POLLUTION SURVEY SUMMARY

NORTH SASKATCHEWAN RIVER

1970 - 1971

by

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S U M M A R Y

Water quality in the North Saskatchewan River deteriorated slightly this past winter as compared to the previous year, mainly due to lower discharge rates in the river.

Incidences of high Threshold Odor Number and Phenol concentration were noted at various locations but these did not result in any complaints from downstream users.

Values for bacteriological constituents remained high at locations immediately downstream from Edmonton. Coliform and E. Coli organisms exceeded guideline values in many instances at Fort Saskatchewan Bridge and Vinca Bridge.

New analyzing techniques were used to determine heavy metals. The results showed values of Mercury exceeding water quality objectives.

The lower flow rates experienced this past winter in the North Saskatchewan River are reflected on the concentration of other constituents such as Ammonia-Nitrogen and Phosphates. These nutrients continued to remain above guideline values despite decreased loadings to the river.

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ESTABLISHMENT AND OPERATION OF THE PROGRAM

Many of the problems involved in the establishment and operation of the program are of practical rather than technical consideration. A summary discussion of some of the more basic considerations has been included.

PROGRAM OBJECTIVES

This program was established a number of years ago to provide basic information which would reveal pollution trends and provide water quality data for the many existing and prospective users of surface water in Alberta.

The monitoring program has these specific objectives:

1. To determine chemical, physical, bacteriological and biological characterisitics of Alberta's water under changing conditions.
2. To indicate, when possible, the sources of pollution entering a stream.
3. To compile data for future pollution abatement activities.
4. To determine background data on certain types of wastes, and to detect critical changes.
5. To obtain data useful for municipal, industrial, agricultural and recreational uses.
6. To procure data useful and necessary for securing public action toward the preservation of streams for all beneficial uses.

SCOPE OF ANALYSES

The frequency of sampling is admittedly limited. In some instances a more important parameter such as Dissolved Oxygen is monitored continuously. The routine analyses shown in this report represent the minimum of bacteriological, biochemical and chemical analyses which justify the program.

SAMPLING STATIONS AND PROCEDURES

The following criteria were used as a basis for selection of the monitor stations.

1. Waters used for municipal, industrial, agricultural, and recreational purposes.
2. Near known or suspected sources of pollution.
3. Near the Alberta-Saskatchewan border to determine the quality of water leaving the Province.

Stations were established at bridges whenever practical for convenient access to each watercourse. Routine samples included two litres for general chemical analyses, one litre each for Phenolics and Oil and Grease, and 100 millilitres in a sterile bottle for bacteriological analyses. Four litre samples were collected in a pyrex glass jar for Heavy Metals analyses. Four litre samples were also collected for Pesticides analyses.

NORTH SASKATCHEWAN RIVER

POLLUTION SURVEY

1970 - 1971

INTRODUCTION

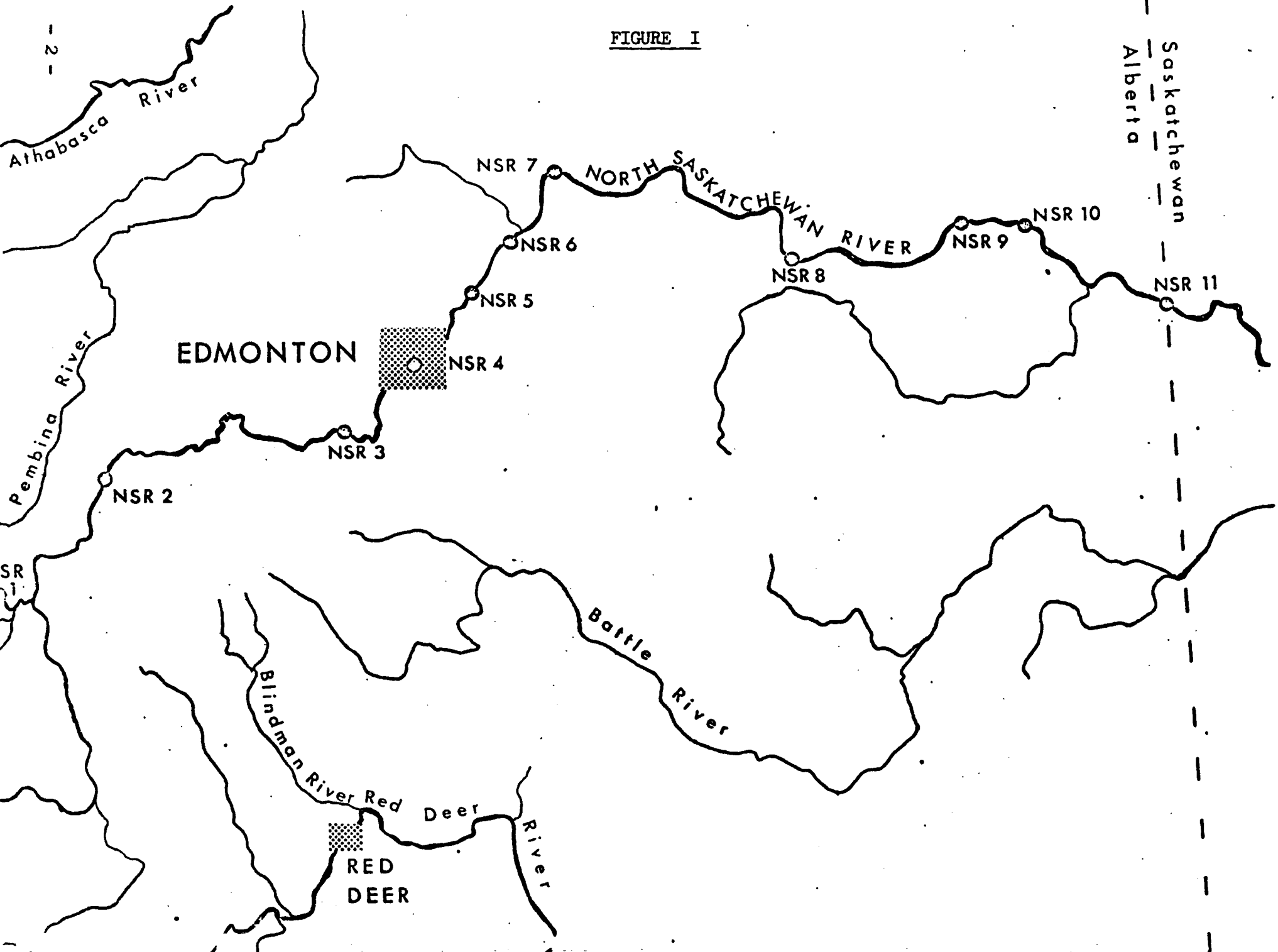
The North Saskatchewan River is used primarily for domestic and industrial uses, serving both as a water supply and as a receiving stream for waste water. In an attempt to control and maintain a reasonable quality of water in this river for downstream users, river sampling surveys are conducted throughout the year with special emphasis placed during the winter when pollutional effects are at a maximum. This report summarizes the efforts of the Division of Pollution Control in assessing the North Saskatchewan River water quality during the winter period of 1970-71.

Bi-weekly samples were taken at the following locations (see Fig. I):

NS 1	Brazeau Reservoir Discharge
NS 2	Drayton Valley Bridge
NS 3	Devon Bridge
NS 4	105 Street Bridge (Edmonton)
NS 5	Fort Saskatchewan Bridge
NS 6	Monitoring Station near Vinca Bridge
NS 7	Waskatenau Bridge
NS 8	Duvernay Bridge
NS 10	Canadian Salt Company Water Intake
NS 11	Lloydminster Ferry

The four upstream locations from Edmonton, including Edmonton's 105th Street Bridge, provide the background levels of constituents in the river. Fort Saskatchewan Bridge is the first location where the quality of water is influenced by major waste discharge sources. Vinca Bridge, Waskatenau Bridge, Duvernay Bridge, Canadian Salt Company Water Intake, and Lloydminster Ferry locations indicate the quality of the water and performance of the

FIGURE I


Athabasca River
NSR 7
NORTH SASKATCHEWAN RIVER
NSR 6
NSR 5
NSR 8
NSR 9
NSR 10
NSR 11
Saskatchewan
Alberta
EDMONTON
NSR 4
NSR 3
Pembina River
NSR 2
Battle River
Blindman River
Red Deer River
RED DEER

river as it moves from a zone of decomposition of degradable material through a zone of recovery.

Aside from manual sampling of the river, an automatic water monitor was placed into operation at the Vinca Bridge site on December 15, 1970. The "Honeywell Water Quality Data Acquisition System" operated a total of 112 days of continuous operation until April 6, 1971. Dissolved Oxygen, pH, Temperature, Conductivity, and Turbidity were the parameters measured by the monitor. Significant variations in some of the parameters were observed during the winter indicating "slug release" of waste water upstream (see Fig. II). In all instances these recorded variations in water quality were traced to accidental spills.

Industrial and municipal discharges to the North Saskatchewan River from all major sources were sampled in conjunction with river surveys. These represented 24-hour composites except for two downstream industries that were 'grab' sampled.

NORTH SASKATCHEWAN RIVER FLOWS

In considering stream pollution, the discharge rate of a river and consequently the dilution factor are of prime importance. Daily discharge in the North Saskatchewan River at Edmonton (Station No. 05DF001) and the discharge rate for the Brazeau Reservoir for the period of October, 1970 through March, 1971 are presented in Figures III and IV.

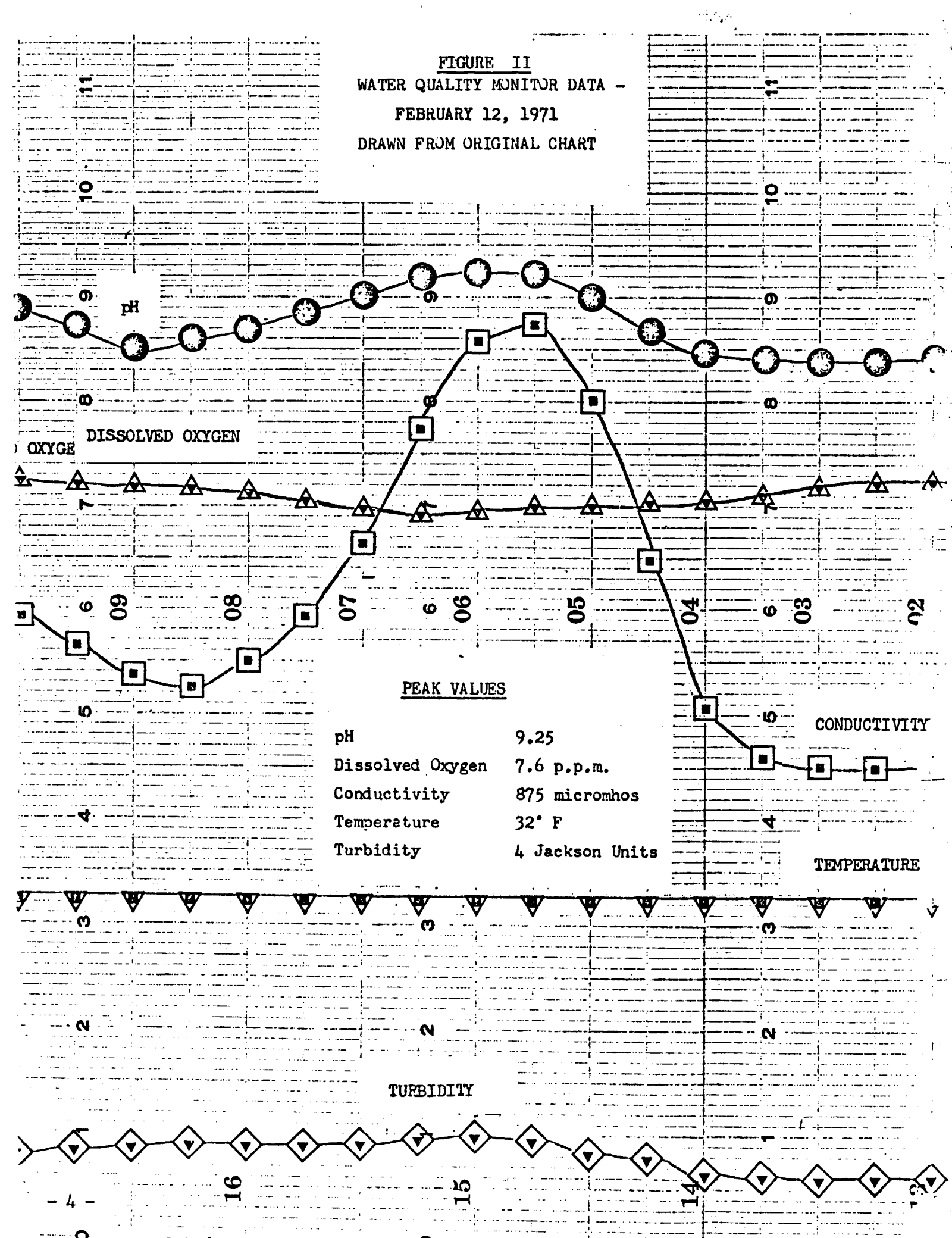
Ice conditions on the North Saskatchewan River at Edmonton began on October 27, 1970 and remained until April 5, 1971. During this period the minimum monthly mean flow was 1640 c.f.s. recorded in February, while the minimum daily discharge rate was 1270 c.f.s. recorded on November 23, 1970.

FIGURE II

WATER QUALITY MONITOR DATA -

FEBRUARY 12, 1971

DRAWN FROM ORIGINAL CHART



PEAK VALUES

pH	9.25
Dissolved Oxygen	7.6 p.p.m.
Conductivity	875 micromhos
Temperature	32° F
Turbidity	4 Jackson Units

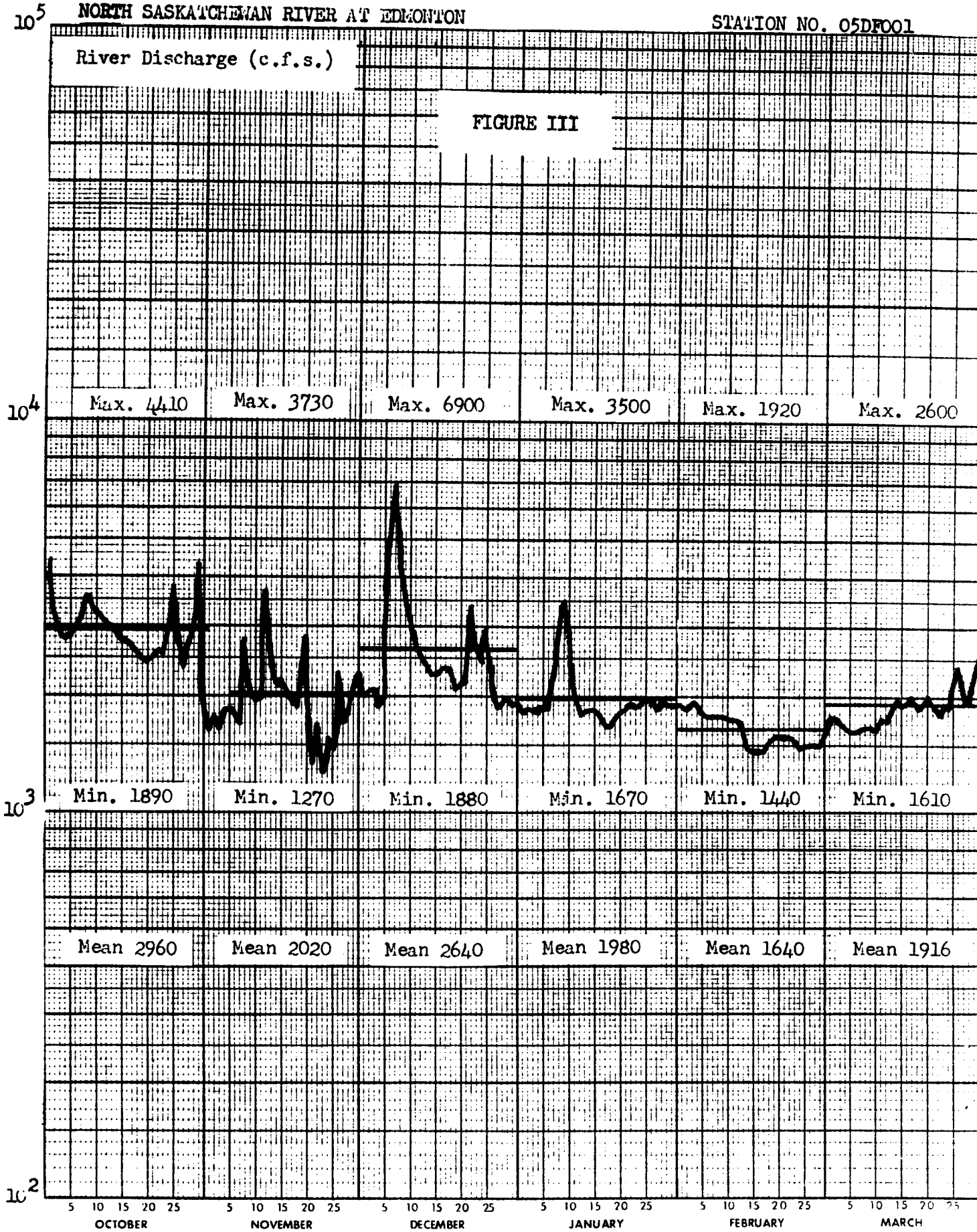
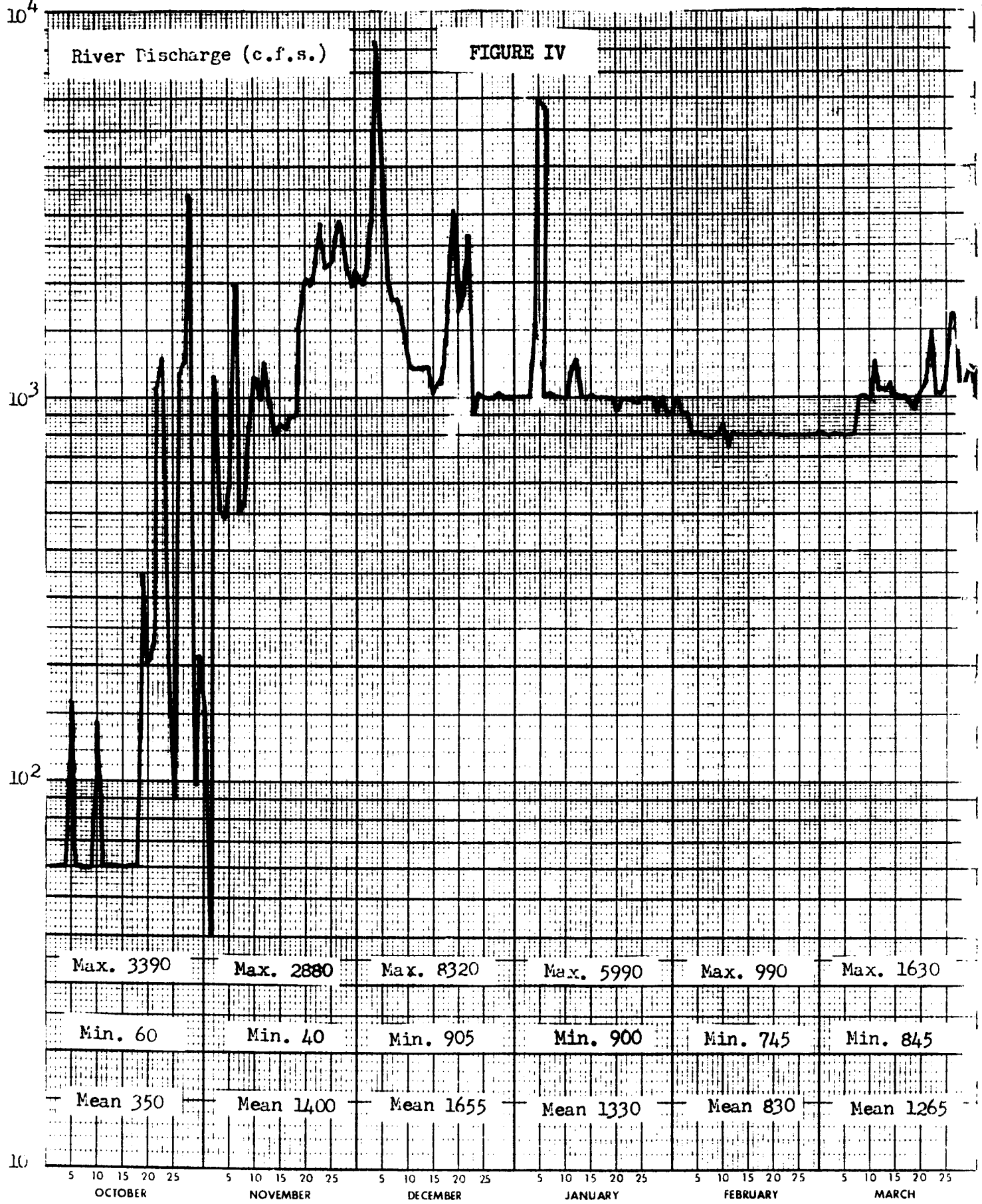


FIGURE III

ICE CONDITIONS - OCTOBER 27, 1970 to APRIL 5, 1971

NORTH SASKATCHEWAN RIVER AT BRAZEAU RIVER



Generally flows in the river were considerably less than in previous years, with minimum daily flows below 2000 c.f.s. in every month from October 1970 through March 1971. There were 103 days with flows less than 2000 c.f.s. and 11 days when the flows were 1500 c.f.s. or lower during this five-month period. These low flow conditions are reflected in the frequency distribution of flows, North Saskatchewan River at Edmonton, Figure V.

LOADINGS TO THE NORTH SASKATCHEWAN RIVER

Table I presents users of the North Saskatchewan River for discharge of waste water. The type of waste and treatment are also included. Major contributors of wastes to the river were surveyed during the winter. In most cases twenty-four hour composite samples were taken in conjunction with river quality sampling surveys.

Total loadings from 14 major effluents are listed in Table II. Three surveys completed during the summer are included with the nine conducted during the winter months.

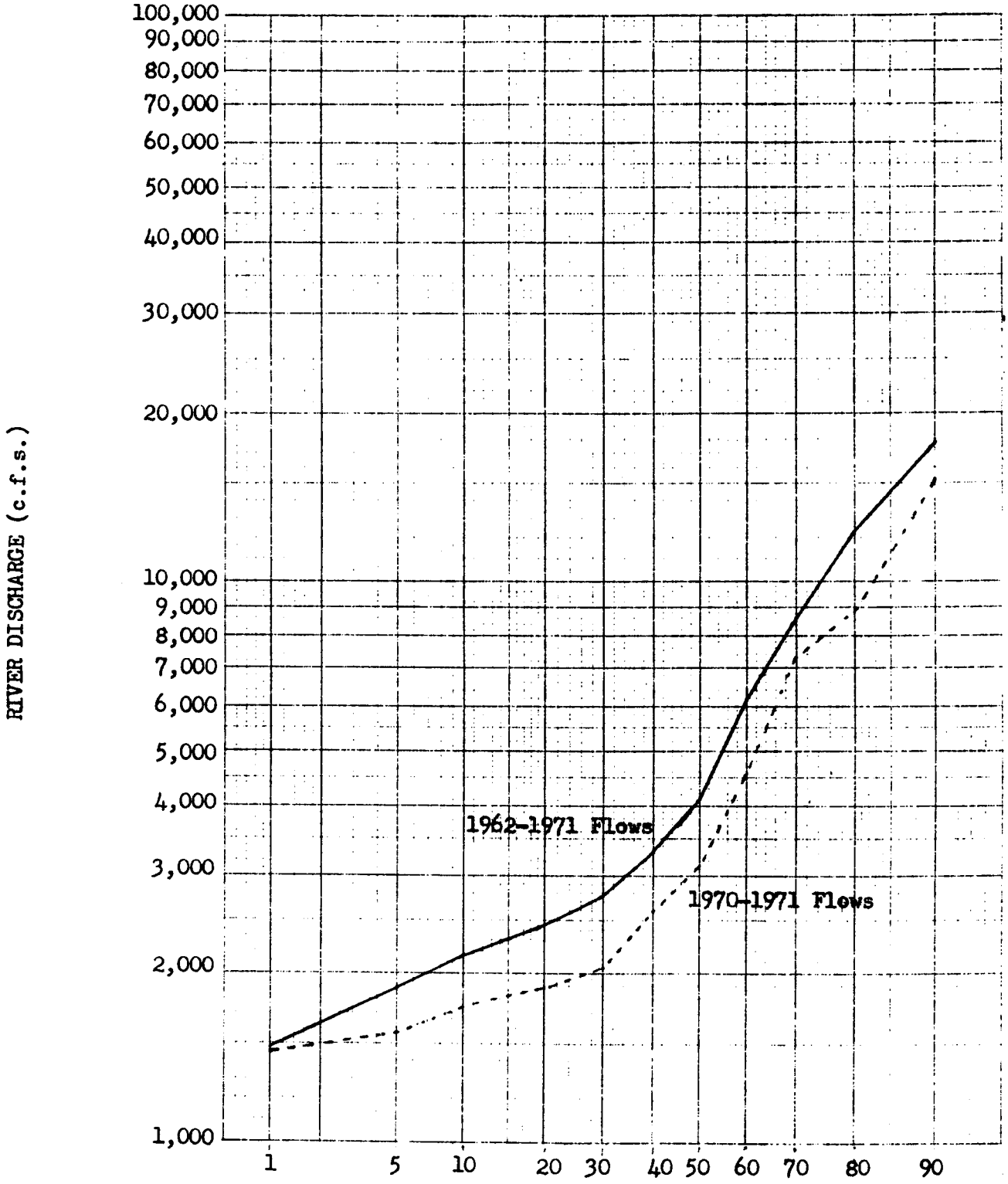
Biochemical Oxygen Demand (B.O.D.5) showed loadings varying from 12,200 lbs/day (March 9-10, 1971) to 51,700 lbs/day (November 16-19, 1970). Lower loadings for this constituent in 1971 are in part due to a higher degree of treatment of the municipal waste from Edmonton Sewage Treatment Plants.

Phenol loadings ranged from 17 lbs/day (January 25-26, 1971) to 68 lbs/day (December 1-2, 1970). Consistently lower loadings were noted for the four survey months of 1971.

Nutrients to the North Saskatchewan River from all sources decreased from loadings of past years. Ammonia Nitrogen and Phosphates loadings decreased significantly.

