect on the overall plant.


DIGESTER OPERATION
GALLONS X 1,000
100
90
80
70
60
50
40
30
20
10
0
VOL. OUT
VOL. IN
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
1964
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1965
JAN. FEB. MAR APR. MAY JUNE JULY AUG. SEPT OCT. NDV. DEC.
1966
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. DCT. NOV. DEC.
19 67
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
19

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS		
	GALLONS	% SOLIDS	% VOL. MAT.	GALLONS	% SOLIDS	% VOL. MAT
JAN.	18500	6.93		17000	7.00	
FEB.	17700	1.90		16500	4.98	
MAR.	23100	-		22000	-	
APR.	13300	2.20		9000	6.88	
MAY	13900	2.90		11000	3.93	
JUNE	17800	4.53		2100	9.37	
JULY	12800	-		8500	-	
AUG.	12900	4.90		9000	.62	
SEPT.	14700	-		13000	-	
OCT.	14400	-		15000	-	
NOV.	14900	-		20000	-	
DEC.	11700	-		7000	-	
TOTAL	185700	-		150100	-	
AVG	15475	3.89		12508	5.46	

COMMENTS

An estimated total of 185,700 gallons of raw sludge was pumped to the digester and an estimated 150,100 gallons of digested sludge was pumped from the digester to the sludge drying beds. Average percent solids of the raw sludge was 3.89 and of the digested sludge 5.46 thus indicating a satisfactory operation.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	4.516	-	-
FEBRUARY	3.894	-	-
MARCH	6.352	-	-
APRIL	8.525	-	-
MAY	6.918	360	6.67
JUNE	5.076	450	8.87
JULY	4.170	450	10.79
AUGUST	4.624	390	10.07
SEPTEMBER	4.904	450	9.17
OCTOBER	4.949	105	9.36
NOVEMBER	7.319	-	-
DECEMBER	8.049	-	-
TOTAL	69.296	2205	-
AVERAGE	5.774	441	9.15

COMMENTS

Chlorination of the final effluent was carried out from May to October. A total of 2205 pounds of chlorine was used during this period for an average dosage of 9.15 ppm.

CONCLUSIONS

The flows in 1967 exceeded the design capacity of the plant 87 percent of the time and the resulting quality of the effluent did not meet the objectives of the OWRC for secondary treatment.

RECOMMENDATIONS

A study of future plant expansion was initiated in 1967. This study should be carried forward without delay.


ONTARIO WATER RESOURCES COMMISSION