FIGURE V

Statistical Flow Analysis of the North Saskatchewan River at Edmonton



1962 - Mar. 1971 Maximum flow 91,600 cubic feet per second
Minimum flow 1,070 cubic feet per second

April 1970 - Mar. 1971 Maximum flow 53,700 cubic feet per second
Minimum flow 1,270 cubic feet per second

TABLE I

NORTH SASKATCHEWAN EFFLUENT DISCHARGERS

Source	Type of Discharge and Treatment	Discharge to
Town of Rocky Mountain House	Domestic Sewage (L)	N.S.R.
Town of Drayton Valley	Domestic Sewage (L)	N.S.R.
Town of Devon	Domestic Sewage (ST)	N.S.R.
Imperial Oil - Devon	Industrial Waste (L)	N.S.R.
City of Edmonton	Domestic Sewage (ST in Winter)	N.S.R.
Canadian Industries Ltd.	Industrial Waste (WELL)	. . .
Building Products Ltd.	Industrial Waste (AERATED LAGOONS)	N.S.R.
Imperial Oil Ltd.	Industrial Waste (A.P.I., WELL)	N.S.R.
Texaco	Industrial Waste (A.P.I., WELL, L)	N.S.R.
Union Carbide	Industrial Waste (L)	N.S.R.
Turbo Oil Limited	Industrial Waste (L)	N.S.R.
Gulf Oil Canada Ltd.	Industrial Waste (A.P.I., L)	N.S.R.
Chemcell	Industrial Waste (WELL, L)	N.S.R.
Uniroyal	Industrial Waste (L - SUMMER DISCHARGE)	N.S.R.
Alberta Hospital - Oliver City of Edmonton Packing Plants Sherwood Park	Waste Storage & Disposal during Summer Months (L) to City Lagoons	N.S.R.
Town of Fort Saskatchewan	Domestic Sewage (L)	N.S.R.
Sherritt Gordon Mines Ltd.	Industrial Waste (L)	N.S.R.
Dow Chemical Ltd.	Industrial Waste (L, WELL)	N.S.R.
Redwater Imperial Fertilizer	Industrial Waste (L)	N.S.R.
Redwater Imperial Oil Gas Plant	Industrial Waste (L)	N.S.R.
Town of Redwater	Domestic Sewage (L)	N.S.R.
Waskatenau	Domestic Sewage (L)	N.S.R.
Chemcell - Duvernay	Industrial Waste (NT)	N.S.R.
Elk Point	Domestic Sewage (L)	N.S.R.
Canadian Salt Co. Ltd.	Industrial Waste (NT)	N.S.R.

LEGEND: L - Lagoon
ST - Secondary Treatment
NT - No Treatment
AP - A.P.I. Separator

Ammonia-Nitrogen varied from 9000 lbs/day (November 16-19, 1970) to 18,400 lbs/day (November 2-4, 1970) while Phosphate loadings ranged from 7180 lbs/day (February 20-22, 1971) to 15,400 lbs/day (November 2-4, 1970).

DISSOLVED OXYGEN IN NORTH SASKATCHEWAN RIVER

River profiles of Dissolved Oxygen are presented in Appendix 'A'. These indicate the effect of oxygen demanding material on Dissolved Oxygen from the Brazeau River Discharge to Lloydminster Ferry. The plots show near saturation levels of Dissolved Oxygen for the two surveys conducted in November, 1970. Subsequent to the survey of November 16-19, 1970, Dissolved Oxygen levels dropped to a low of 5.6 mg/l on February 10, 1971 at Lloydminster Ferry. A reading of 5.7 mg/l was noted during the same survey at Lindbergh and the same reading observed at Lloydminster Ferry during the following survey of February 24, 1971.

Dissolved Oxygen in the river upstream of Edmonton remained above 10 mg/l throughout the winter except for the Brazeau Reservoir discharge location. Here, the oxygen level dropped to a low of 4.8 mg/l on January 12, 1971. Other readings subsequent to that date ranged from 8.4 mg/l to 8.9 mg/l.

BIOCHEMICAL OXYGEN DEMAND

The amount of oxygen consumed in stabilizing waste material is determined by the Biochemical Oxygen Demand test. These tests were run on all river samples taken during the sampling period.

Background levels of Biochemical Oxygen Demand ranged from 0.1 mg/l to 3.4 mg/l between the Brazeau Reservoir and Edmonton. Concentrations at 105 Street Bridge varied from 0.1 mg/l (November 4, 1970) to 1.3 mg/l (March 10, 1971).

TABLE II-a

NORTH SASKATCHEWAN RIVER

Total Loadings - lbs/day

Sampling Date :	June 16-17/70	July 13-15/70	September 22-23/70	November 2-4/70
River Flow at Edmonton (c.f.s)	18,900	14,000	2,730	1,740
Total Number of Locations :	14	14	14	14
Number of Locations Sampled :	12	13	13	14
Biochemical Oxygen Demand	78,900	44,500	92,500	49,900
Chemical Oxygen Demand	204,000	171,000	242,000	152,000
P.P. Alkalinity as $CaCO_3$	9,290	93,400	38,500	596
Total Alkalinity " "	155,000	238,000	172,000	107,000
Total Residue	962,000	843,000	708,000	658,000
Ignition Loss	140,000	195,000	267,000	221,000
Non-filtrable Residue	133,000	87,200	196,000	66,500
Ignition Loss	64,100	26,000	89,900	15,400
Oil and Grease	19,100	14,400	30,500	2,190
Phenols	115	87.2	29.1	28.4
Chlorides	387,000	197,000	117,000	148,000
Total Phosphorous as $PO_4^{\equiv}$	6,530	6,690	8,740	15,400
Ammonia Nitrogen	7,690	14,800	15,700	18,374
Nitrate Nitrogen	1,030	189	259	2,416
Sulphates	8,460	39,100	10,700	20,900
Hexavalent Chromium	11.0	9.0	13.0	12.0
Fluorides	164	20.3	50.9	31.7
Copper	1.1	0.0	0.2	0.7
Nickel	1.6	0.9	0.0	0.0
Cyanide	0.7	0.7	1.8	0.7
Arsenic	-	3.3	-	-

TABLE II-b

NORTH SASKATCHEWAN RIVER (Cont'd.)

Total Loadings - lbs/day

Sampling Date :	November 16-19/70	December 1-2/70	December 14-16/70	January 10-13/71
River Flow at Edmonton (c.f.s.)	1,990	2,030	2,310	1,830
Total Number of Locations :	14	14	14	14
Number of Locations Sampled :	14	14	14	14
Biochemical Oxygen Demand	51,700	28,100	49,700	26,300
Chemical Oxygen Demand	82,100	80,700	116,000	55,900
P.P. Alkalinity as $CaCO_3$	96,200	12,800	24,700	46,200
Total Alkalinity " "	201,000	135,500	132,000	159,000
Total Residue	568,000	491,000	856,000	487,000
Ignition Loss	147,000	59,800	354,000	94,300
Non-filtrable Residue	66,600	52,400	43,700	36,500
Ignition Loss	32,500	26,400	23,700	21,900
Oil and Grease	6,940	1,151	2,540	4,590
Phenols	33.6	67.6	18.3	23.8
Chlorides	105,000	97,500	164,200	110,000
Total Phosphorous as $PO_4^{\equiv}$	7,920	9,210	8,430	8,500
Ammonia Nitrogen	9,000	13,400	15,700	10,500
Nitrate Nitrogen	226	49	113	873
Sulphates	12,900	24,200	16,200	15,600
Hexavalent Chromium	36.0	7.0	30.0	35.0
Fluorides	4.9	34.8	17.7	9.1
Copper	2.5	0.6	0.5	0.0
Nickel	4.0	6.0	6.7	9.4
Cyanide	0.0	0.0	0.6	0.0
Arsenic	-	-	-	-

NORTH SASKATCHEWAN RIVER (Cont'd.)

Total Loadings - lbs/day

Sampling Date :	January 25-26/71	February 8-10/71	February 20-22/71	March 9-10/71
River Flow at Edmonton (c.f.s.) :	1,975	1,770	1,510	1,650
Total Number of Locations :	14	14	14	14
Number of Locations Sampled :	14	14	14	13
Biochemical Oxygen Demand	30,400	26,800	18,580	12,200
Chemical Oxygen Demand	103,000	99,700	84,900	76,500
P.P. Alkalinity as $CaCO_3$	42,700	54,300	36,900	4,260
Total Alkalinity " "	142,000	146,000	170,000	121,000
Total Residue	1,780,000	1,460,000	891,000	1,700,000
Ignition Loss	117,000	370,000	121,000	143,000
Non-filtrable Residue	56,100	30,700	68,800	48,200
Ignition Loss	24,800	10,700	25,000	21,400
Oil and Grease	4,920	5,070	4,670	6,000
Phenols	17.3	21.0	23.1	24.8
Chlorides	786,000	555,000	234,000	449,000
Total Phosphorous as $PO_4^{\equiv}$	8,960	7,510	7,180	8,270
Ammonia Nitrogen	10,300	9,630	10,400	13,600
Nitrate Nitrogen	341	689	875	769
Sulphates	30,300	20,100	104,000	40,900
Hexavalent Chromium	50.0	23.0	45.0	70.0
Fluorides	10.7	20.3	26.3	31.8
Copper	2.1	1.6	4.3	4.0
Nickel	10.1	6.5	29.4	540
Cyanide	0.0	0.6	0.0	0.0
Arsenic	-	-	-	-

The highest values for Biochemical Oxygen Demand downstream of Edmonton were observed in the zones of degradation and decomposition, as expected. At Fort Saskatchewan Bridge (zone of degradation) values ranged from 1.3 mg/l to 5.2 mg/l, with mean and median values of 2.9 mg/l and 2.5 mg/l, respectively. Concentrations at Vinca Bridge and Waskatenau Bridge (zone of decomposition) were only slightly lower.

A decrease is noted in Biochemical Oxygen Demand from Duvernay Bridge to Lloydminster Ferry. The highest value in this region was 3.9 mg/l at both Lindbergh and Lloydminster Ferry on November 4, 1970. The lowest value was 0.4 mg/l on December 2, 1970 at Lloydminster Ferry.

NUTRIENTS

Nutrient concentrations of Ammonia Nitrogen, Nitrate Nitrogen, and Total Phosphorous remained relatively constant above Edmonton. Minimum and maximum values for these three constituents were 0.0 to 0.6 mg/l of Ammonia Nitrogen, 0.0 to 0.5 mg/l of Nitrate Nitrogen, and 0.0 to 0.7 mg/l of Total Phosphorous.

The effects of both municipal and industrial loadings are reflected on these constituents downstream from Edmonton. Maximum values observed were 2.4 mg/l for Ammonia Nitrogen, 1.1 mg/l for Nitrate Nitrogen and 15 mg/l for Total Phosphorous.

Total Phosphorous above 2.5 mg/l are not consistent with results obtained in other surveys of the river. This indicates either that a sample of a slug flow high in phosphates was taken during a survey or that the sample was contaminated.

PHENOLS

Samples taken at four locations upstream of Edmonton showed a

relatively high concentration of Phenols, especially those taken in November and December. The maximum value was 15 p.p.b. on the sample of November 18, 1971 taken at 105 Street Bridge, Edmonton. A greater portion of the analysis (29 of 36 samples) showed values within the established criterion level of 5 p.p.b.

The highest value for Phenols downstream of Edmonton was 14 p.p.b. This value was determined on the sample taken at the Fort Saskatchewan Bridge on November 18, 1970.

Fifty-four individual samples were collected from the six locations downstream of Edmonton during the winter sampling period (November 1, 1970 to March 31, 1971). Twenty of these samples contained Phenols exceeding 5 p.p.b. Waskatenau Bridge and Duvernay Bridge locations had the highest incidence of Phenols exceeding the established criterion level.

THRESHOLD ODOR NUMBER

Threshold Odor of the river water from the Brazeau Dam to Edmonton was of the "Musty" type with a maximum value of 8. All other values were between 1 and 4 with one incident of a "Chemical Hydrocarbon" type determined on a sample taken at Devon Bridge on February 9, 1971.

Odors were of a higher magnitude downstream of Edmonton, especially at Waskatenau Bridge where a value of 32 "Chemical" was determined on the sample of December 17, 1970.

There were no complaints of odors in the river water this past winter from downstream users.

OIL AND GREASE

Oil and Grease concentrations in the North Saskatchewan River during the winter sampling program were between 0.3 mg/l to 4.6 mg/l. The higher

values may have been due to unauthorized release of oily matter to the North Saskatchewan River. Generally, the concentration was the same or slightly improved from conditions experienced last year.

HEAVY METALS

One complete survey of the North Saskatchewan River was made during February, 1971 to determine the concentration of heavy metals. The analytical results for these tests are presented in Table III-a. These results show no appreciable change in concentration of metals from the Brazeau Dam to Lloydminster Ferry except for Chromium and Mercury.

The concentration of Chromium showed a general upward trend starting from the Brazeau Dam (2 p.p.b.) to Vinca Bridge (17.5 p.p.b.). The concentration then decreased to 5 p.p.b. at Lloydminster Ferry.

Samples for Mercury were taken at Edmonton's 105 Street Bridge, Vinca Bridge, and Lloydminster Ferry. Increases are noted in both Soluble and Total Mercury concentrations, progressing downstream to the Alberta-Saskatchewan border. The values ranged from 0.08 p.p.b. to 0.16 p.p.b. for Soluble Mercury and 0.11 p.p.b. to 0.43 p.p.b. for Total Mercury.

Table III-b presents heavy metal results of samples taken at Edmonton's 105 Street Bridge and Vinca Bridge in May, 1971. Concentrations of Selenium and Mercury were above the established Water Quality Criteria level.

PESTICIDES

Samples for Pesticides analyses were taken during June and July, 1970 and April and May, 1971, from various locations on the North Saskatchewan River and Whitemud Creek. Samples were also obtained from three storm sewer outlets in Edmonton on April 1, 1971.

TABLE III-a

HEAVY METALS

NORTH SASKATCHEWAN RIVER
(Concentration in Parts Per Billion)

Sampling Location:	Brazeau Dam	Drayton Valley	Devon	105 St. Bridge	Ft.Sask.	Vinca	Waska-tenau	Duver-nay	Lind-bergh	Lloyd-minste
Sampling Date :	2/23/71	2/23/71	2/23/71	2/23/71	2/24/71	2/24/71	2/24/71	2/24/71	2/24/71	2/25/7
Cadmium - Total	0	2.0	1.0	1.5	2.0	2.0	2.0	4.0	2.5	1.5
Manganese - Total	17	50	15	7.5	32	18.5	19	15	7.5	7.5
Zinc - Total	7.5	10	10	7.5	15	12.5	22.5	11	12.5	7.5
Copper - Total	7.5	10	10	15	11.5	9	11	5.0	5.0	15
Cobalt - Total	2.5	2.0	3.5	3.0	6.5	6.5	5.0	0	0	4.0
Nickel - Total	12.5	12.5	15	15	10	12.5	12.5	20	15	17.5
Chromium - Total	2.0	3.5	5.0	2.5	5.0	17.5	7.5	15	10	5.0
Lead - Total	42.5	25	27.5	25	42.5	37.5	27.5	27.5	15	22.5
Tin - Total	50	25	25	25	25	10	25	55	35	25
Arsenic - Total	-	-	-	-	-	-	-	-	-	-
Selenium - Total	-	-	-	-	-	-	-	-	-	-
Mercury - Soluble	-	-	-	.08	-	.10	-	-	-	.16
- Total	-	-	-	.11	-	.31	-	-	-	.43

TABLE III-b

HEAVY METALS

NORTH SASKATCHEWAN RIVER

(Concentration in Parts Per Billion)

Sampling Location :		105 St. Bridge	Vinca
Sampling Date :		May 21, 1971	May 21, 1971
CADMIUM	- Total	2	2
	- Dissolved	2	2
CHROMIUM	- Total	5	10
	- Dissolved	5	10
COBALT	- Total	5	0
	- Dissolved	5	0
COPPER	- Total	5	8
	- Dissolved	5	8
LEAD	- Total	8	15
	- Dissolved	8	15
MANGANESE	- Total	18	48
	- Dissolved	5	48
MERCURY	- Total	0.97	0.58
	- Dissolved	0.14	0.53
NICKEL	- Total	8	10
	- Dissolved	-	10
SELENIUM	- Total	200	15
	- Dissolved	-	15
TIN	- Total	70	17
	- Dissolved	70	17
ZINC	- Total	5	25
	- Dissolved	5	8

Thirty compounds were tested on each sample taken in 1970 and forty compounds were tested on each sample taken in 1971. Pesticide compounds identified in the samples include 2,4-D Acid, 2,4,5-T Acid, M.C.P.A. Acid, Dicamba, Phorate, and Diazinon. Other compounds that were detected but could not be identified are reported in a general classification of pesticides as: Acids, Chlorinated, Phosphorous and Esters (See Appendix 'C').

2,4-D Acid was detected in six samples. The maximum value was 0.4 p.p.b. on the sample taken at Fort Saskatchewan Bridge on June 30, 1970.

2,4,5-T Acid was detected in three samples. The maximum concentration was 0.1 p.p.b. on the sample taken at Fort Saskatchewan Bridge on June 30, 1970.

M.C.P.A. Acid was detected in five samples. The maximum concentration was 0.6 p.p.b. on samples taken at Vinca Bridge on June 23, 1970. Trace quantities of two other pesticides were detected in storm sewer samples taken on April 1, 1971. Diazinon was determined on a sample from a storm sewer in Emily Murphy Park and Phorate was found in a sample from a storm sewer near Whitemud Road.

BACTERIOLOGICAL CONSTITUENTS

Coliform, E. coli and Standard Plate Count were determined on all samples taken from the North Saskatchewan River during the winter survey. A gradual increase in these constituents was observed from the Brazeau Reservoir to Edmonton. Maximum values obtained in this stretch of the river were 2400+ organisms/100 ml for Coliform, 170 organisms/100 ml for E. coli and 55,000 colonies/ml for Standard Plate Count.

Downstream from Edmonton at Ft. Saskatchewan Bridge, all bacteriological constituents showed sharp increases as expected. Maximum values were 180,000 organisms/100 ml for Coliform, 2700 organisms/100 ml for E. coli and 1,100,000 colonies/ml for Standard Plant Count. Values determined at Vinca Bridge was similar to those found at Ft. Saskatchewan Bridge.

A decrease in bacteriological constituents is noted as one proceeds further downstream. Values found at Lloydminster Ferry location were similar to those determined at Edmonton's 105 Street Bridge location.

DISCUSSION

A comparison of frequency distribution of flows shows a lower rate of discharge of water in the North Saskatchewan River this past winter than in the previous ten years. This is reflected on the quality of the river water downstream from Edmonton.

Lower Dissolved Oxygen and generally higher concentrations of Biochemical Oxygen Demand, Alkalinity, Total Residue, Chlorides, Nutrients, and Phenolics were noted as compared to data obtained in the previous year.

Levels of Ammonia Nitrogen and Total Phosphorous continue to be excessive despite a significant decrease in loadings of these constituents.

Bacteriological constituents downstream of Edmonton were in excess of established objectives for Total Coliform and E. coli.

Concentrations of Heavy Metals did not vary appreciably from background levels except for Chromium and Mercury. Further investigations are required to substantiate and verify the concentrations of Total Mercury determined at Vinca Bridge and Lloydminster Ferry.

WATER POLLUTION CONTROL TECHNOLOGY

This is a selected list containing the key terms likely to be encountered in water pollution control technology.

ABSORPTION - The taking up of one substance into the body of another.

ACID - Most commonly refers to a large class of chemicals having a sour taste in water, ability to dissolve certain metals, bases or alkalies to form salts and to turn certain acid-base indicators to their acid form. Characterized by the hydrated H^+ ion.

ADSORPTION - The taking up of one substance upon the surface of or interface zone of another substance.

ADVANCED WASTE TREATMENT - Renovation of used water by biological, chemical or physical methods that are applied to upgrade water quality for specific reuse requirements. May include more efficient cleanup of a general nature or the removal of components that are inefficiently removed by conventional treatment processes.

AERATION - The operation of adding oxygen to, removing volatile constituents from, or mixing a liquid by intimate contact with air.

AEROBIC - A condition characterized by an excess of dissolved oxygen in the aquatic environment.

AEROBIC BACTERIA - Organisms that require dissolved oxygen in the aquatic environment to enable them to metabolize or to grow.

ALGAE - Primitive plants, one or many celled, usually aquatic and capable of growth on mineral materials via energy from the sun and the green coloring material, chlorophyll. Generally considered as the primary source of food for all other organisms.

ALKALINITY - A term used to represent the sum of the effects opposite in reaction to acids in water. Usually due to carbonates, bicarbonates and hydroxides; also including borates, silicates and phosphates.

ANAEROBIC - A condition in which dissolved oxygen is not detectable in the aquatic environment. Commonly characterized by the formation of reduced sulfur compounds from the use of bound oxygen from sulfates as an hydrogen acceptor.

ANAEROBIC BACTERIA - Organisms that can metabolize and grow in the absence of dissolved oxygen. Their oxygen supply is obtained from the bound oxygen such as in sulfates, carbonates, or other oxygen-containing compounds.

ANION - A negatively charged ion in water solution. May be a single element or a combination of elements, such as the Cl^- ion in a water solution of NaCl (common table salt) or $SO_4^{=}$ ion in a sulfuric acid solution.

ASSESSMENT - A legal financial obligation of the property owner in an irrigation, water, drainage or sanitary district, created for the purpose of financing the construction and operation of facilities required to protect and enhance public benefit within the district.

BACTERIA - Primitive organisms having some of the features of plants and animals. Generally included among the fungi. Usually do not contain chlorophyll, hence commonly require preformed organic nutrients among their foods. May exist as single cells, groups, filaments, or colonies.

BENTHIC DEPOSIT (BENTHOS) - Refers to the accumulated deposition of cell mass living or dead that collects at the bottom of a stream impoundment where velocity or catchment permits.

BIO-CHEMICAL - Resulting from the combined activities of biological and chemical transformations. Usually measured in terms of the ensuing chemical changes.

BIODEGRADATION - The stabilization of wastewater contaminants by biological conversion of pollutants into separatable materials at a higher oxidation state.

BIOLOGICAL PROCESSES - Activities of living organisms to sustain life, growth, and reproduction. Commonly the processes by which organisms degrade complex organic material into simpler substances at a higher oxidation state to obtain energy for life processes and growth of new cell mass.

BOD - Biological or biochemical oxygen demand. A test for estimation of wastewater polluting effects in terms of the oxygen requirements for biochemical stabilization under specified conditions and time.

BUFFER ACTION - An action exhibited by certain chemicals that limits the change in pH upon addition of acid or alkaline materials to the system. In surface water, the primary buffer action is related to carbon dioxide, bicarbonate and carbonate equilibria.

CARBOHYDRATES - Naturally occurring compounds consisting of carbon, hydrogen and oxygen, that are considered as energy foods and precursors of proteins and fats in the natural food chain.

CATION - A positively charged ion in water solution. May be a single element or a combination of elements, such as Na^+ in a water solution of NaCl (common table salt).

CHLOROPHYLL - The green coloring material or pigments in plants that promotes the photosynthetic reactions forming organic materials from inorganic nutrients and light energy within the living cells.

CLARIFIER - A basin or chamber serving as an enlargement of a channel to reduce flow velocity sufficiently to permit separation of settleable or floatable materials from the carrier water (a sedimentation basin).

COAGULANT - A chemical, or chemicals, which when added to water suspensions will cause finely dispersed materials to gather into larger masses of improved filterability, settleability, or drainability.

COAGULATION - The process of modifying chemical, physical, or biological conditions to cause flocculation or agglomeration of particulates.

COD - A test for the estimation of the contamination of a wastewater in terms of oxygen requirements from a strong chemical oxidant under specified conditions, i.e., Dichromate, 50% sulfuric acid and 145°C for 2 hours.

COLIFORM GROUP - A group of bacteria that inhabits the intestinal tract of man, warm-blooded animals, and may be found in plants, soil, air and the aquatic environment. Includes aerobic and facultative gram negative non-spore forming bacilli that ferment lactose with gas formation.

COLLOID, COLLOIDAL STATE - A state of suspension in which the particulate or insoluble material is in a finely divided form that remains dispersed in the liquid for extended time periods. Usually cloudy or turbid suspensions requiring flocculation before clarification.

CONCENTRATION -

a) The act of increasing the mass per unit volume of one substance with respect to another, such as concentrating the solids in a sludge from 3% to 6%.

b) A means of designating the ratio of one substance with respect to another, such as 15 mg of suspended solids per liter of water.

CRITERION (pl. CRITERIA) - Something which can be measured. Commonly used as a basis for standards.

CUBIC FOOT PER SECOND (c.f.s.) - A unit of discharge rate such as one cubic foot of water per second past a given point.

DATA - Records of observations or measurements of facts, occurrences and conditions in written, graphical or tabular form.

DEGRADE - To reduce the complexity of a chemical compound.

DENITRIFICATION -

a) The conversion of oxidized nitrogen (nitrate and nitrite-N) to nitrogen gas by contact with septic wastewater solids or other reducing chemicals.

b) A reduction process with respect to oxidized nitrogen.

DETERGENT - Something used for cleaning. Commonly consists of soap or surfactant plus various additives or associated materials.

DILUTION -

a) To make thinner or more liquid.

b) A ratio, volume or weight of a more concentrated sample or effluent flow compared to that into which it is discharged.

DISSOLVED -

a) Those materials dispersed in water in ionic, atomic, or molecular form; an homogenous mixture or solution.
b) Generally clear but may be colored.
c) Present in true solution form.

DISSOLVED OXYGEN (D.O.) - Dissolved molecular oxygen usually expressed in mg DO/l or percent of saturation.

ECOLOGY - The relation of an organism to its environment; i.e., how is an organism affected by its surroundings such as air, water, heat, noise, contamination, etc.

EFFLUENT - A liquid or product water discharged from a chamber, basin or other treatment operation.

ENTERIC ORGANISMS - Those organisms commonly associated with the intestinal tract.

ENTRAINMENT - A condition or action that will cause an immiscible substance to be mixed with another. Usually the result of turbulence or entrapment; i.e., air bubbles in aqueous media.

ENZYME - A soluble or colloidal organic catalyst produced by a living organism. Usually they are simple or conjugated proteins that catalyze specific reactions.

EUTROPHIC - Well nourished; rich in dissolved nutrients.

EUTROPHICATION - An action involving the aging of lakes characterized by nutrient enrichment and increasing growth of plant and animal organisms. The net effect is to decrease depth until the lake becomes a bog and eventually dry land. Man-made pollution tends to hasten the process.

FACULTATIVE BACTERIA - Bacteria that can adapt themselves to growth and metabolism under aerobic or anaerobic conditions. Many organisms of interest in wastewater stabilization are among this group.

FLOC - Gelatinous or amorphous solids formed by chemical, biological or physical agglomeration of fine materials into larger masses that are more readily separated from the liquid.

FUNGI - Simple or complex organisms without chlorophyll. The simpler forms are one-celled; higher forms have branched filaments and complicated life cycles. Examples are molds, yeasts and mushrooms.

HARDNESS - Commonly refers to the chemicals interfering with soap action or producing scale in boilers or heating units. Specifically refers to Calcium and Magnesium salts; sometimes including iron, aluminum, and silica.

INDICATOR - May include the color change of a dye, electronic sensor response, or other means of estimating the equivalence point of a reaction between two different materials.

INFLUENT - That material entering a process unit or operation.

INORGANIC - Being composed of material other than plant or animal materials. Forming or belonging to the inanimate world.

LAGOON - A natural or artificial basin used for storage and/or stabilization of wastewater or sludge. Sometimes used for indefinite storage for disposal purposes. Commonly the lagoon depth is greater than a wadable depth but not greater than twenty feet.

LOAD - The load to a process is that which is contained in the inflow to that process. It may be expressed as hydraulic, oxygen demand, solids, or other criteria.

MICRO ORGANISM - Commonly an organism too small to be observed individually by the human eye without optical aid.

MG/L - A unit of concentration on a weight/volume basis: Milligrams per liter. Equivalent to ppm when the specific gravity of the liquid is 1.0.

MIXING ZONE - An area where two or more substances of different characteristics blend to form a uniform mixture; i.e., chlorine application, heated water, or other discharged materials entering a water mass will show significant differences of chlorine residual, temperature or other criteria, depending upon the sampling location throughout the mixing zone and approach uniform results with respect to lateral, longitudinal, and vertical sampling positions when mixing has been completed.

MOST PROBABLE NUMBER (MPN) - A statistical method of determining microbial populations. A multiple dilution tube technique is utilized with a standard medium and observations are made for specific individual tube effects. Resultant coding is translated by mathematical probability tables into population numbers.

NITRIFICATION - The biochemical conversion of unoxidized nitrogen (ammonia and organic N) to oxidized nitrogen (usually nitrate).

NUTRIENTS -

a) Anything essential to support life.

b) Includes many common elements and combinations of them. The major nutrients include carbon, hydrogen, oxygen, nitrogen, sulfur, and phosphorus.

c) Nitrogen and phosphorus are of major concern because they tend to recycle and are hard to control.

OILS -

a) Liquid fats of animal or vegetable origin.

b) Oily or waxy mineral oils.

OXIDATION POND -A shallow basin employed for the stabilization of wastewaters.

OXYGEN DEPLETION - The loss of oxygen from water or sewage due to biological, chemical or physical action.

PARASITE - A living organism deriving its nutrients at the expense of another living organism, giving nothing in return.

PARSHALL FLUME - A device for estimation of the flow in an open conduit. Consists of a constricting section, a throat, and an expanding section. The throat contains a sill over which the liquid passes. The pressure change over the sill can be related to quantity of flow.

PARTS PER MILLION (PPM) - A unit of concentration signifying parts of some substance per million parts of dispersing medium. Equivalent numerically to mg/l only when the specific gravity of the solution is 1.0.

PATHOGENIC ORGANISMS - Bacterial, fungal, viral, or other organisms directly involved with diseases of plants, animals, or man, are included among this group.

pH - An index of hydrogen ion activity. Defined as the negative logarithm (base 10) of H^+ ion concentration at a given instant. On a scale of 0 to 14 pH 7.0 is neutral, pH less than 7.0 indicates a predominance of H^+ or acid ions; pH greater than 7.0 indicates a predominance of OH^- or alkaline ions.

POLLUTION - Anything appearing in water that renders it unacceptable in terms of established water quality standards. Commonly conditions or contaminants that interfere with subsequent beneficial uses of the water.

PRIMARY TREATMENT - Commonly the separation of settleable or floatable materials from carrier water. Usually preceded by pretreatment such as coarse screens, grit separation, comminution.

SATURATION - Commonly refers to the maximum amount of any material that can be dissolved in water or other liquid at a given temperature and pressure. For oxygen, this commonly refers to a percentage saturation in terms of the saturation value, such as about 9 mg O_2/l at 20°C.

SECOND FOOT - An abbreviation for cubic foot per second. A rate term.

SECONDARY TREATMENT - Processes used to convert dissolved and colloidal materials in wastewater to a form that may be separated from the water. Commonly consists of biodegradation and conversion to cell mass in a separatable form with partial oxidation, such as in activated sludge, trickling filtration, or oxidation ponds.

SETTLEABLE SOLIDS -

a) Includes materials that will settle by gravity under low flow velocities.

b) Commonly expressed in terms of the volume of solids accumulating in an Imhoff cone after one hour on a volume basis.

SEWER - A pipe or conduit, generally covered, for the purposes of conveying wastewaters from the point of origin to a point of treatment or discharge.

SEWERAGE SYSTEM - A system of sewers and appurtenances for the collection, transportation and pumping of used waters for a given area or basin. Any treatment device or facility and its outfall conduit are a part of the system.

SLIME - SEWAGE SLIMES - Consisting of organisms growing on wastewater nutrients with the formation of mucilaginous covering, streamers or clumps. May consist of bacteria, molds, protozoa or algae.

STABILIZATION -

a) The activity proceeding along the pathway to stability.

b) In organic wastes, generally refers to oxidation via biochemical pathways and conversion to gaseous or insoluble materials relatively inert to further change.

STANDARD - Something set by authority. Having qualities or attributes required by law and defined by minimum or maximum limits of acceptability in terms of established criteria or measurable indices.

STANDARD METHODS - Methods of analysis prescribed by joint action of APHA, ASCE, AWWA, and FWPCA. Methods accepted by authority.

SUBSTRATE -

a) The base or media in which an organism lives.

b) The liquid in an activated sludge aeration tank.

SURFACTANT -

a) A chemical that, when added to water, will greatly reduce the surface tension of the solution.

b) The surface active component in a detergent mixture.

SUSPENDED SOLIDS - The concentration of insoluble materials suspended or dispersed in waste or used water. Generally expressed in mg/liter on a dry weight basis. Usually determined by filtration methods.

SYNERGISM - Refers to the action produced when two or more substances in combination have a greater effect than that produced by the additive effects of each one separately.

THERMAL POLLUTION - Refers to heated discharges to surface waterways. The largest contributor of heated discharges is associated with power production.

TOC - Total Organic Carbon. A test expressing wastewater contaminant concentration in terms of the carbon content.

TOTAL SOLIDS - Refers to the solids contained in dissolved and suspended form in water. Commonly determined on a weight basis by evaporation to dryness.

VELOCITY (FLOW) - A rate term expressed in terms of linear movement per unit of time. Commonly expressed in ft per sec (English) or cm/sec (Metric).

VOLATILE MATERIAL -

a) Refers to those chemicals having a vapor pressure low enough to evaporate from water readily at normal temperatures.

b) With reference to dry solids, the term includes loss in weight upon ignition at 600°C.

WATER QUALITY CRITERIA - Includes selected analytical measurements with limits designated to be acceptable or unacceptable in reference to water quality standards.

WATER QUALITY STANDARDS - Limits set by authority on the basis of water quality criteria required for beneficial uses.

WASTEWATER - Refers to the used water of a community. Generally contaminated by the waste products from household, commercial or industrial activities. Often contains surface wash, storm water and infiltrations water.

ABBREVIATIONS

ODOR TYPE

Abbreviation	Nature of Odor	Description (Such as Odors of:)
A	Aromatic (spicy)	Camphor, cloves, lavender, lemon
AC	cucumber	Synura
B	Balsamic (flowery)	Geranium, violet, vanilla
BG	geranium	Asterionella
BN	nasturtium	Aphanizomenon
BS	sweetish	Coelosphaerium
BV	violets	Mallomonas
C	Chemical	Industrial wastes or treatment chemicals
CC	chlorinous	Free Chlorine
CH	hydrocarbons	Oil Refinery Wastes
CM	medicinal	Phenol and Iodoforms
CS	sulfuretted	Hydrogen Sulphide
D	Disagreeable	(Pronounced unpleasant odors)
DF	fishy	Uroglenopsis and Dinobryon
DP	pigpen	Anabaena
DS	septic	Stale sewage
E	Earthy	Damp earth
EP	peaty	Peat
G	Grassy	Crushed grass
M	Musty	Decomposing straw
MN	moldy	Damp Cellar
V	Vegetable	Root vegetables
WR	Wood Resin	

APPENDIX A

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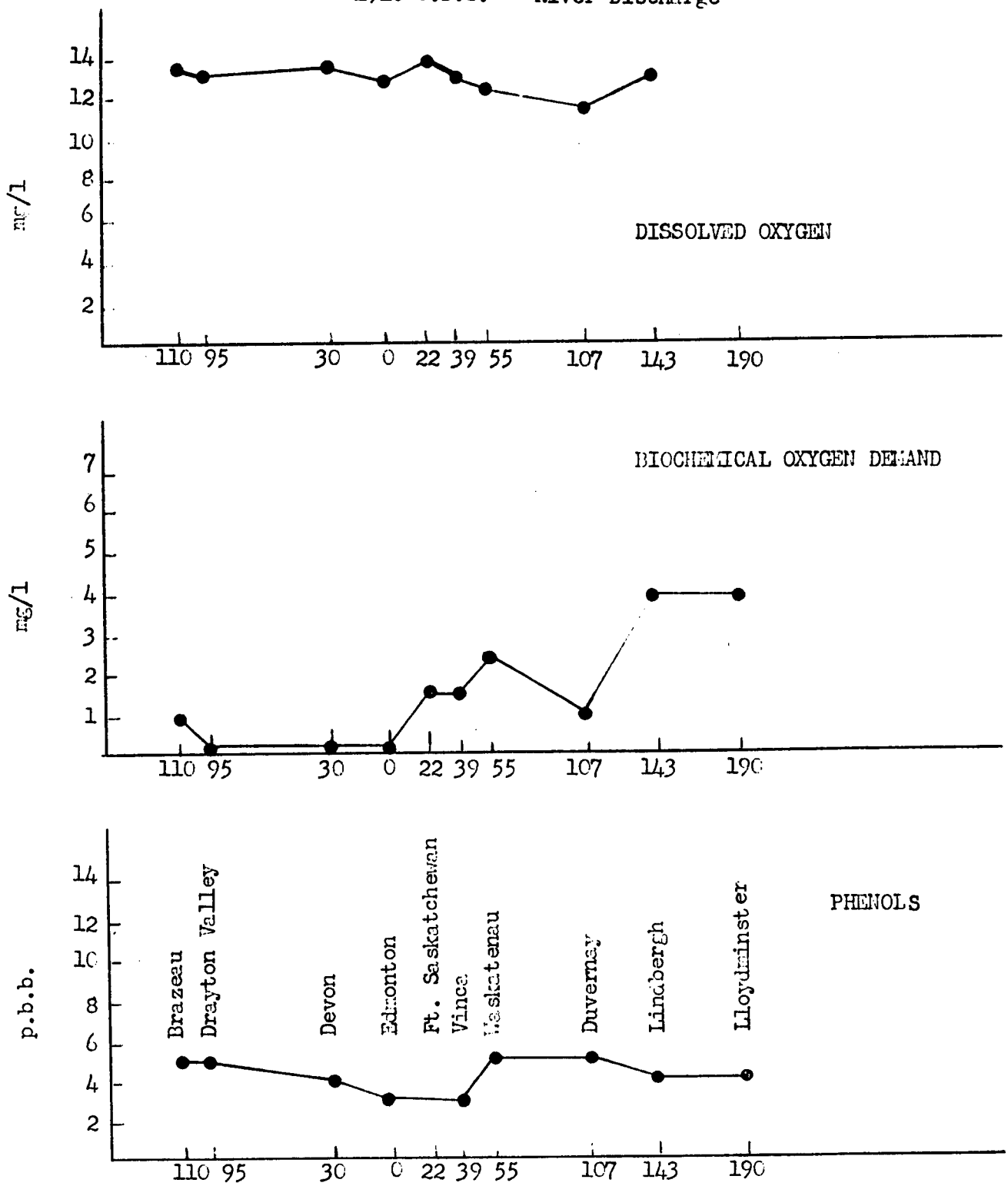
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
November 4 - 5, 1970

1910 c.f.s. River Discharge

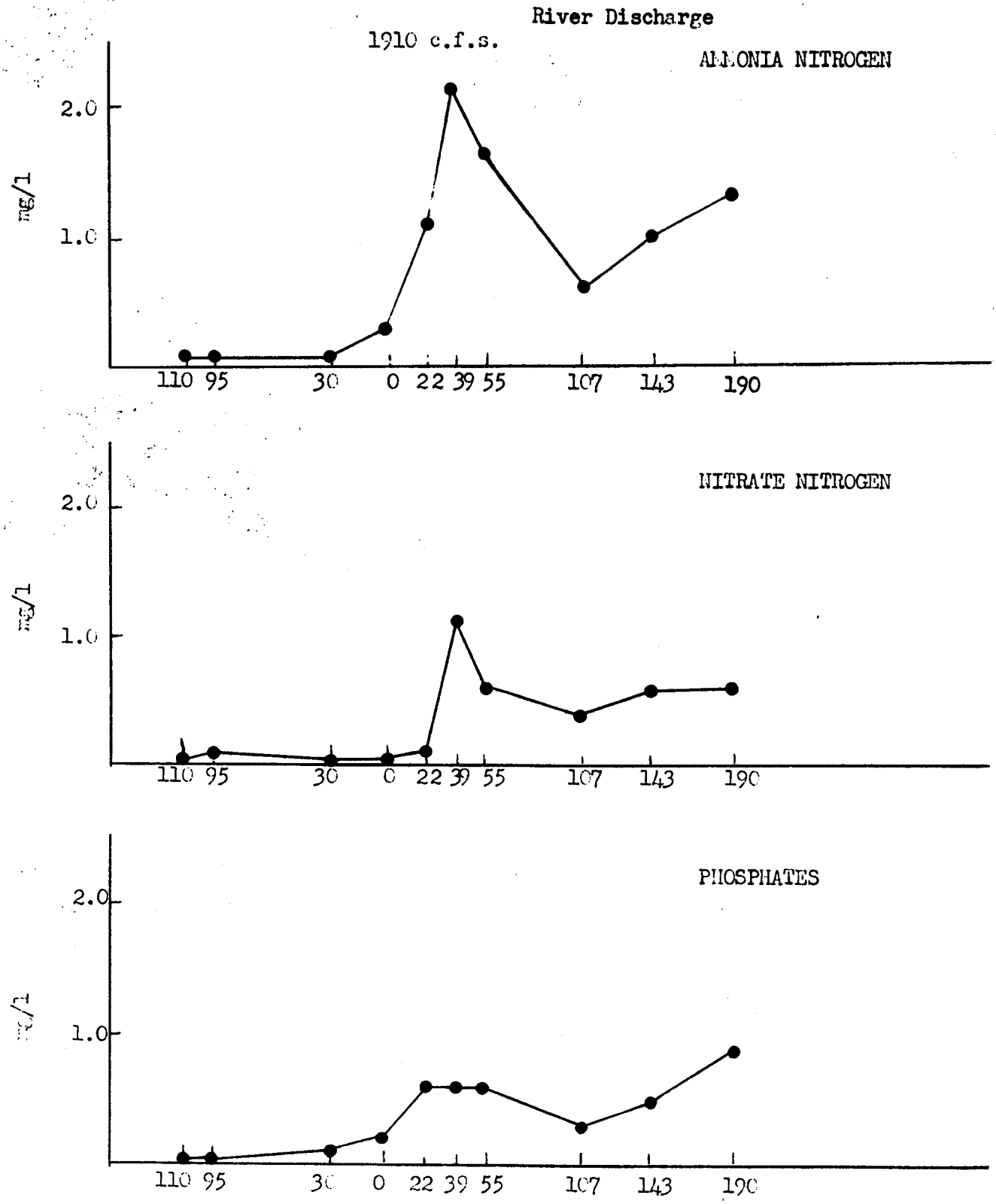


RIVER MILES FROM EDMONTON

A-1

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
November 4 - 5, 1970

River Discharge
1910 c.f.s.



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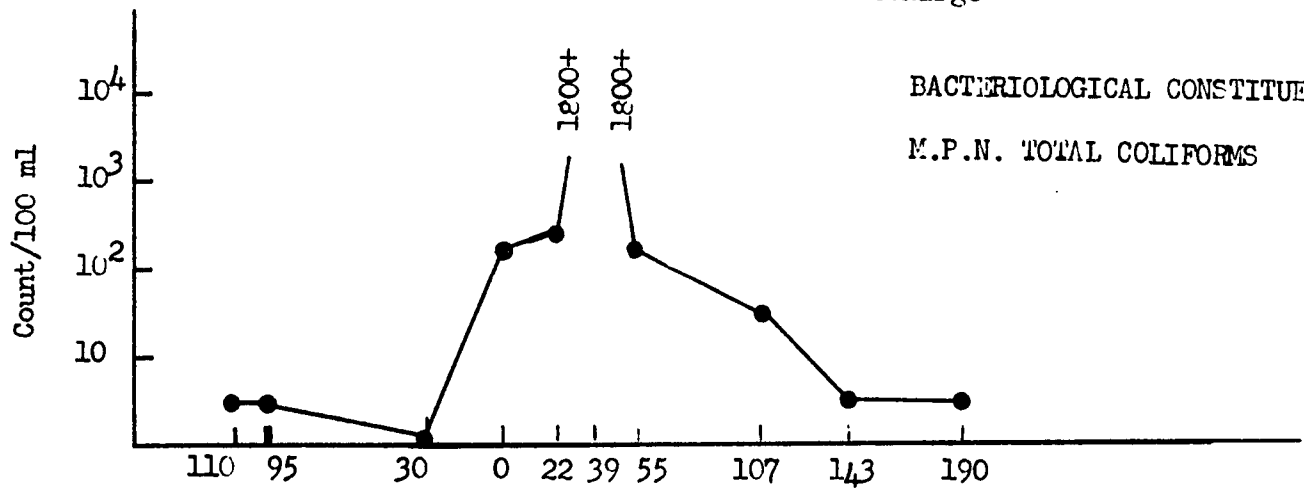
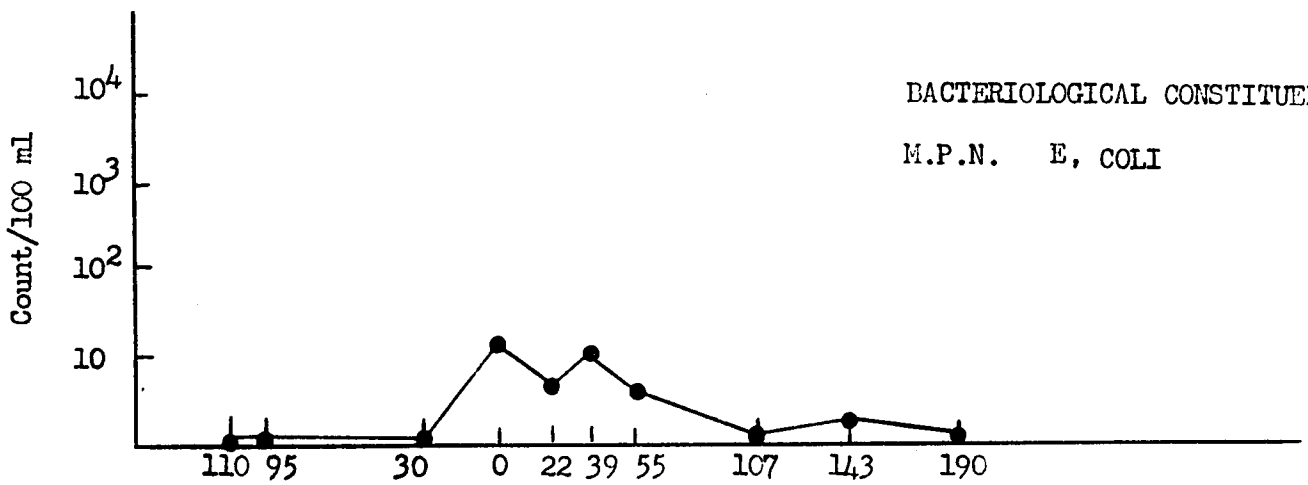
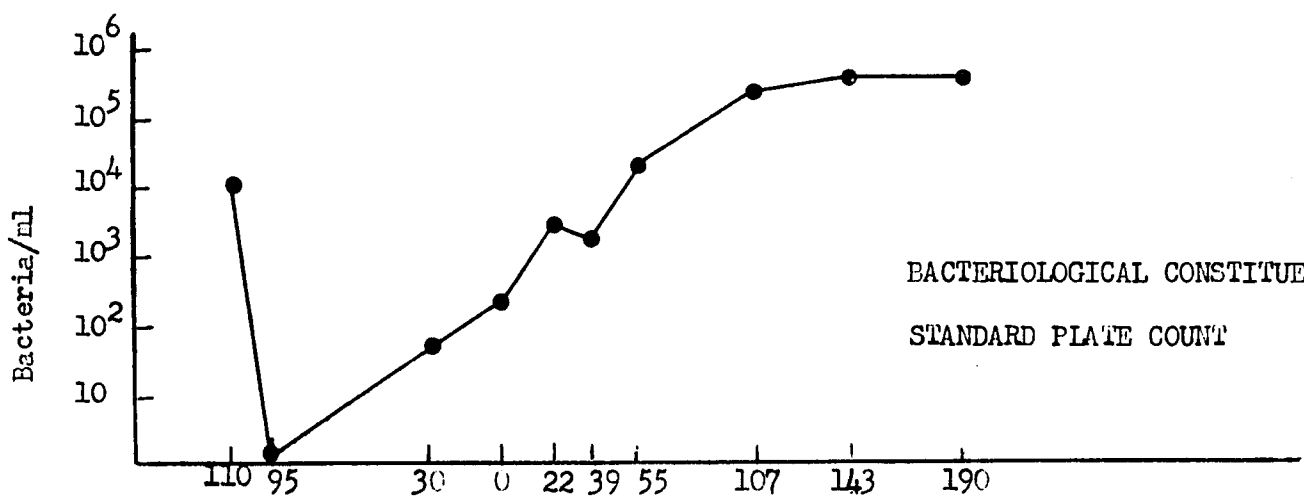
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
November 4 - 5, 1970

1910 c.f.s. River Discharge



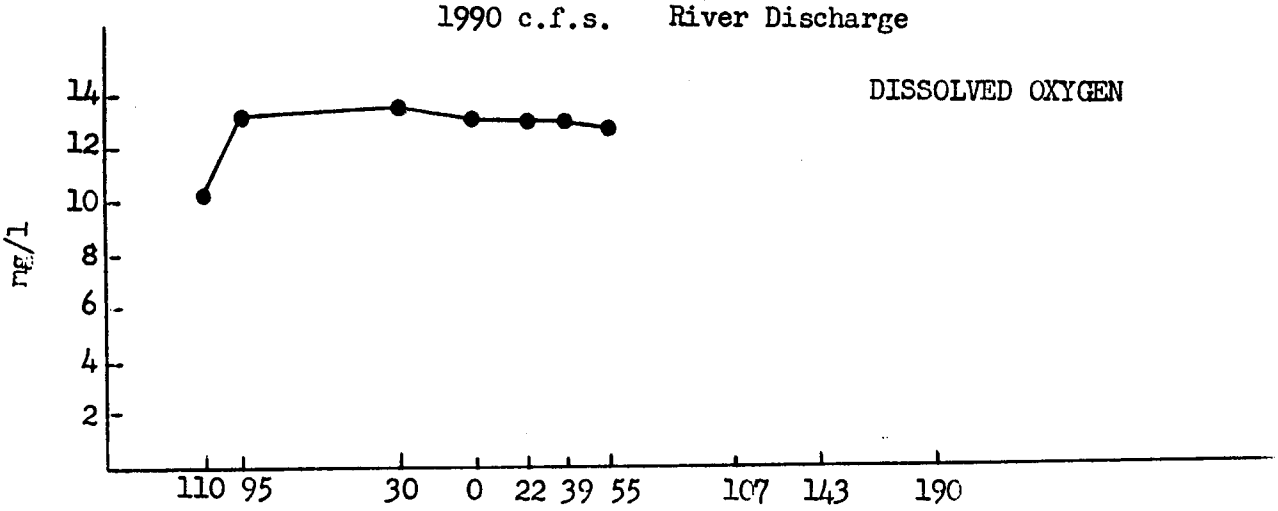


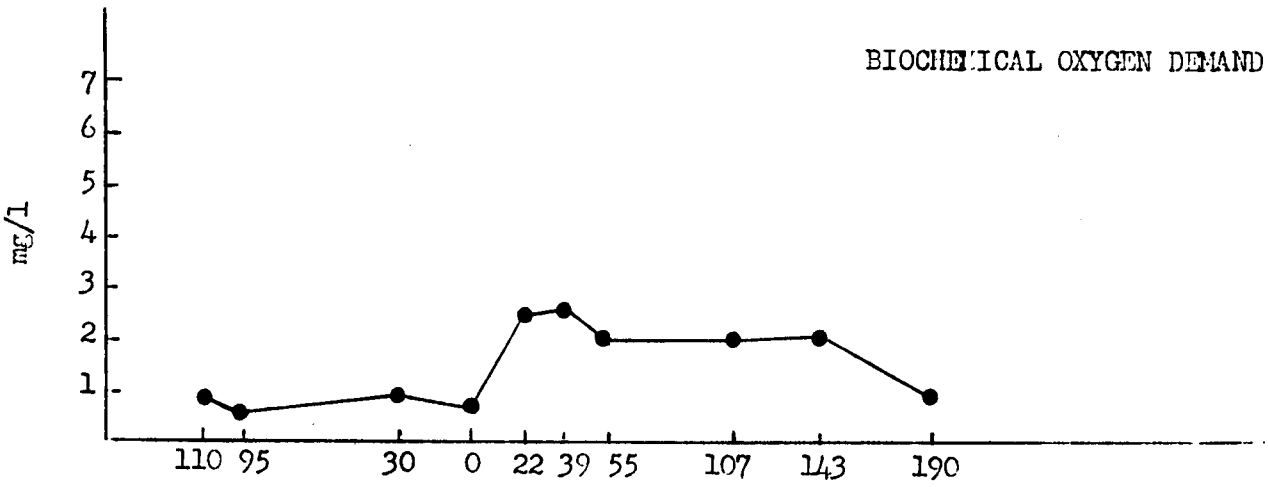


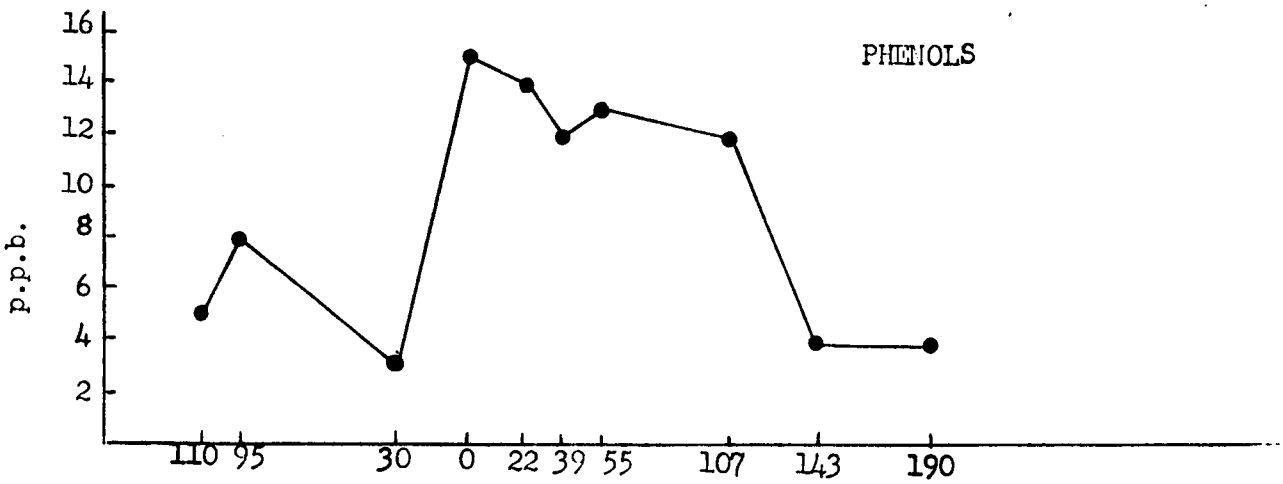
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
November 17 - 19, 1970

1990 c.f.s. River Discharge







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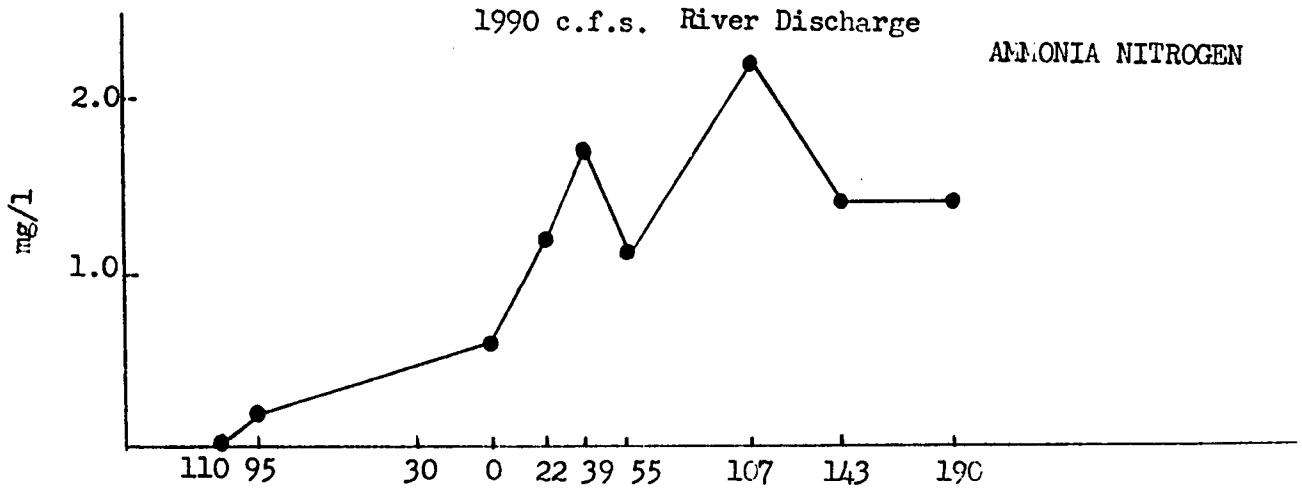

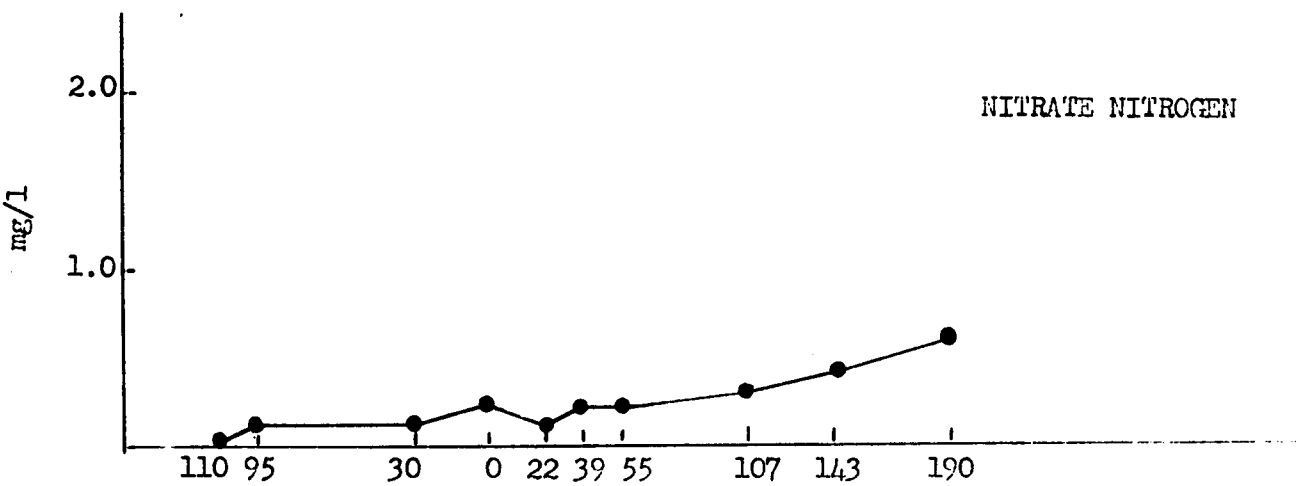

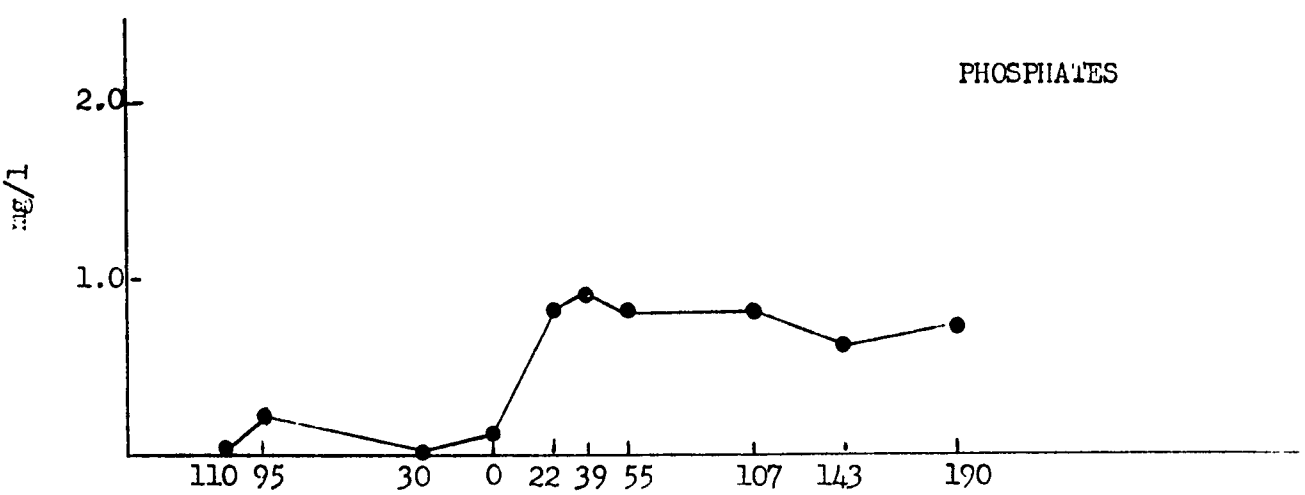

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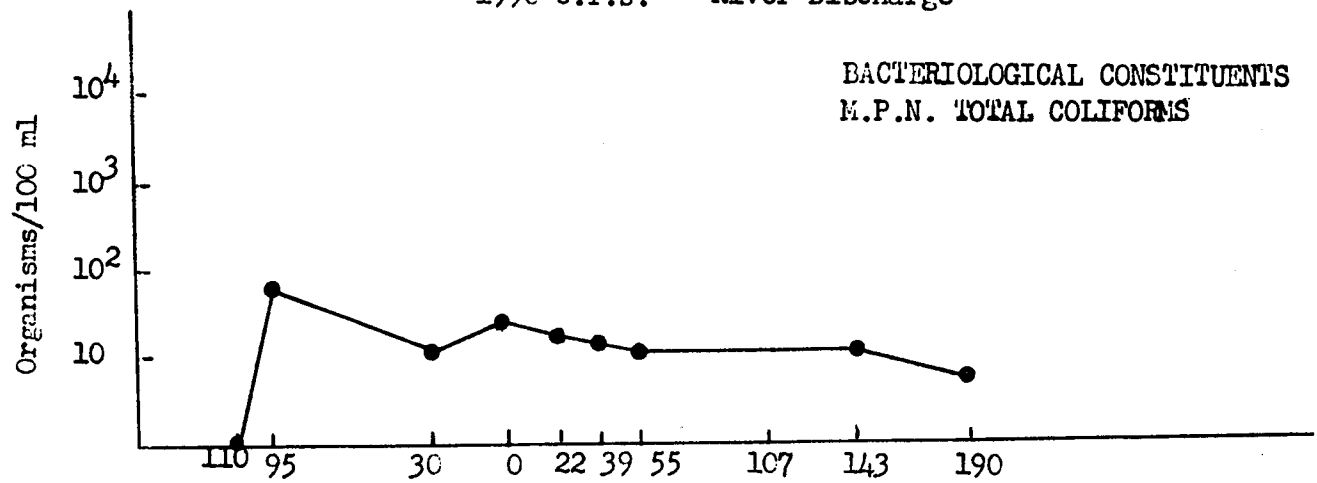
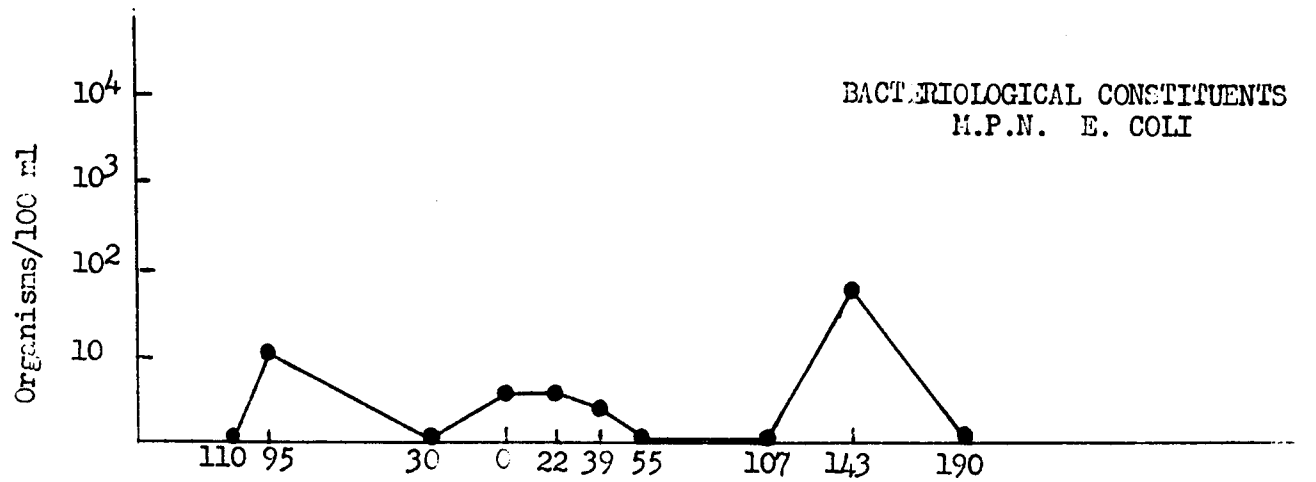
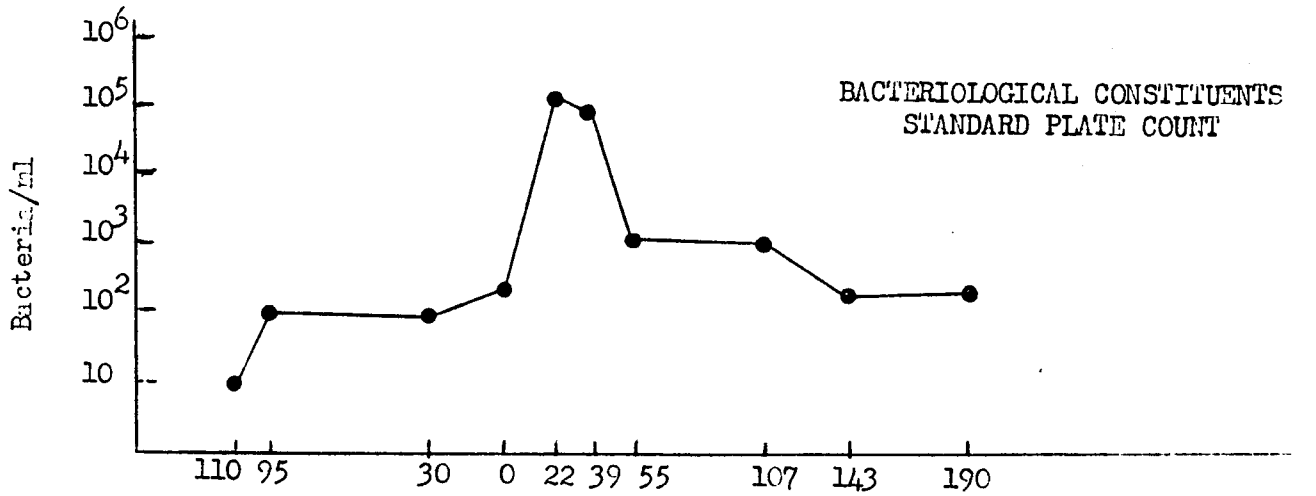


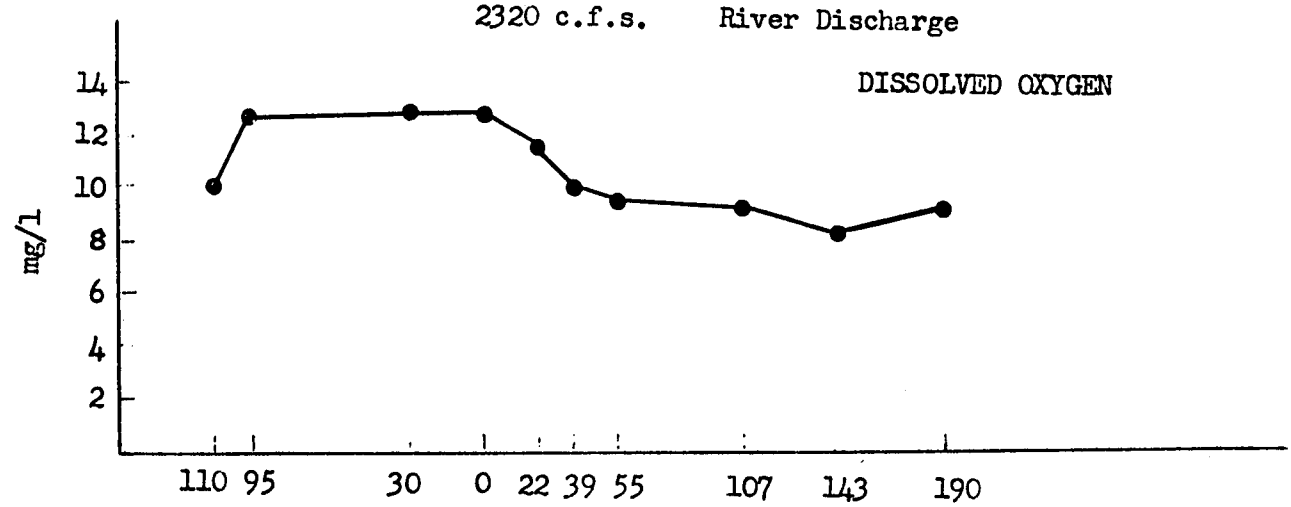


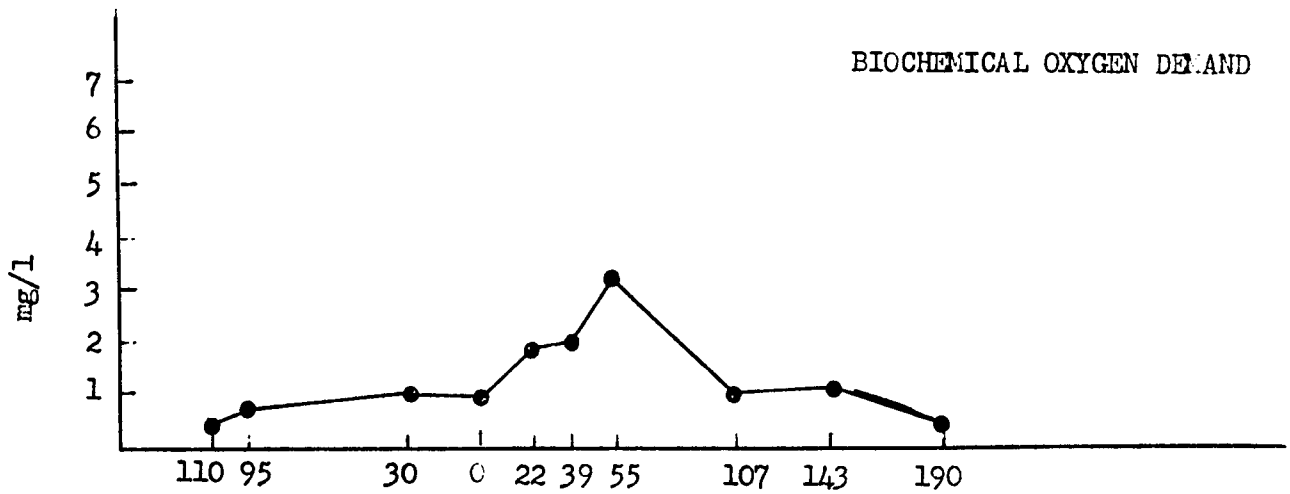


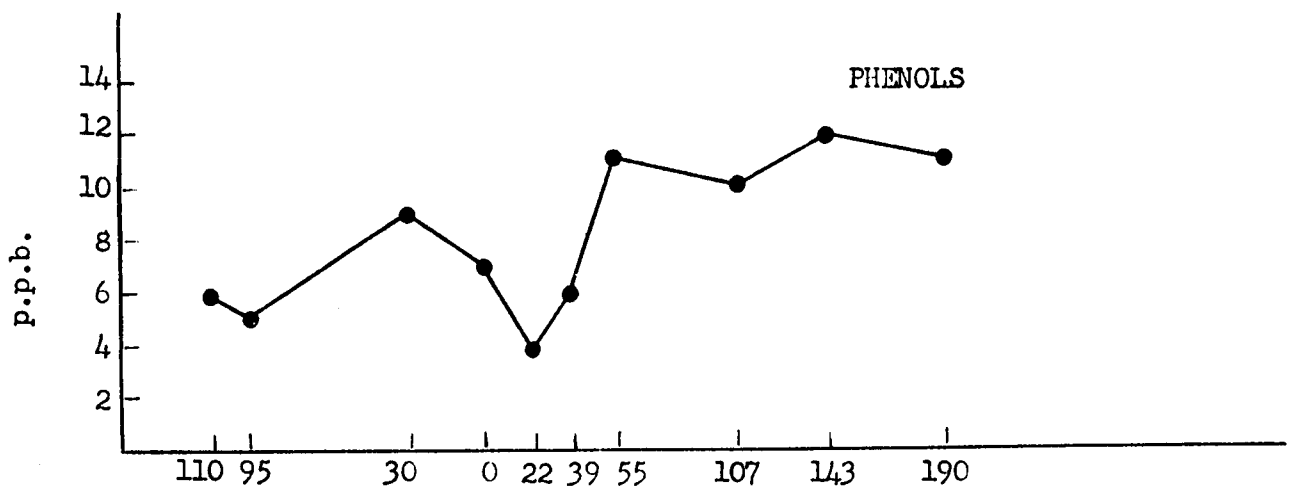
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 1 - 2, 1970

2320 c.f.s. River Discharge





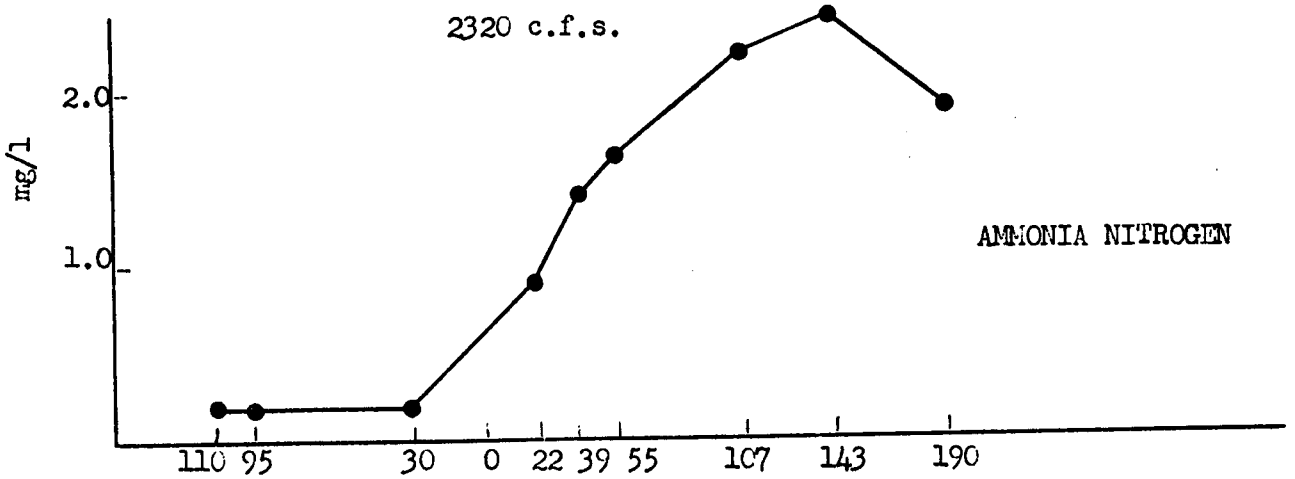


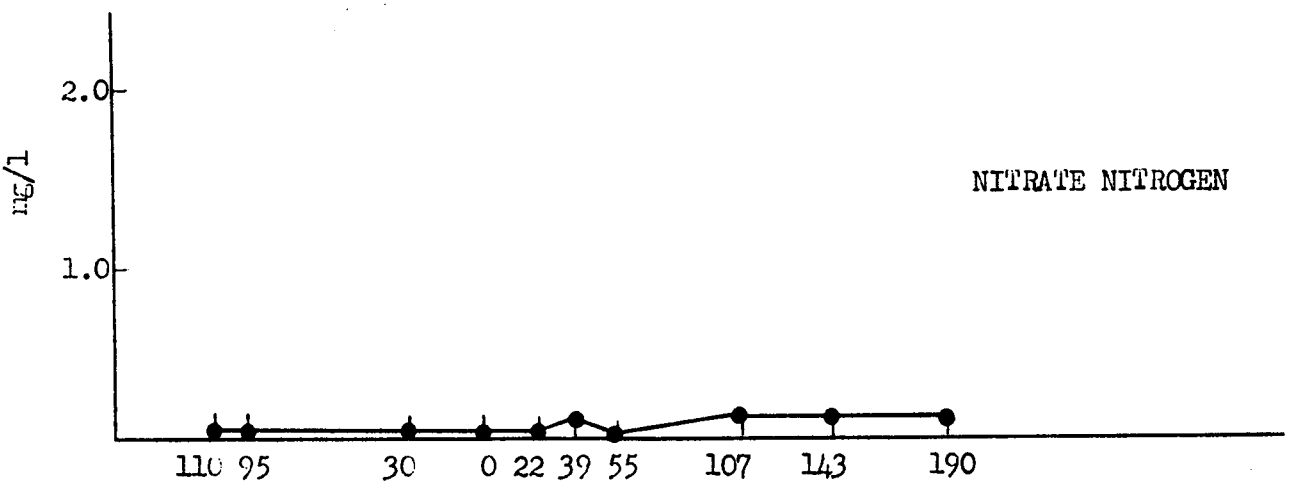
RIVER MILES FROM EDMONTON

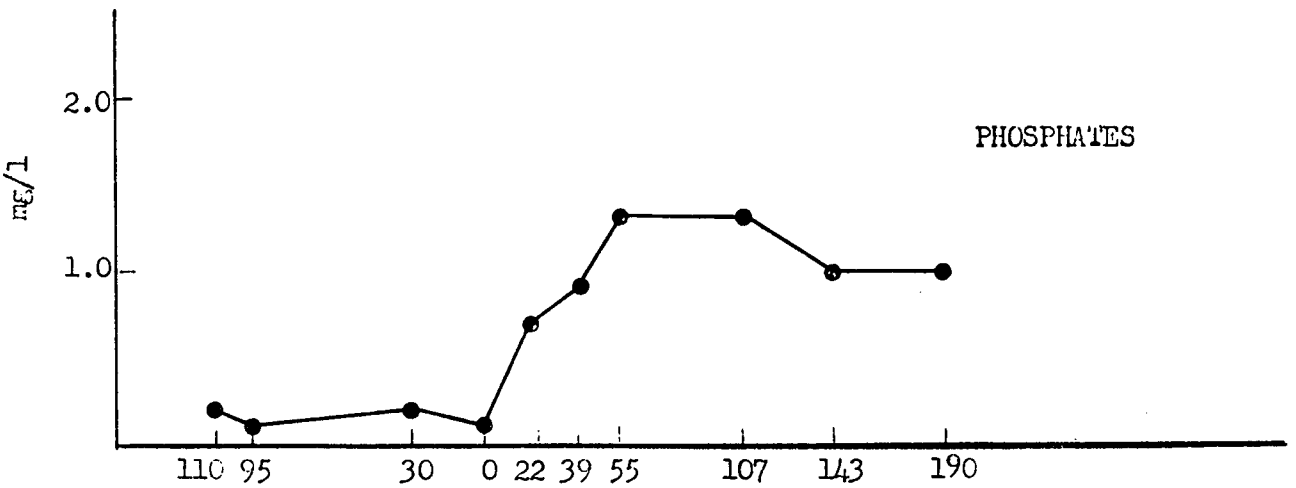
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 1 - 2, 1970

River Discharge

2320 c.f.s.





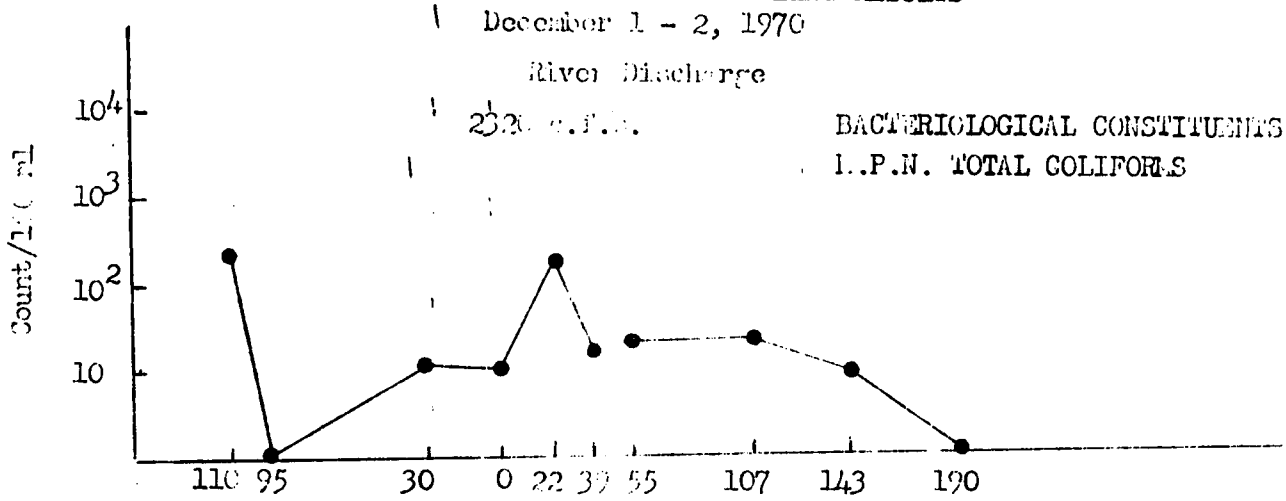


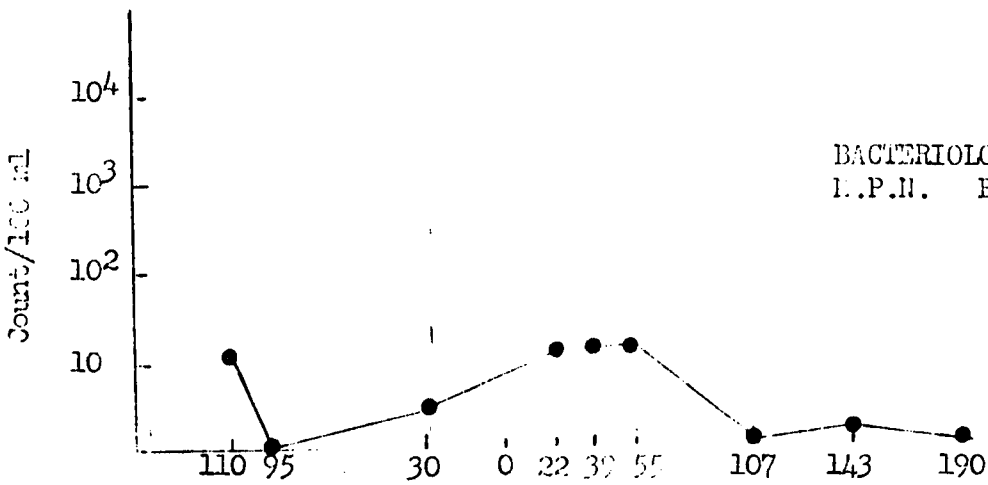
RIVER MILES FROM EDMONTON

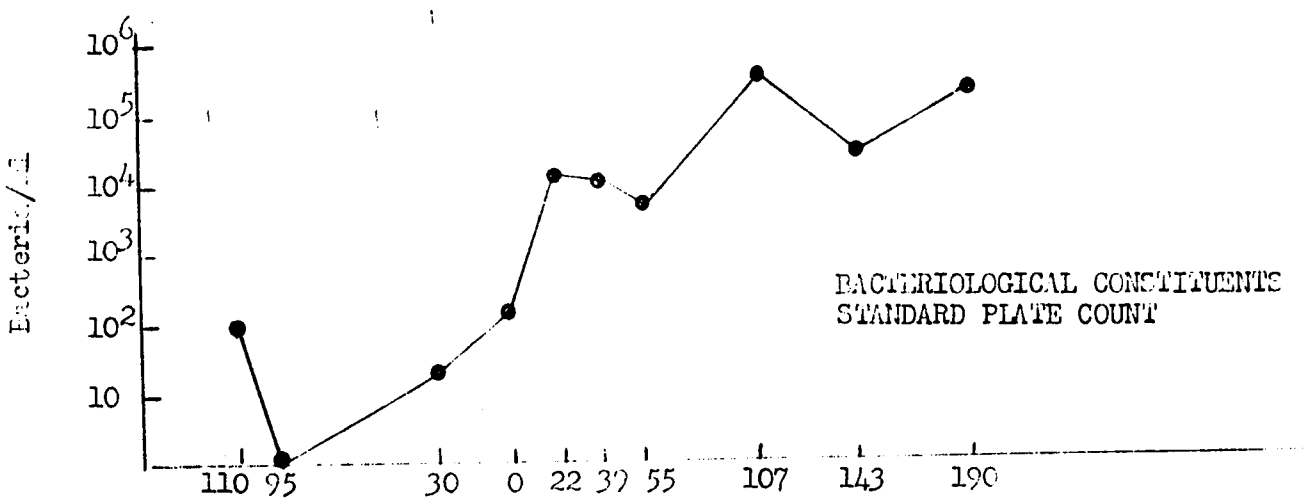
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 1 - 2, 1970

River Discharge

2320 c.f.s.





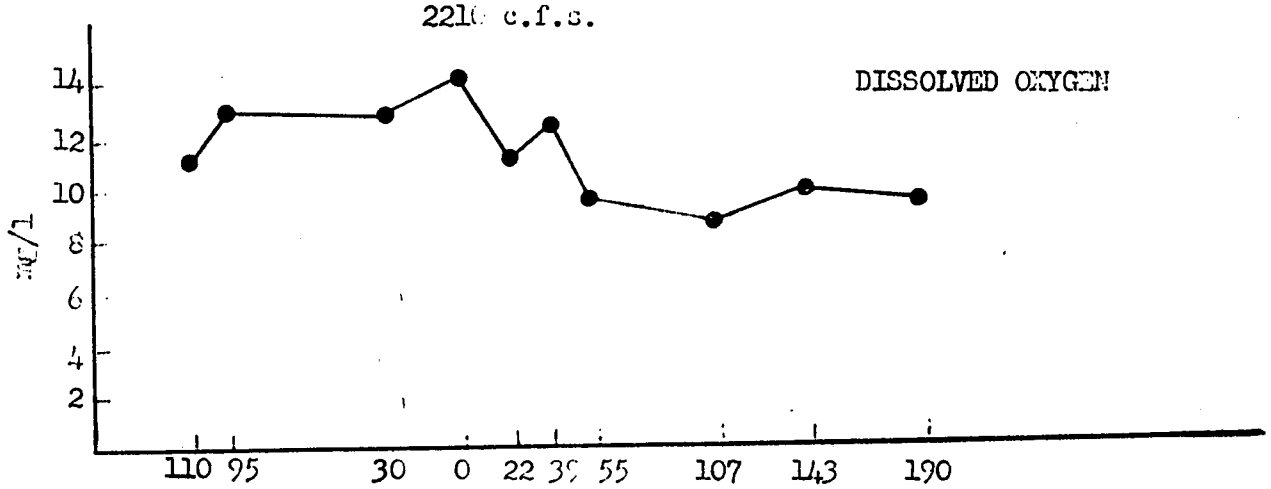


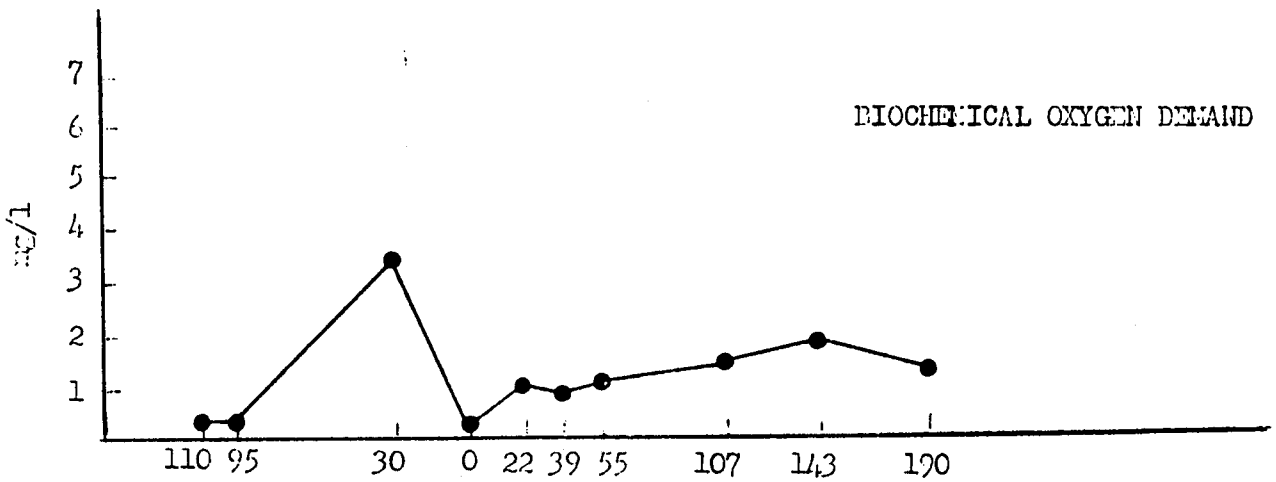
RIVER MILES FROM EDMONTON

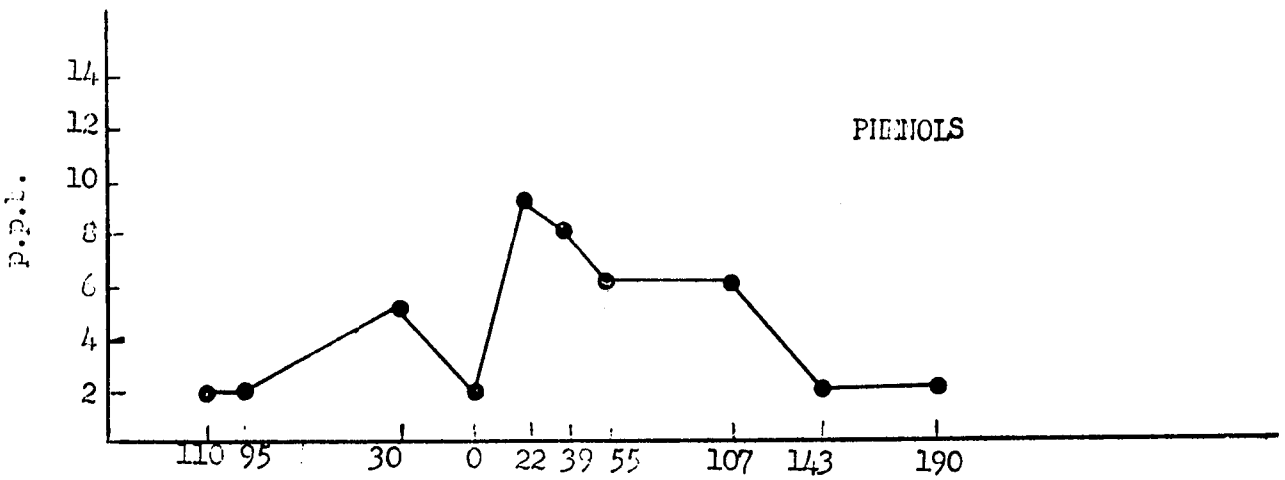
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 15-17, 1970

River Discharge

2210 c.f.s.



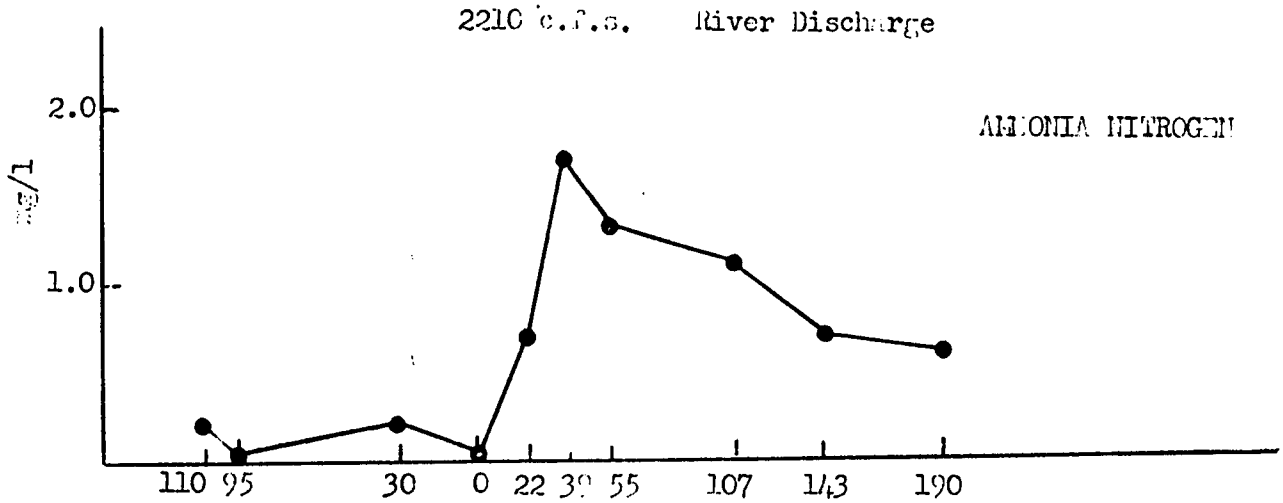


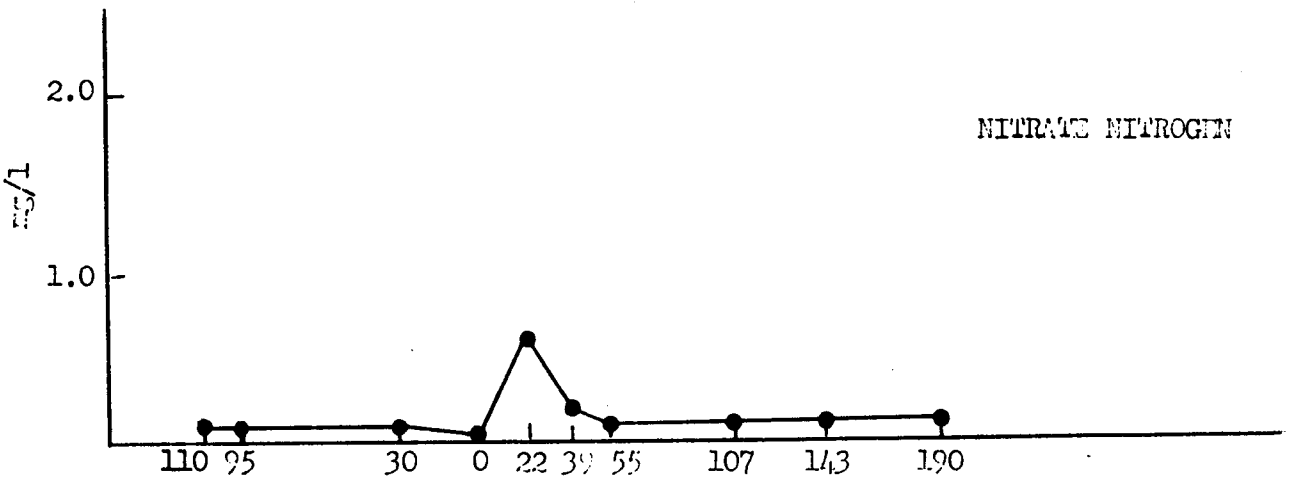


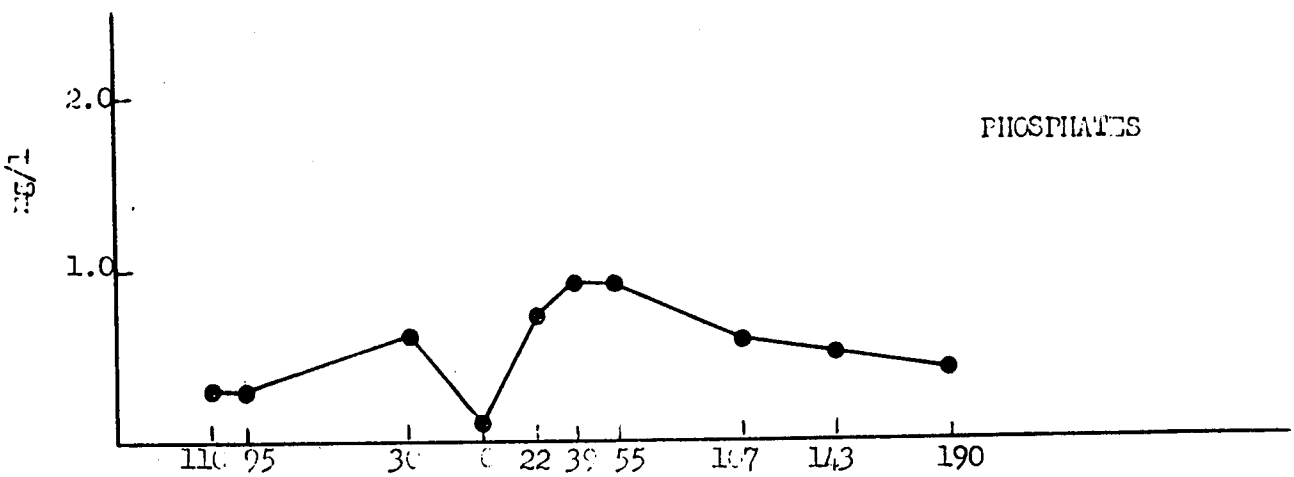
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 15 - 17, 1970

2210 c.f.s. River Discharge

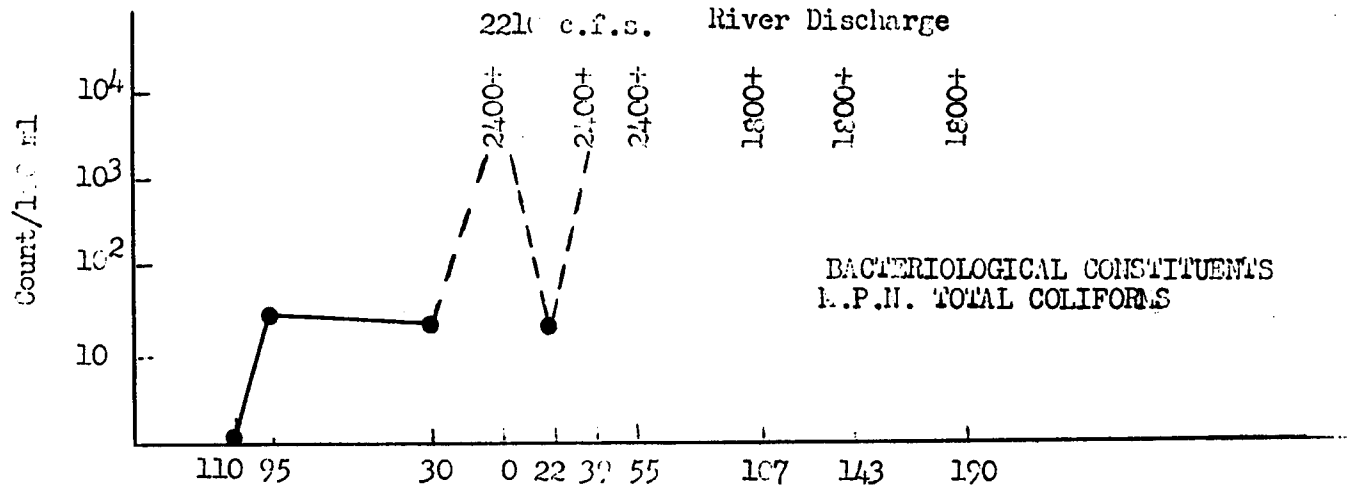


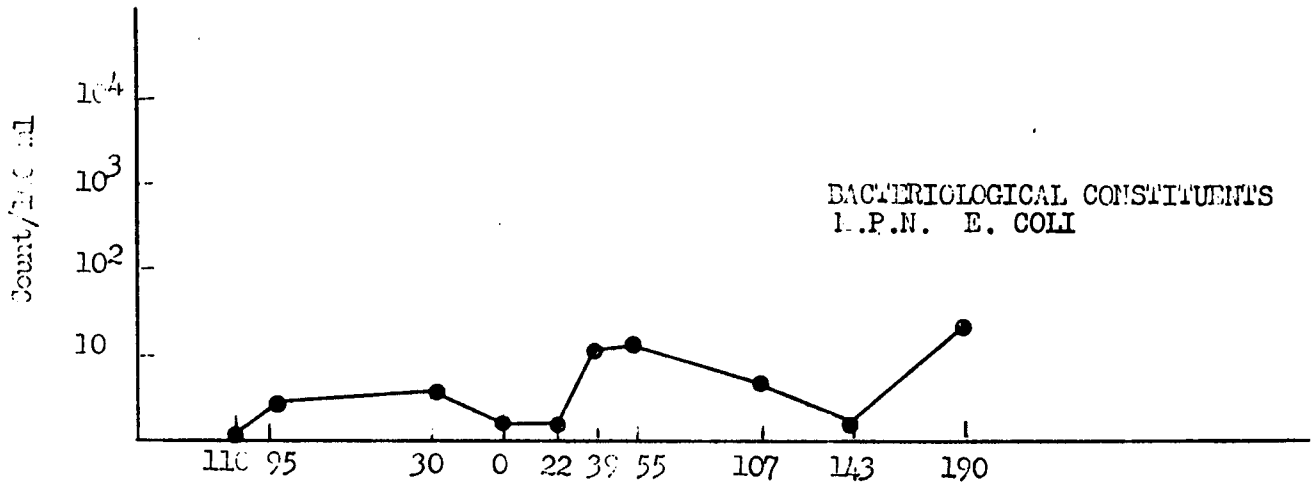


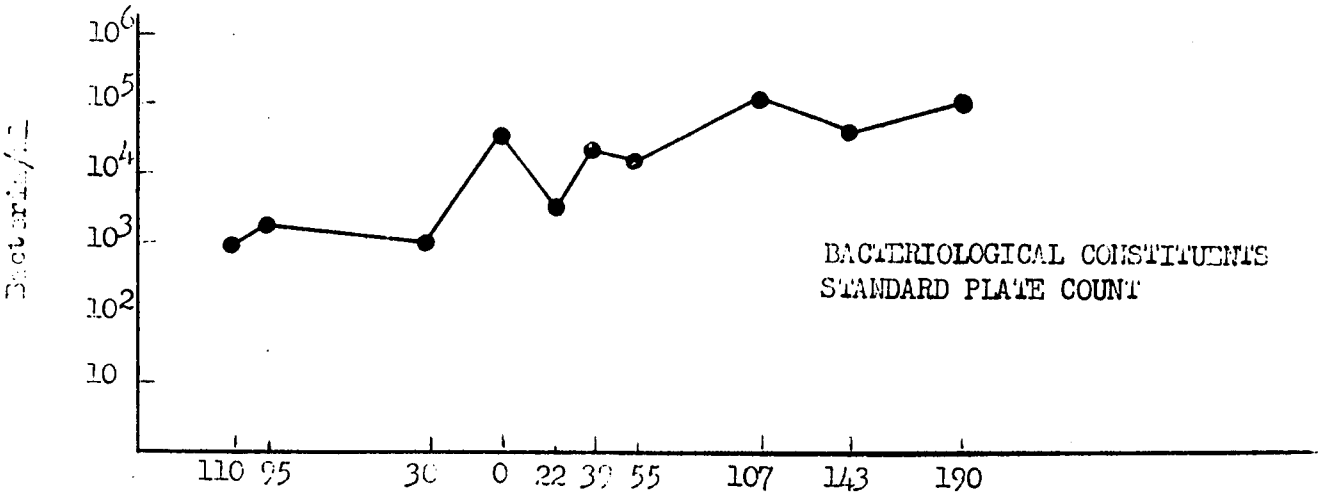


RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
December 15 - 17, 1970



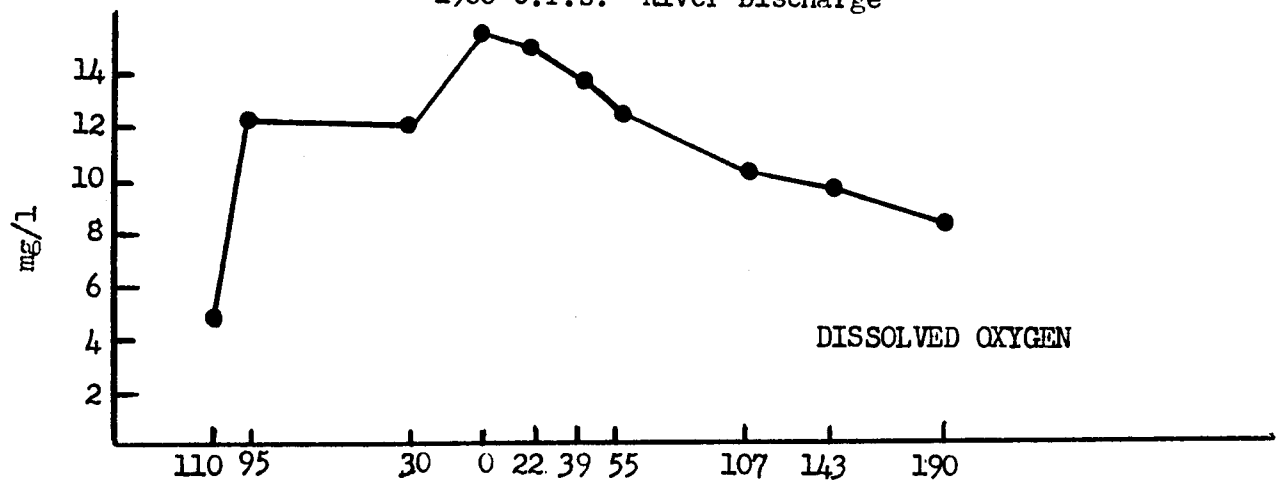


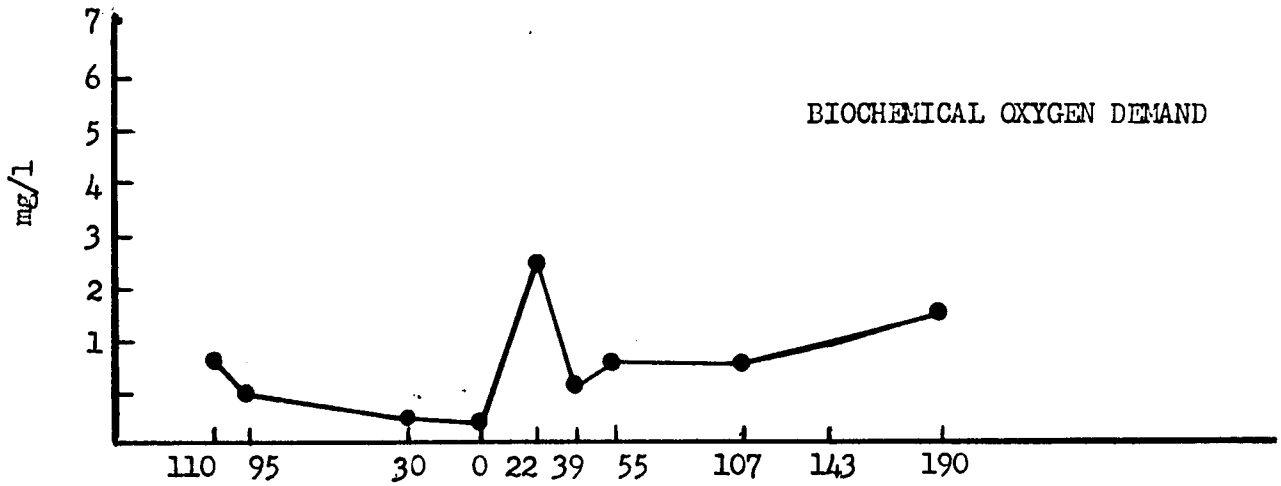


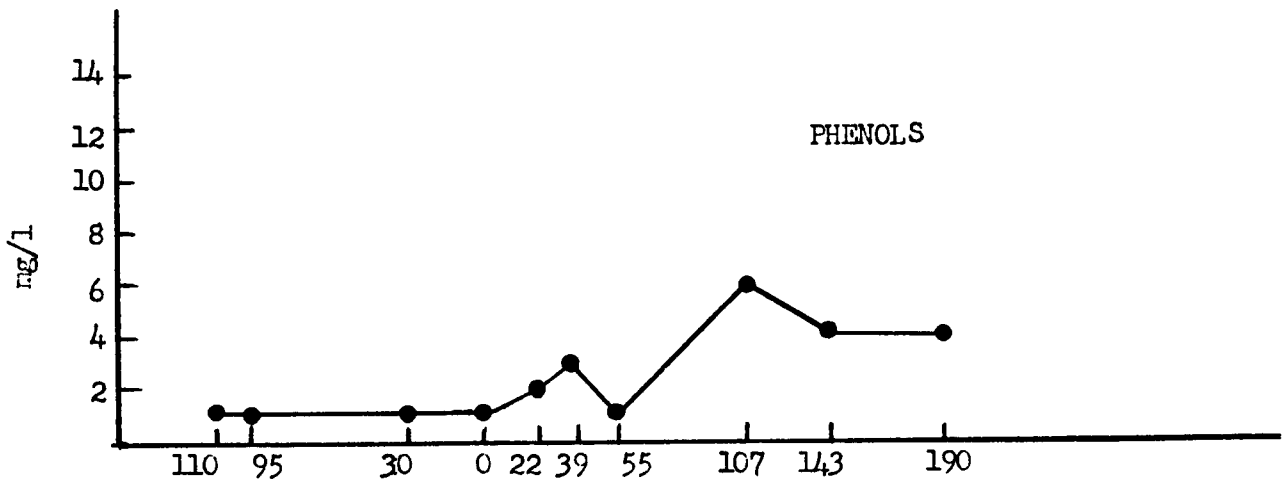
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
January 12-13, 1971

1900 c.f.s. River Discharge

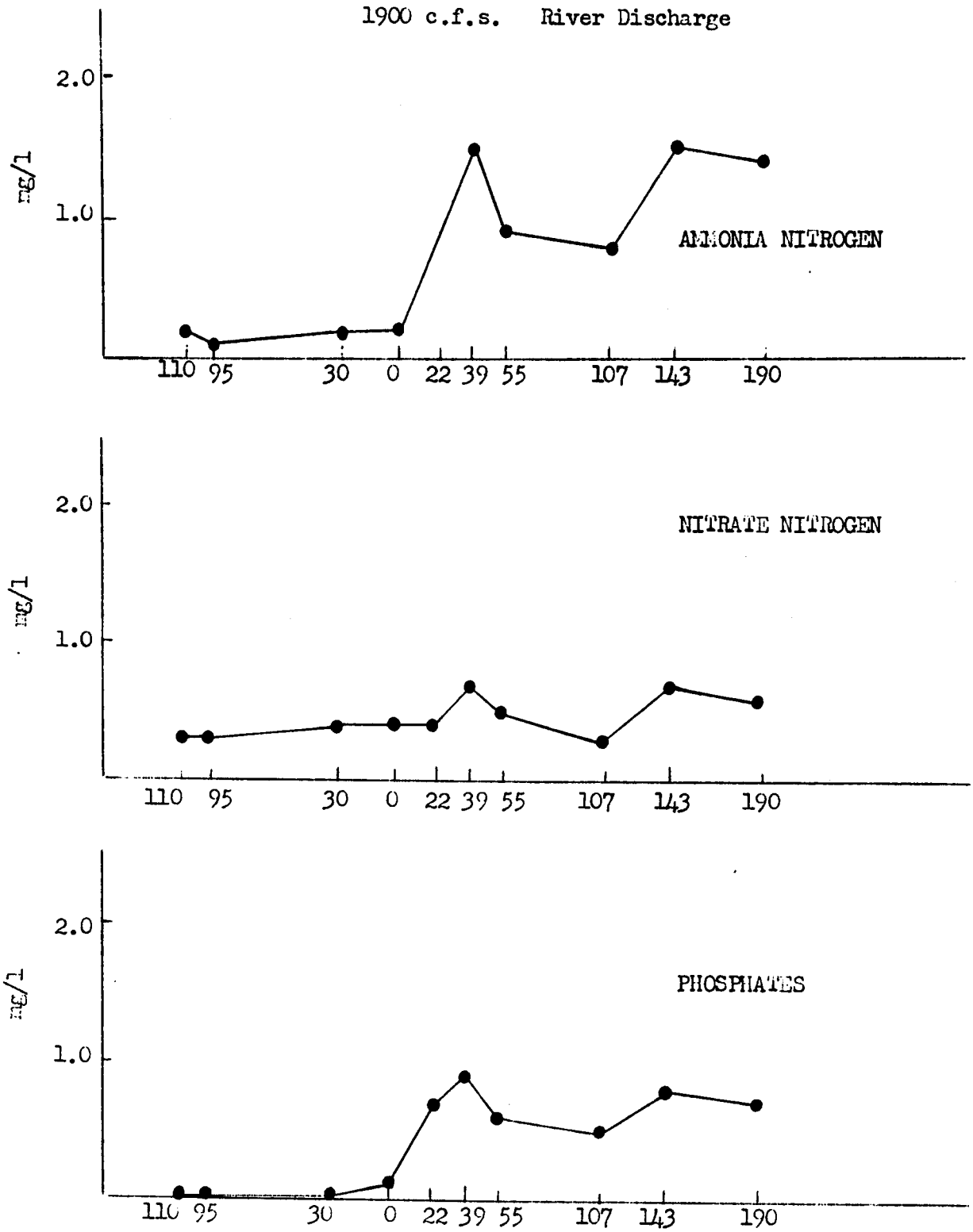






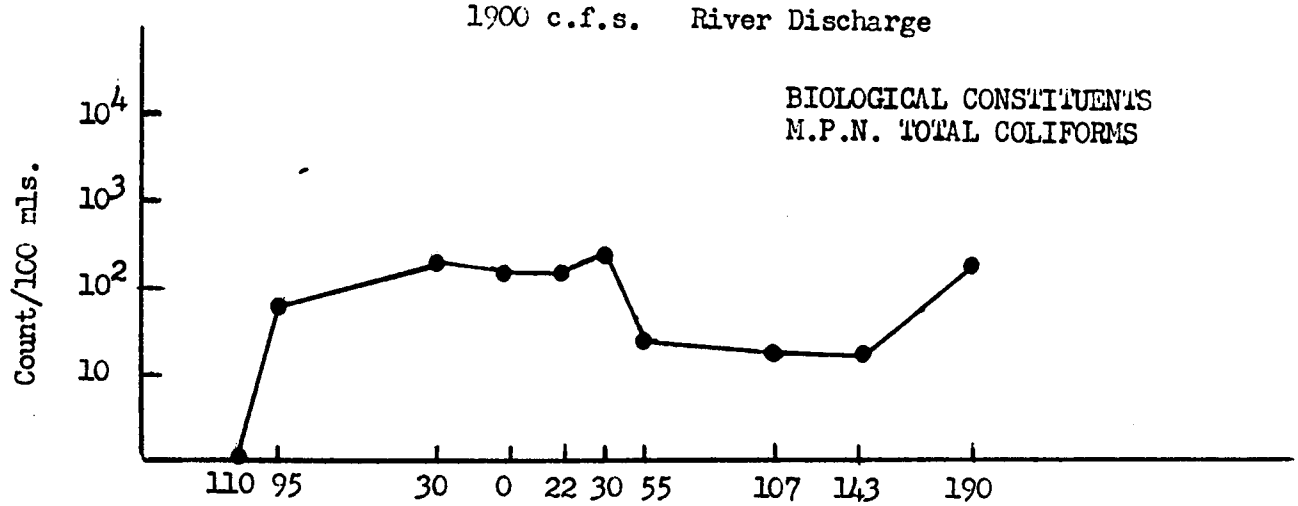
RIVER MILES FROM EDMONTON

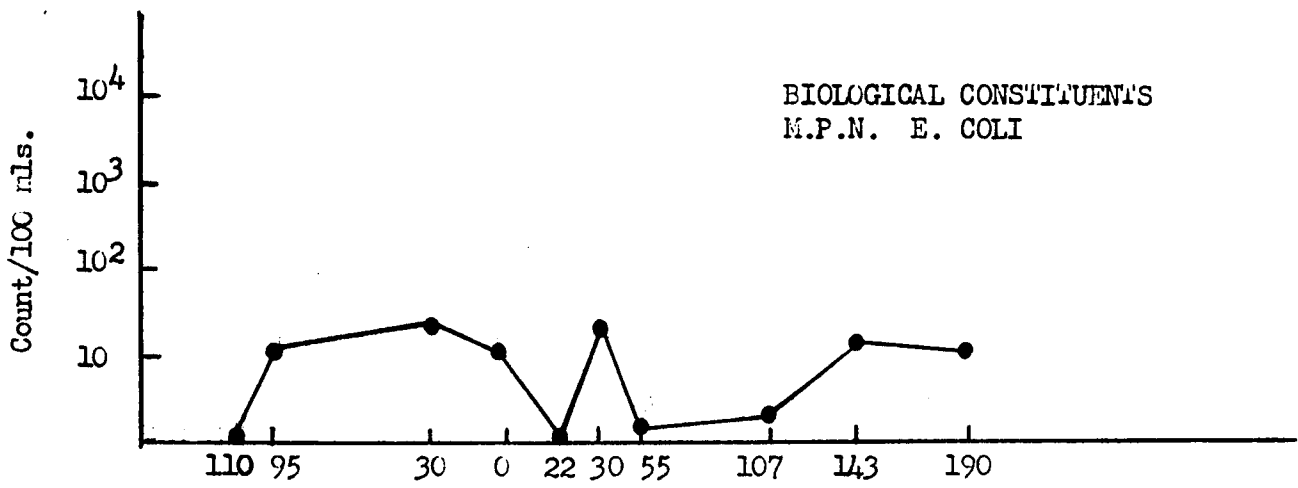
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
January 12-13, 1971

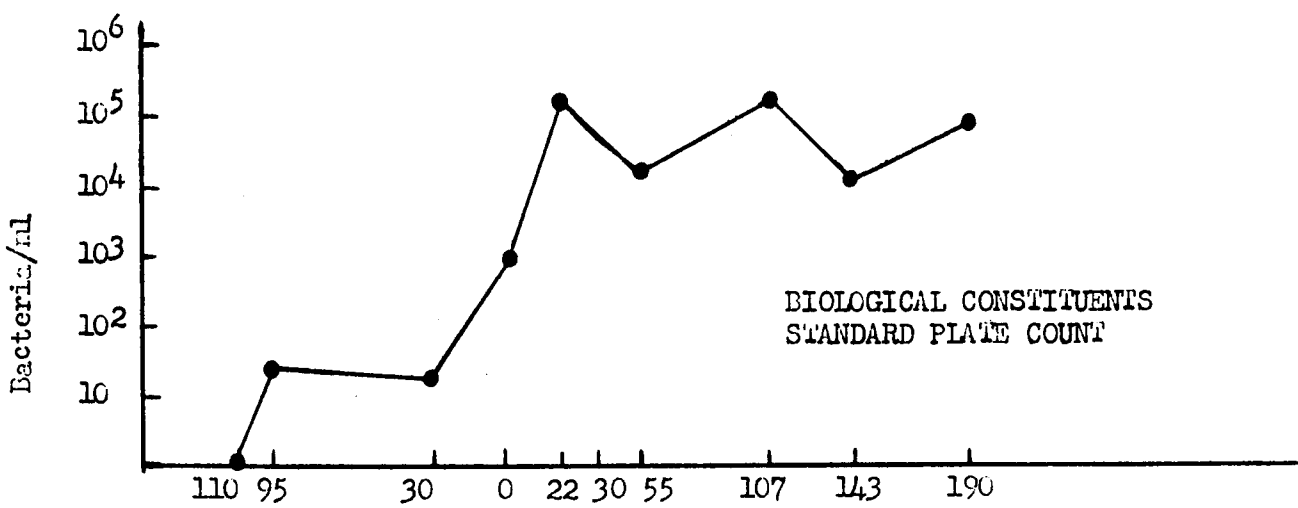


NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
January 12-13, 1971

1900 c.f.s. River Discharge



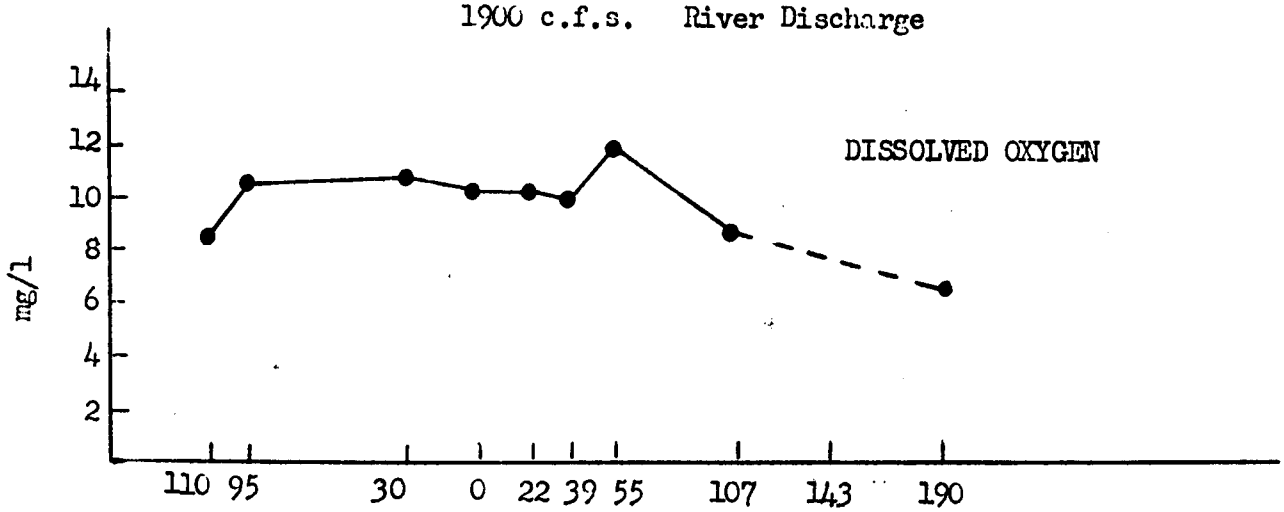


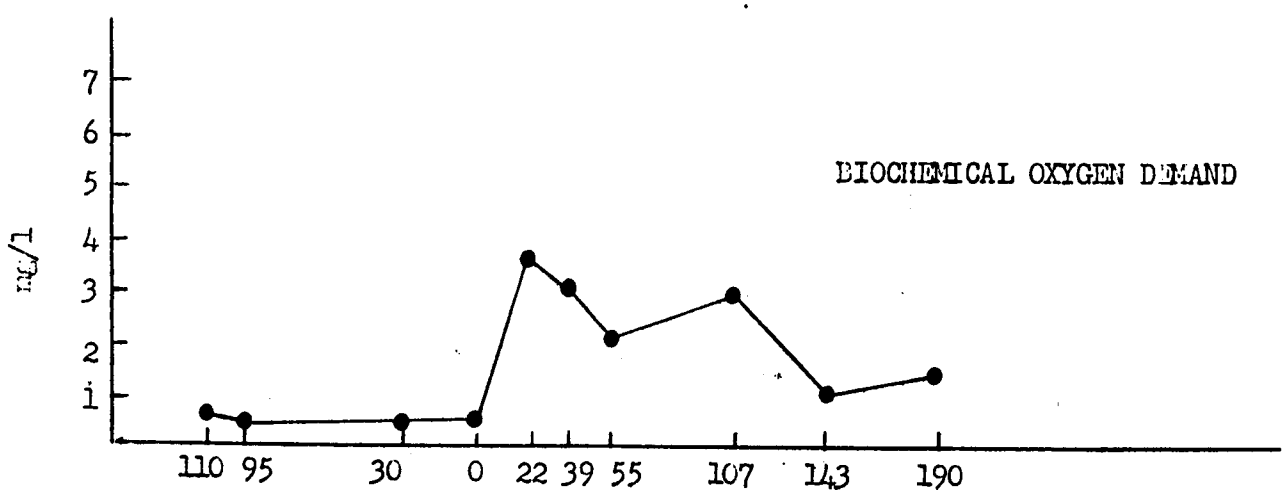


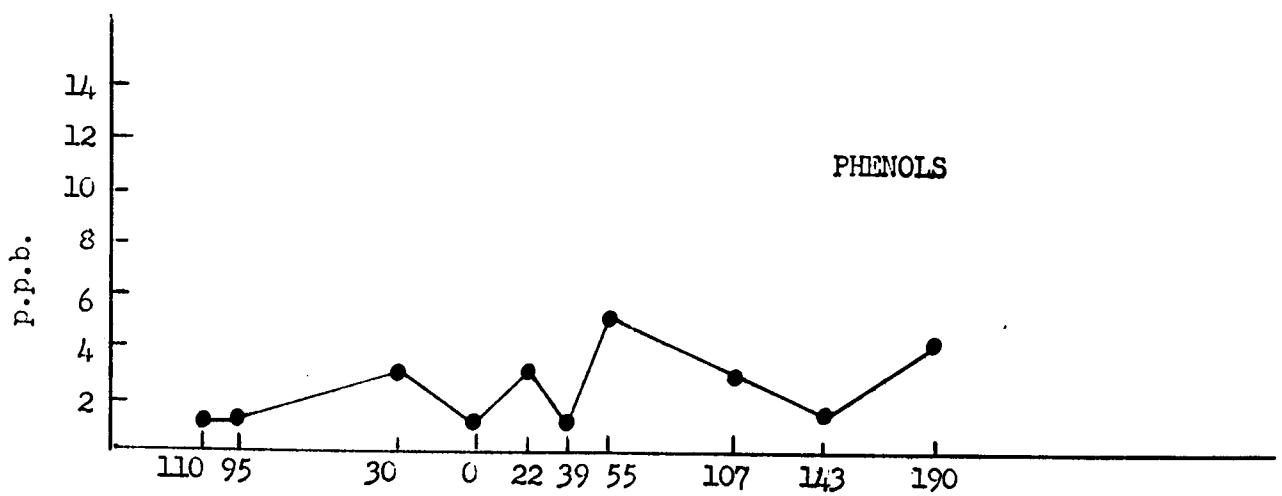
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
January 26-27, 1971

1900 c.f.s. River Discharge

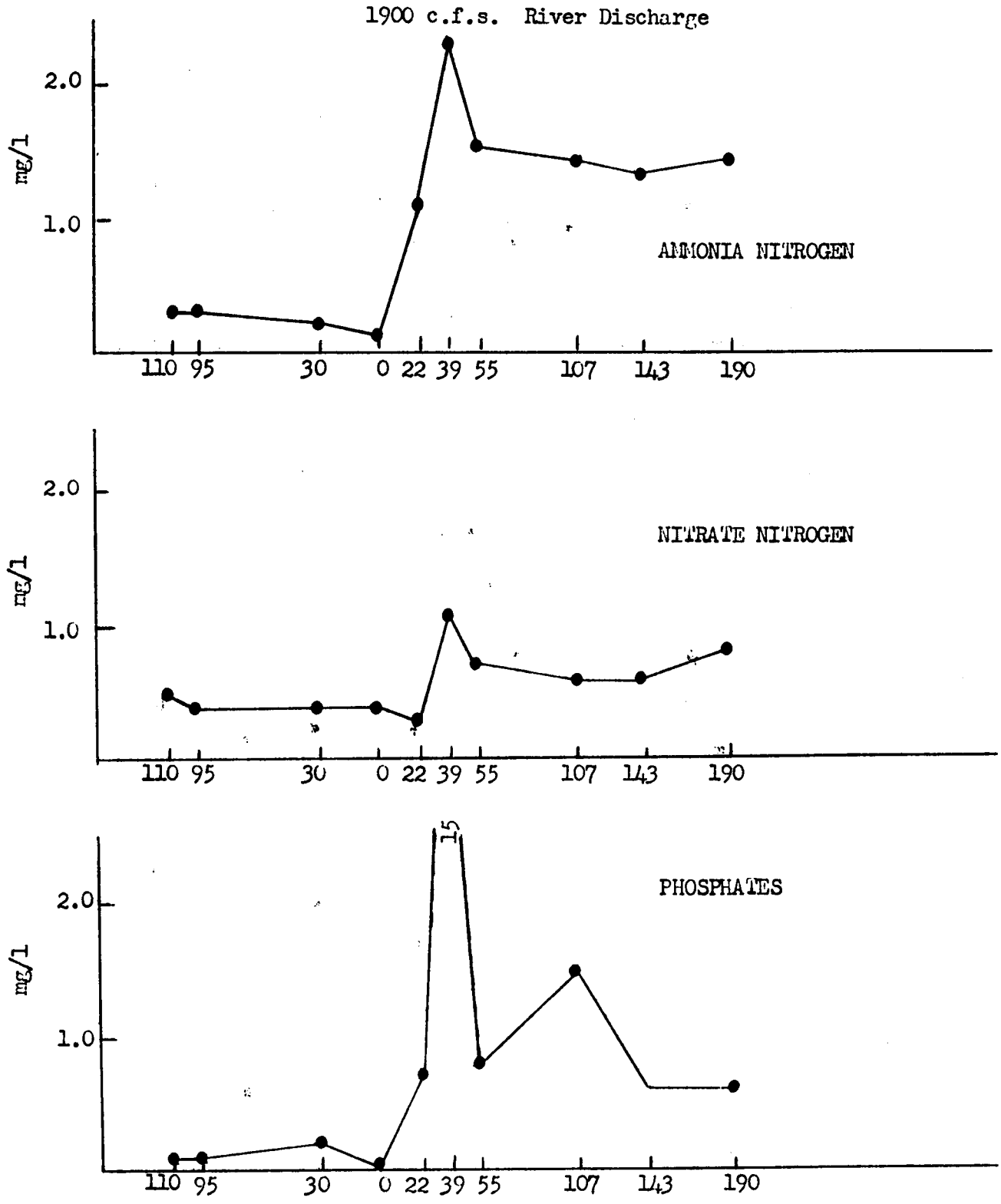






RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
January 26-27, 1971



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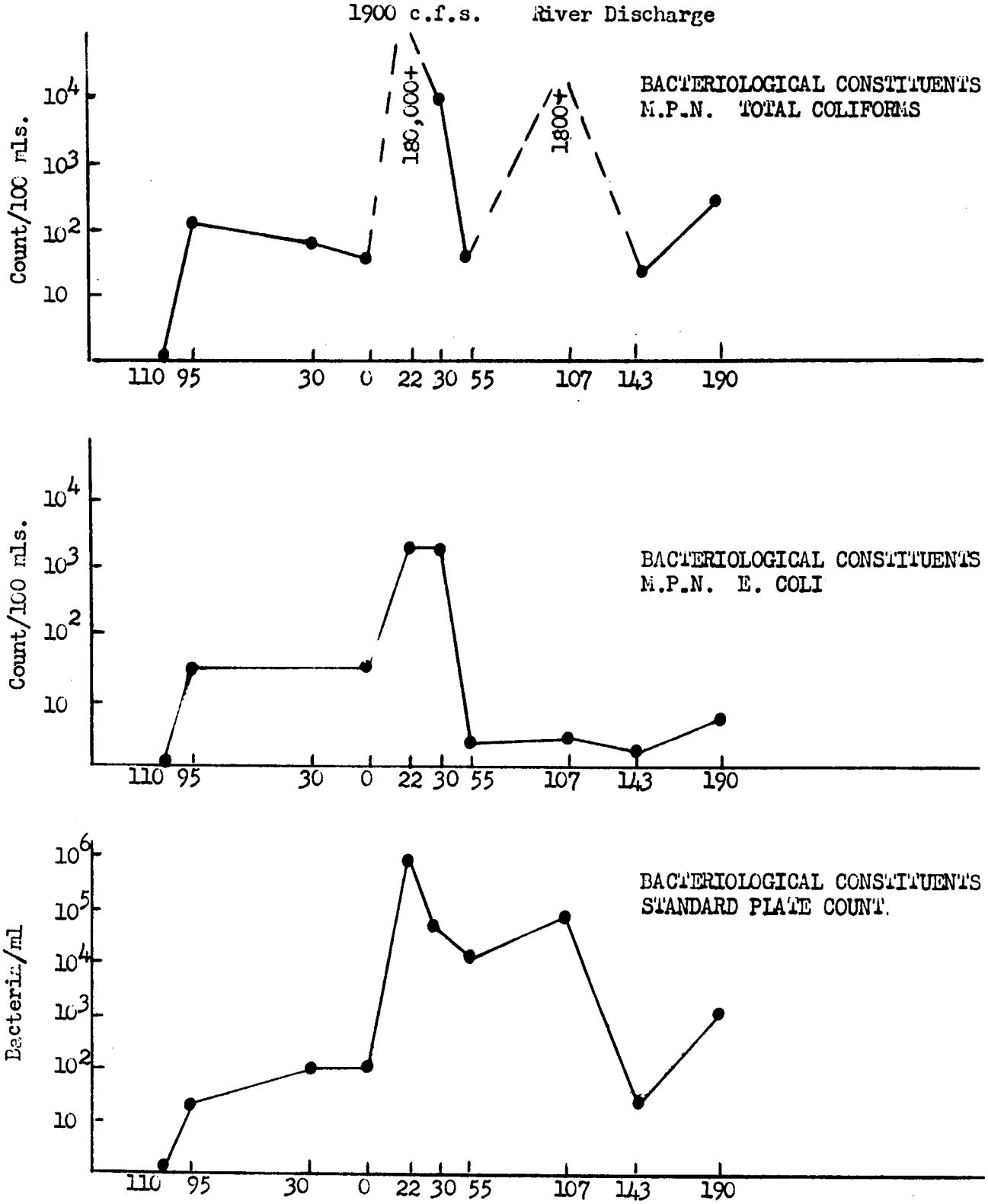
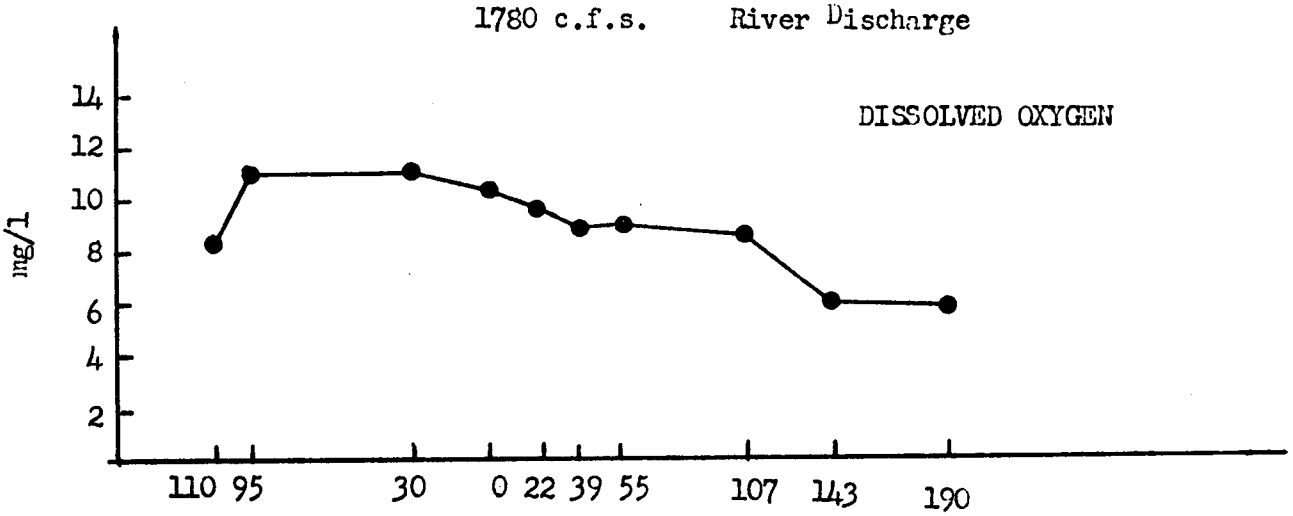
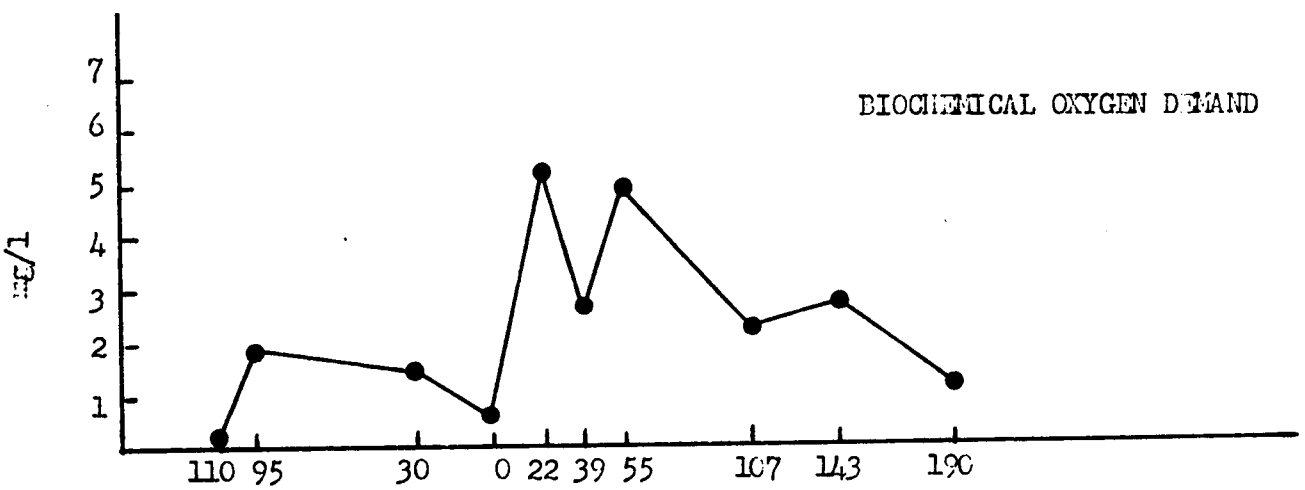
January 26-27, 1971

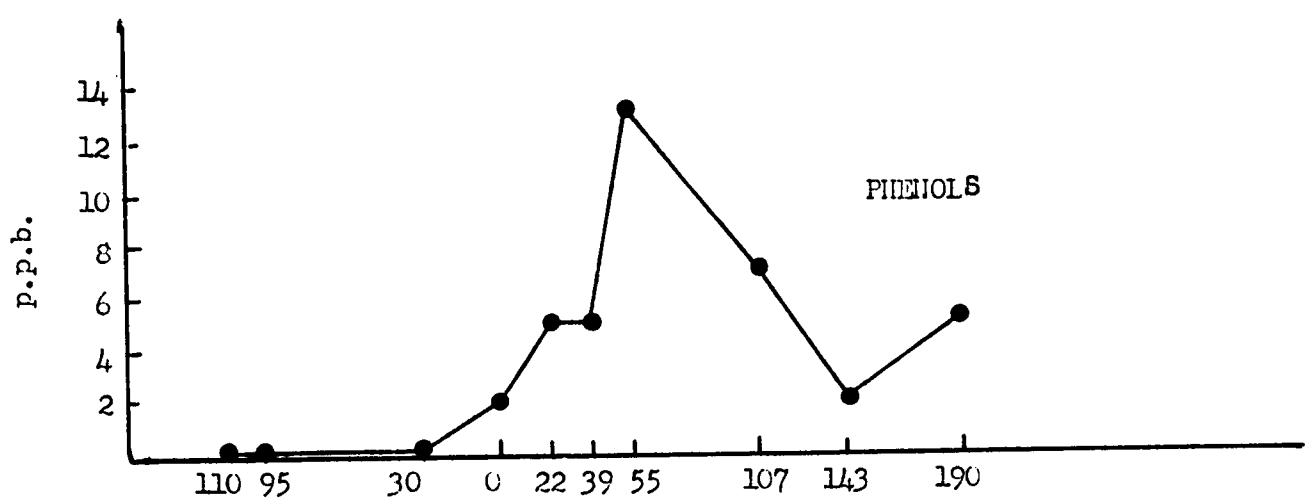


NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
February 9-10, 1971

1780 c.f.s. River Discharge

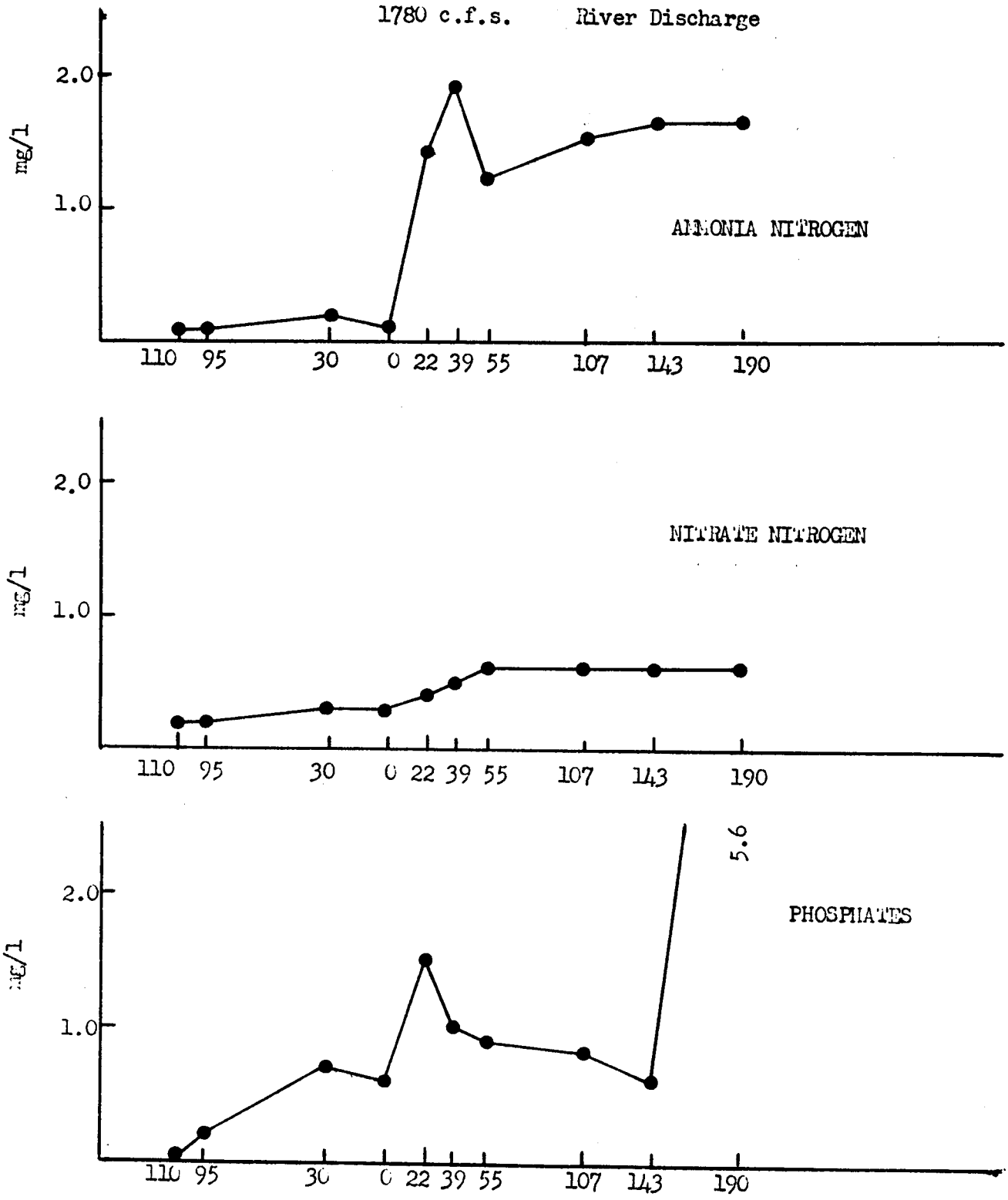






RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
February 9-10, 1971



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February 9-10, 1971

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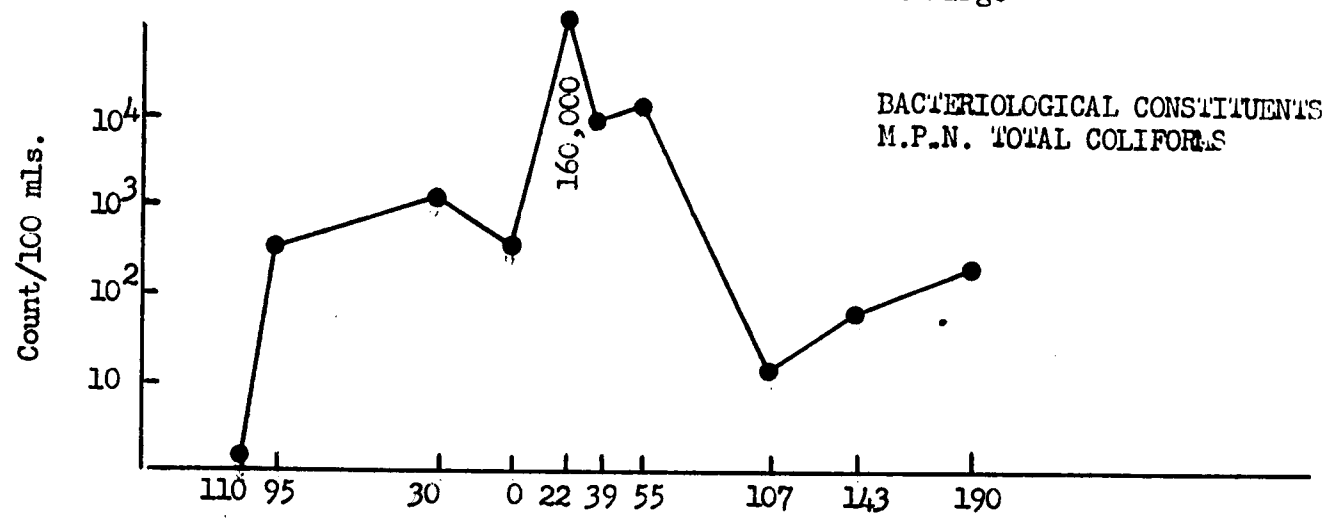
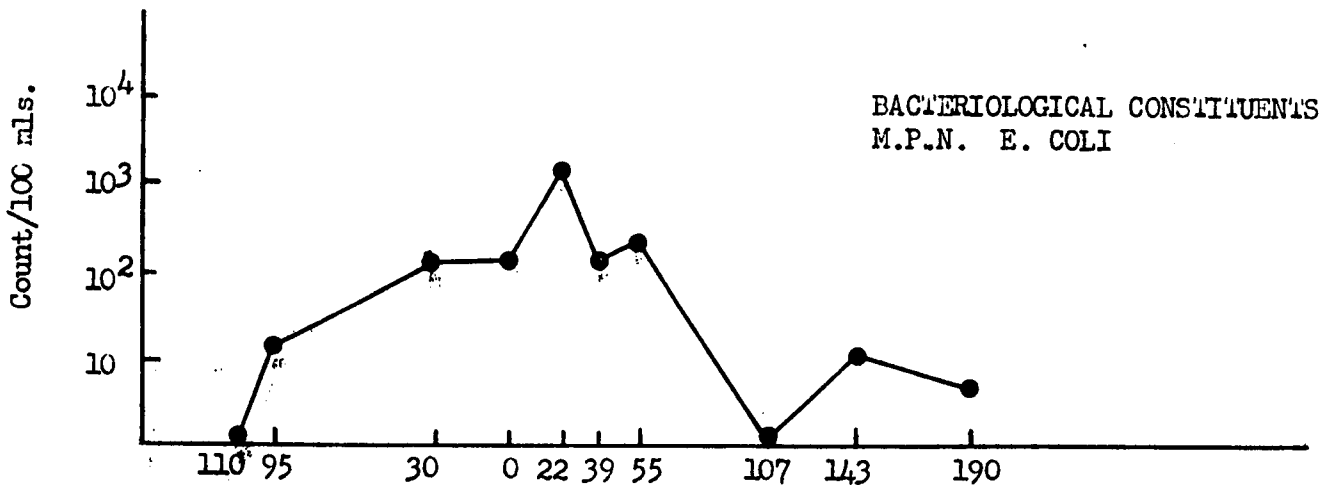
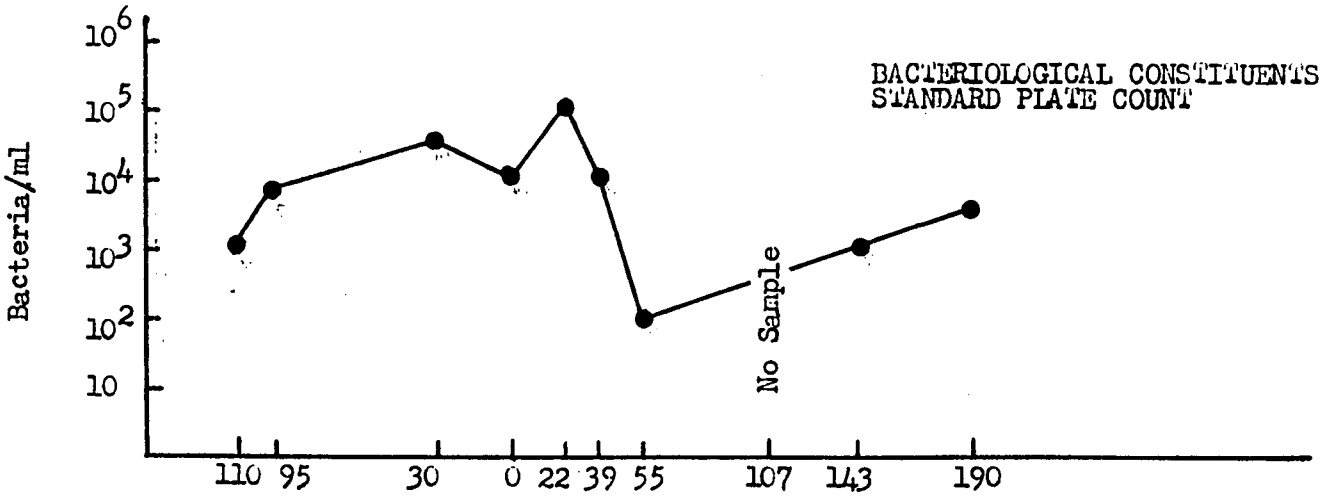


BACTERIOLOGICAL CONSTITUENTS
M.P.N. TOTAL COLIFORMS



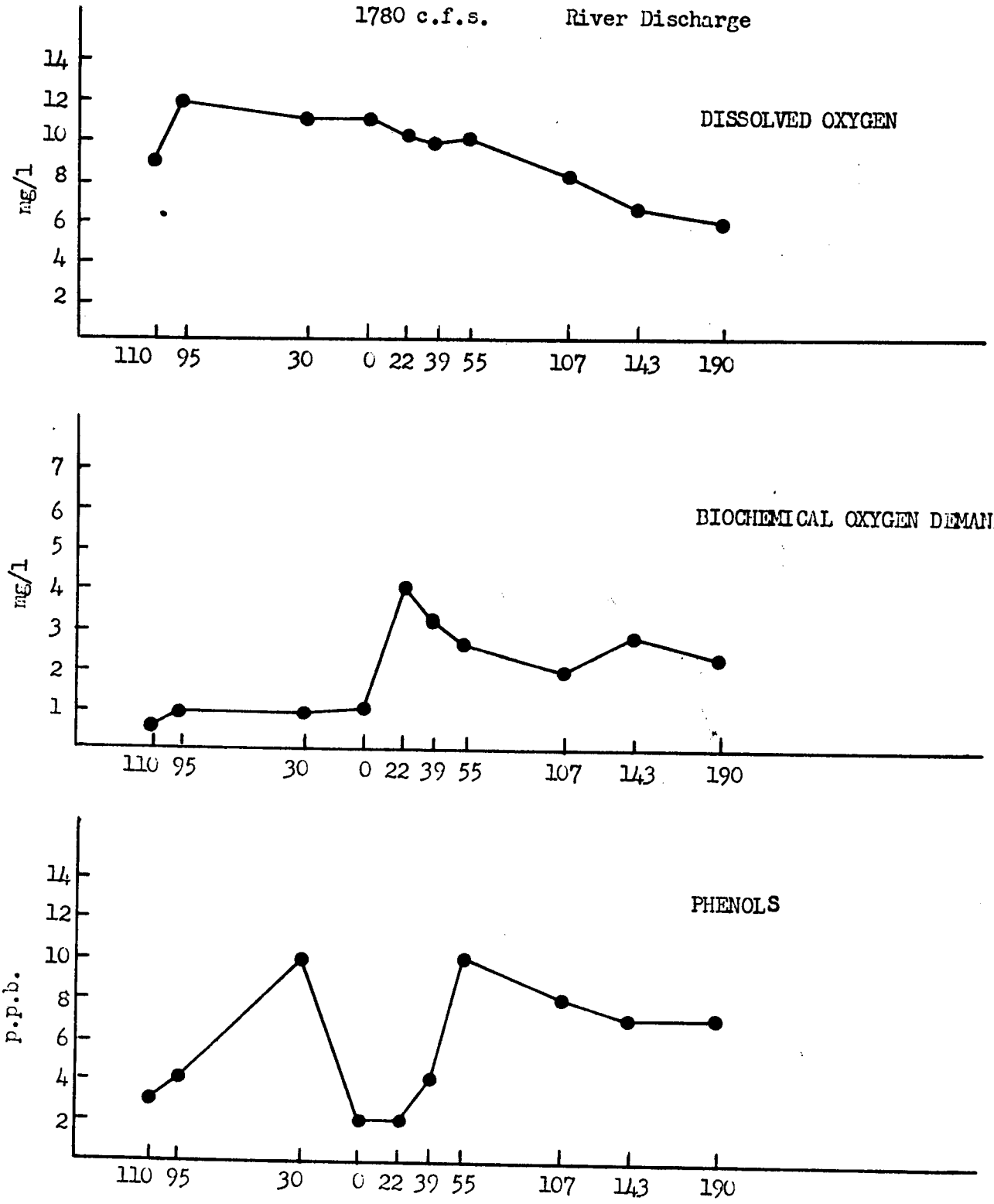
BACTERIOLOGICAL CONSTITUENTS
M.P.N. E. COLI



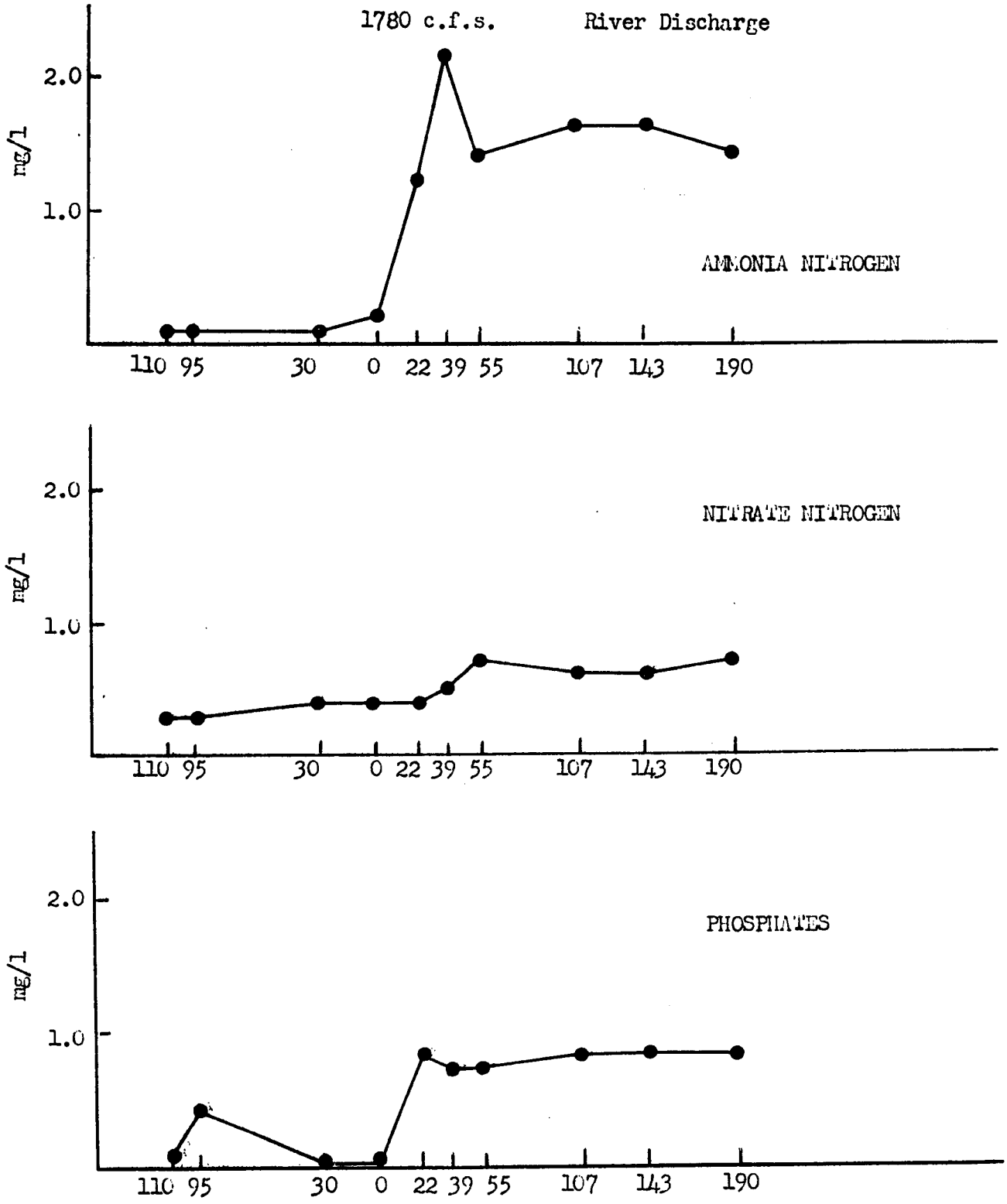
BACTERIOLOGICAL CONSTITUENTS
STANDARD PLATE COUNT

RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
February 23-24, 1971

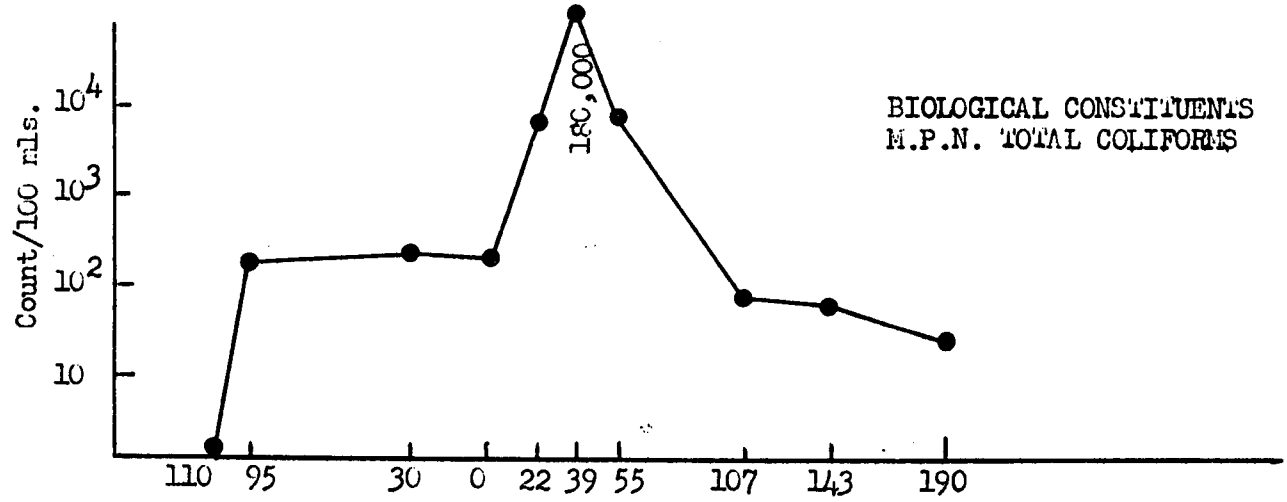


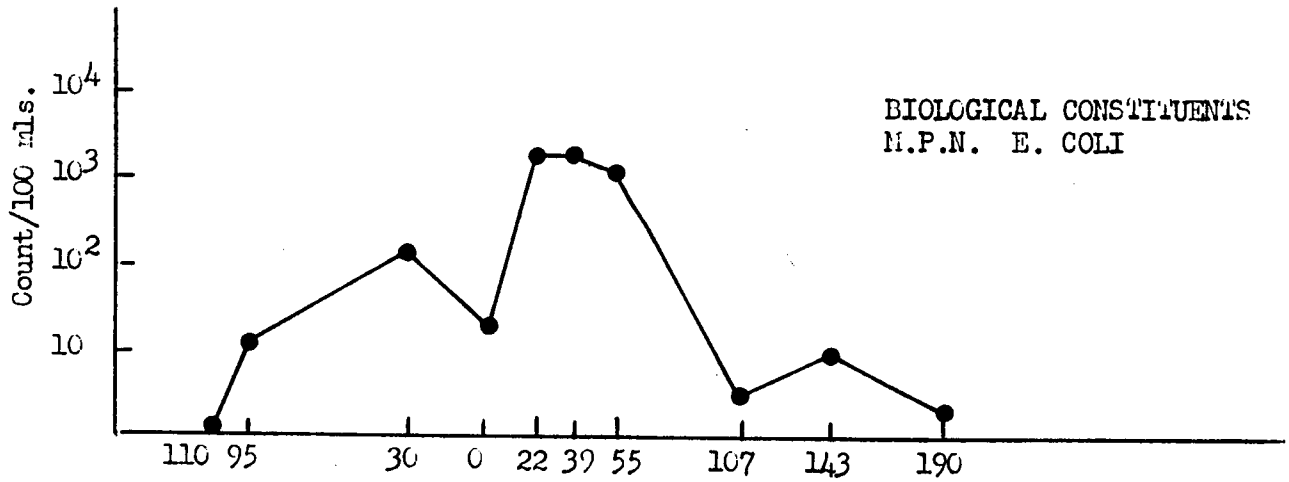
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
February 23-24, 1971

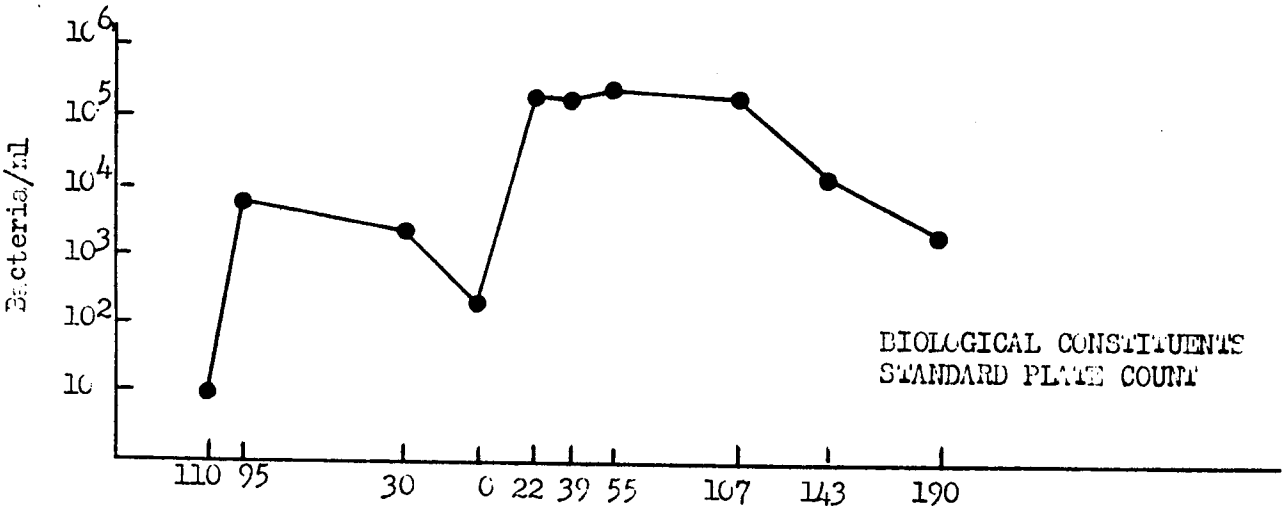


NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
February 23-24, 1971

1780 c.f.s. River Discharge



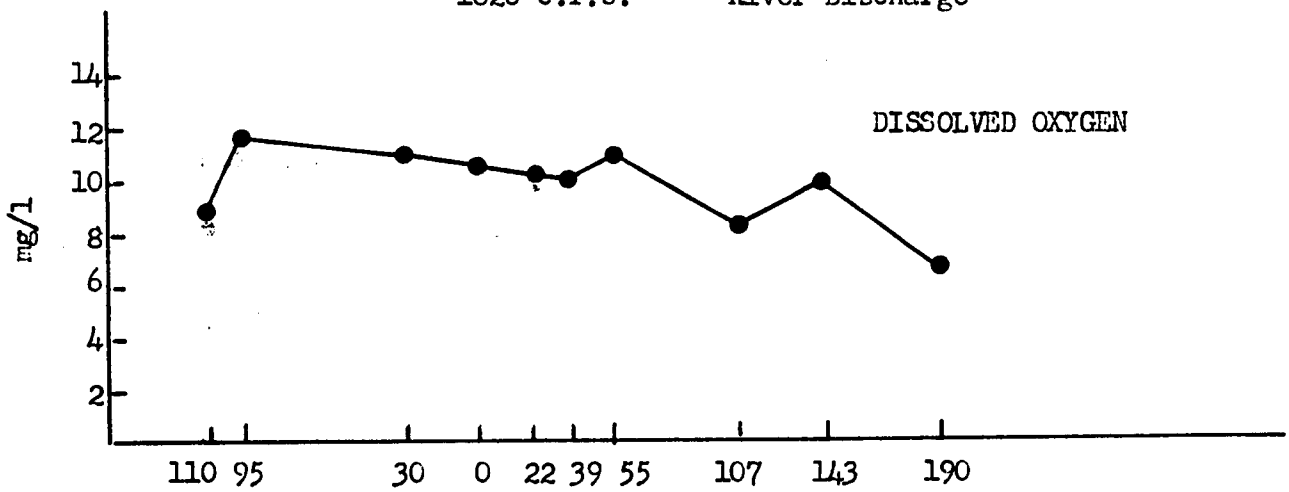


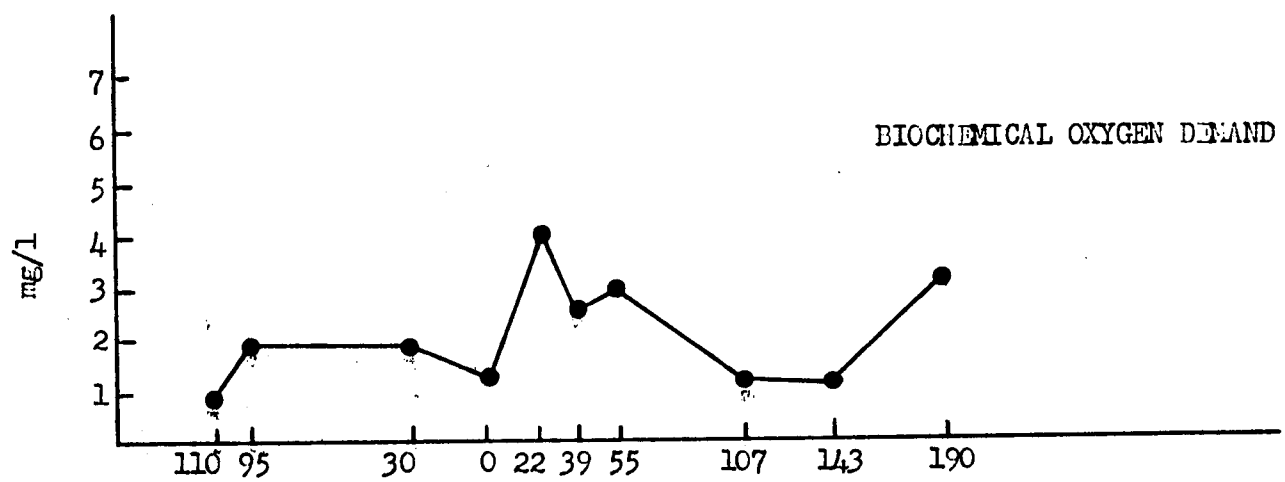


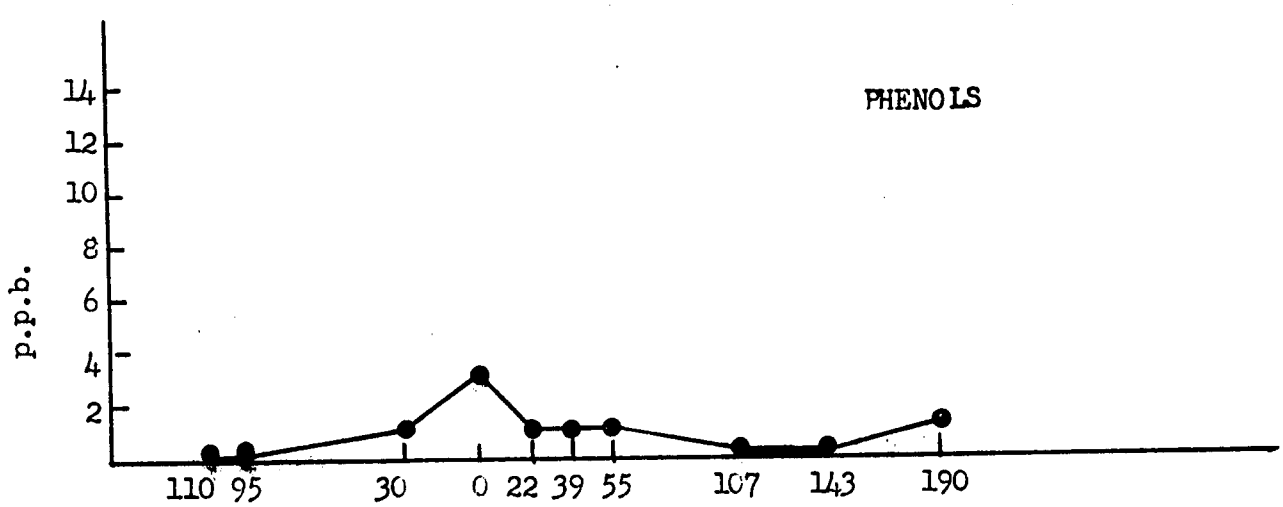
RIVER MILES FROM EDMONTON

NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
March 9-10, 1971

1620 c.f.s. River Discharge

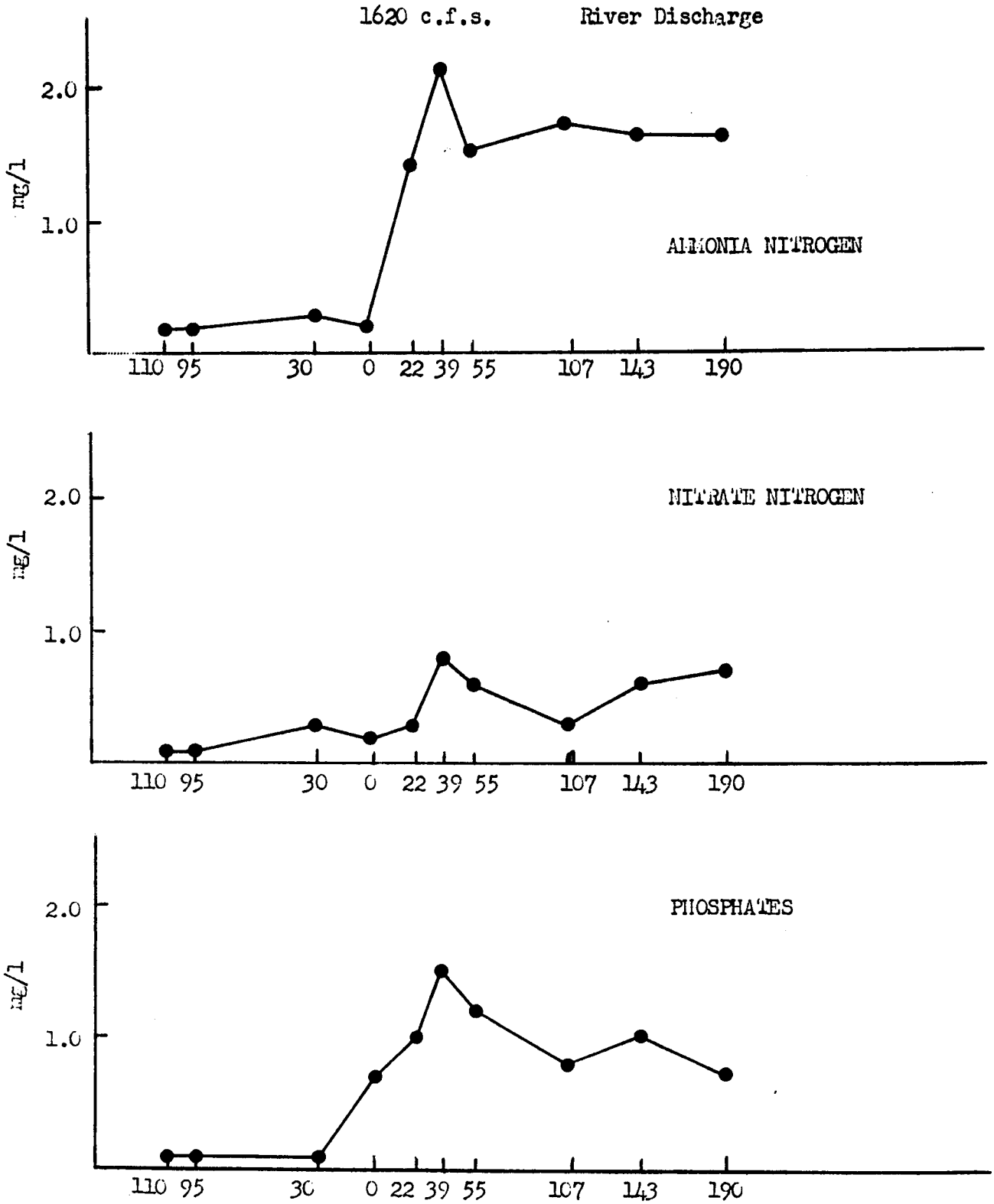






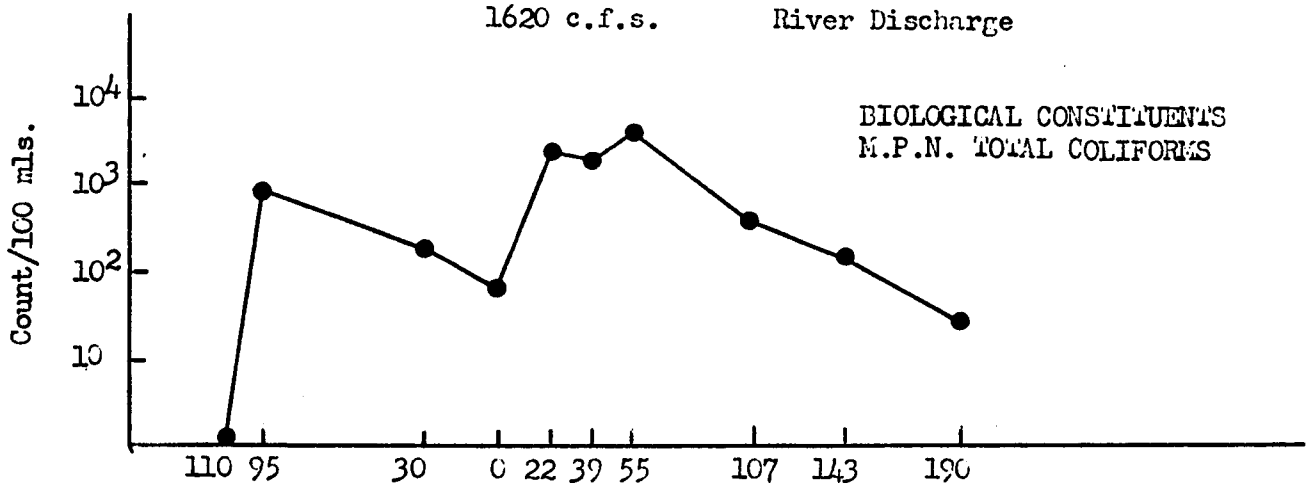
RIVER MILES FROM EDMONTON

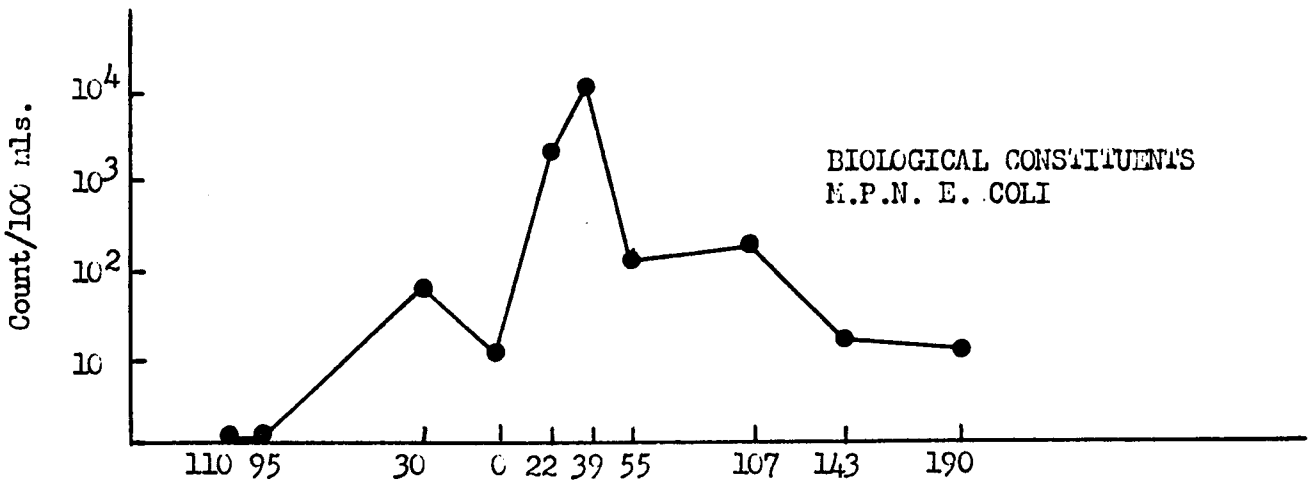
NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
March 9-10, 1971

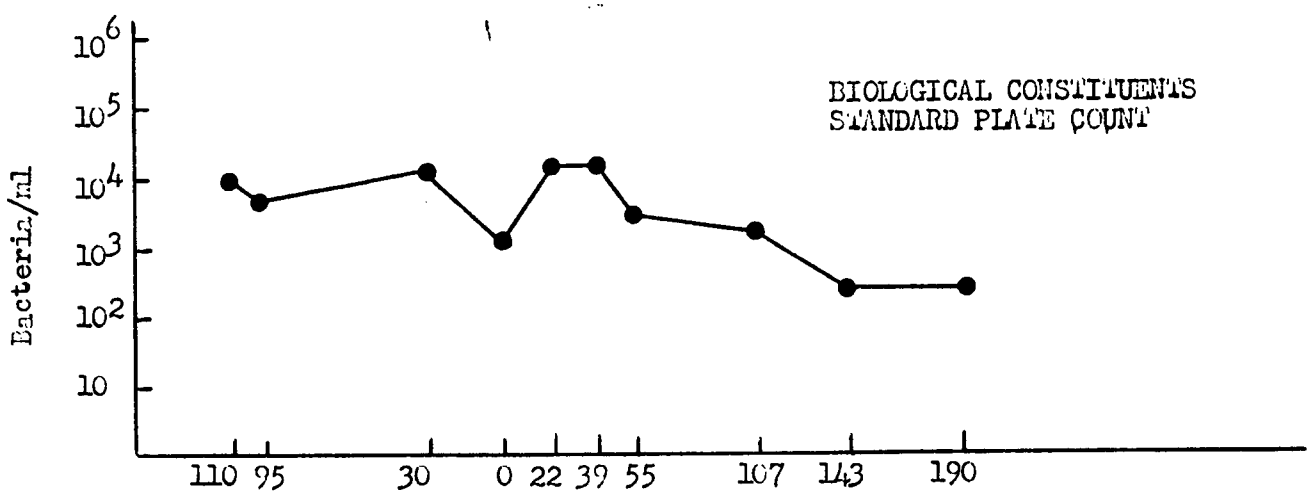


NORTH SASKATCHEWAN RIVER SAMPLING RESULTS
March 9-10, 1971

1620 c.f.s. River Discharge







RIVER MILES FROM EDMONTON

APPENDIX B

INDEX TO APPENDIX 'B'

START
DEPT. OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
STATISTICAL FLOW ANALYSIS FOR THE N. SASK RIVER APR. 70 TO MAR. 71

THERE ARE 365 PIECES OF DATA

THE MINIMUM FLOW IS 1270 CUBIC FEET PER SECOND

1% OF THE TIME THE FLOW IS LESS THAN 1450 CUBIC FEET PER SECOND

5% OF THE TIME THE FLOW IS LESS THAN 1570 CUBIC FEET PER SECOND

10% OF THE TIME THE FLOW IS LESS THAN 1730 CUBIC FEET PER SECOND

20% OF THE TIME THE FLOW IS LESS THAN 1880 CUBIC FEET PER SECOND

30% OF THE TIME THE FLOW IS LESS THAN 2050 CUBIC FEET PER SECOND

40% OF THE TIME THE FLOW IS LESS THAN 2600 CUBIC FEET PER SECOND

50% OF THE TIME THE FLOW IS LESS THAN 3140 CUBIC FEET PER SECOND

60% OF THE TIME THE FLOW IS LESS THAN 4590 CUBIC FEET PER SECOND

70% OF THE TIME THE FLOW IS LESS THAN 7360 CUBIC FEET PER SECOND

80% OF THE TIME THE FLOW IS LESS THAN 8910 CUBIC FEET PER SECOND

90% OF THE TIME THE FLOW IS LESS THAN 15200 CUBIC FEET PER SECOND

THE MAXIMUM FLOW IS 53700 CUBIC FEET PER SECOND

START
DEPT. OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
STATISTICAL FLOW ANALYSIS FOR THE N. SASK RIVER 1962-MAR.71

THERE ARE 3104 PIECES OF DATA

THE MINIMUM FLOW IS 1070 CUBIC FEET PER SECOND

1%	OF THE TIME THE FLOW IS LESS THAN	1480	CUBIC FEET PER SECOND
5%	OF THE TIME THE FLOW IS LESS THAN	1890	CUBIC FEET PER SECOND
10%	OF THE TIME THE FLOW IS LESS THAN	2170	CUBIC FEET PER SECOND
20%	OF THE TIME THE FLOW IS LESS THAN	2460	CUBIC FEET PER SECOND
30%	OF THE TIME THE FLOW IS LESS THAN	2790	CUBIC FEET PER SECOND
40%	OF THE TIME THE FLOW IS LESS THAN	3340	CUBIC FEET PER SECOND
50%	OF THE TIME THE FLOW IS LESS THAN	4160	CUBIC FEET PER SECOND
60%	OF THE TIME THE FLOW IS LESS THAN	6150	CUBIC FEET PER SECOND
70%	OF THE TIME THE FLOW IS LESS THAN	8600	CUBIC FEET PER SECOND
80%	OF THE TIME THE FLOW IS LESS THAN	12200	CUBIC FEET PER SECOND
90%	OF THE TIME THE FLOW IS LESS THAN	17800	CUBIC FEET PER SECOND

THE MAXIMUM FLOW IS 91600 CUBIC FEET PER SECOND

DAY	22	4	22	3	17	1	15
MONTH	APR	MAY	SEP	NOV	NOV	DEC	DEC
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1130	1200	1000	1115	1130	1100	1030
TEMPERATURE, DEG.CENT.	5.0	*0.0	10.0	2.5	2.0	0.0	1.0
BAROMETRIC PRES. IN.HG	26.90	*0.00	26.90	27.50	27.10	*0.00	*0.00
DISSOLVED OXYGEN, MG/L	11.5	*0.0	11.2	13.7	10.2	10.1	11.2
PERCENT SATURATION	100.	*00.	110.	109.	82.	*00.	*00.
BIOCHEM. OX. DEMAND MG/L	0.4	1.0	1.1	0.9	0.9	0.4	0.3
HYDROGEN ION CONC.,PH	8.2	8.2	8.2	8.3	7.5	7.8	8.0
ALKALINITY MG/L	155	153	120	*000	*000	*000	*000
THRESHOLD ODOR NO.,TYPE	2 M	4 M	32 M	4 M	4 M	4 M	2 M
TOTAL RESIDUE MG/L	240	270	188	220	226	244	256
IGNITION LOSS MG/L	88	138	110	92	50	86	*00
TURBIDITY AS SIO2 MG/L	6	4	3	1	1	4	1
TOTAL HARDNESS MG/L	168	132	116	160	154	130	160
CHLORIDES MG/L	1	1	2	1	3	1	1
AMMONIA NITROGEN MG/L	0.1	0.1	0.5	0.1	0.0	0.2	0.2
NITRATE NITROGEN MG/L	0.3	0.1	0.1	0.0	0.1	0.0	0.1
SULFATES AS SO4 MG/L	0	*00	*00	52	53	54	70
TOTAL PHOS.AS PO4 MG/L	0.2	0.1	0.2	0.0	0.0	0.2	0.3
PHENOLS PPB	1	1	2	5	7	6	2
OILS & GREASES MG/L	0.5	1.3	1.6	0.9	3.6	2.3	1.3
FLUORIDES MG/L	0.10	0.15	0.16	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	0	0	4	0	0	350	0
MPN OF E COLI/100ML	0	0	0	0	0	14	0
STD. PLATE COUNT/ML	200	400	42000	10	10	100	1000
RIVER DISCHARGE C.F.S.	800.	790.	115.	510.	895.	2000.	1030.

* DENOTES DATA NOT AVAILABLE

DAY	12	26	9	23	9
MONTH	JAN	JAN	FEB	FEB	MAR
YEAR	1971	1971	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1100	1045	1300	1100	1100
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.5
BAROMETRIC PRES. IN.HG	27.20	27.10	26.81	*0.00	27.55
DISSOLVED OXYGEN, MG/L	4.8	8.5	8.4	8.9	8.9
PERCENT SATURATION	36.	64.	64.	*00.	67.
BIOCHEM. OX. DEMAND MG/L	1.7	0.6	0.3	0.6	0.8
HYDROGEN ION CONC.,PH	7.9	8.0	8.1	7.5	8.3
ALKALINITY MG/L	149	149	126	141	153
THRESHOLD ODOR NO.,TYPE	4 M	1 M	4 M	4 M	2 M
TOTAL RESIDUE MG/L	224	234	256	304	230
IGNITION LOSS MG/L	*00	68	*00	38	110
TURBIDITY AS SIO2 MG/L	2	1	1	1	1
TOTAL HARDNESS MG/L	174	170	170	172	170
CHLORIDES MG/L	4	1	2	0	0
AMMONIA NITROGEN MG/L	0.2	0.3	0.1	0.1	0.2
NITRATE NITROGEN MG/L	0.3	0.5	0.2	0.3	0.1
SULFATES AS SO4 MG/L	42	45	42	40	60
TOTAL PHOS.AS PO4 MG/L	0.0	0.1	0.0	0.1	0.1
PHENOLS PPB	1	1	0	3	0
OILS & GREASES MG/L	2.0	0.7	*.0	0.4	0.9
COLIFORM M.P.N./100ML.	0	0	0	0	0
MPN OF E COLI/100ML	0	0	0	0	0
STD. PLATE COUNT/ML	1	1	1500	10	10000
RIVER DISCHARGE C.F.S.	1260.	1000.	805.	800.	990.

* DENOTES DATA NOT AVAILABLE

NS2 NORTH SASKATCHEWAN RIVER AT DRAYTON VALLEY 1970-71

DAY	22	11	22	3	17	1	15
MONTH	APR	JUN	SEP	NOV	NOV	DEC	DEC
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1300	1300	1200	1300	1245	1230	1200
TEMPERATURE, DEG.CENT.	3.0	*0.0	10.0	1.5	1.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.20	*0.00	27.00	27.80	27.40	*0.00	*0.00
DISSOLVED OXYGEN, MG/L	12.4	*0.0	10.2	13.4	13.3	12.7	12.9
PERCENT SATURATION	101.	*00.	100.	103.	102.	*00.	*00.
BIOCHEM. OX. DEMAND MG/L	0.5	0.4	1.4	0.1	0.6	0.7	0.4
HYDROGEN ION CONC.,PH	8.3	8.4	8.3	8.2	8.0	8.0	8.0
ALKALINITY MG/L	141	108	127	*000	*000	*000	*000
THRESHOLD ODOR NO.,TYPE	4 M	4 CH	4 M	1 M	1 M	2 M	4 M
TOTAL RESIDUE MG/L ,	240	278	220	298	240	248	312
IGNITION LOSS MG/L	86	146	64	120	55	112	*00
TURBIDITY AS SIO2 MG/L	26	58	2	3	6	4	3
TOTAL HARDNESS MG/L	164	128	144	200	184	202	200
CHLORIDES MG/L	2	1	0	1	3	1	1
AMMONIA NITROGEN MG/L	0.1	0.2	0.4	0.1	0.2	0.2	0.0
NITRATE NITROGEN MG/L	0.1	0.0	0.0	0.1	0.1	0.0	0.1
SULFATES AS SO4 MG/L	*00	*00	*00	62	69	69	79
TOTAL PHOS.AS PO4 MG/L	0.2	0.3	0.1	0.0	0.2	0.1	0.3
PHENOLS PPB	1	10	2	5	8	5	2
OILS & GREASES MG/L	0.4	0.3	1.0	0.7	1.6	1.7	1.0
FLUORIDES MG/L	0.09	0.15	0.18	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	13	*00000	4	4	79	0	49
MPN OF E COLI/100ML	2	*00000	2	0	13	0	4
STD. PLATE COUNT/ML	100	*00000	200	1000	100	0	2500

* DENOTES DATA NOT AVAILABLE

DAY	12	26	9	23	9
MONTH	JAN	JAN	FEB	FEB	MAR
YEAR	1971	1971	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1300	1215	1030	1300	1300
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.40	27.40	27.20	*0.00	27.49
DISSOLVED OXYGEN, MG/L	12.4	10.6	10.9	11.6	11.6
PERCENT SATURATION	93.	79.	82.	*00.	86.
BIOCHEM. OX. DEMAND MG/L	0.9	0.4	1.8	0.9	1.9
HYDROGEN ION CONC.,PH	8.1	8.3	8.3	7.8	8.1
ALKALINITY MG/L	148	190	141	158	172
THRESHOLD ODOR NO.,TYPE	1 M	1 M	1 M	1 M	1 M
TOTAL RESIDUE MG/L ,	227	304	320	384	272
IGNITION LOSS MG/L	*00	76	*00	54	138
TURBIDITY AS SIO2 MG/L	8	1	3	4	8
TOTAL HARDNESS MG/L	184	202	200	206	212
CHLORIDES MG/L	4	1	2	0	1
AMMONIA NITROGEN MG/L	0.1	0.3	0.1	0.1	0.2
NITRATE NITROGEN MG/L	0.3	0.4	0.2	0.3	0.1
SULFATES AS SO4 MG/L	57	71	73	74	62
TOTAL PHOS.AS PO4 MG/L	0.0	0.1	0.2	0.4	0.1
PHENOLS PPB	1	1	0	4	0
OILS & GREASES MG/L	1.3	1.0	*.0	2.7	0.9
COLIFORM M.P.N./100ML.	79	110	540	240	920
MPN OF E COLI/100ML	11	49	17	17	0
STD. PLATE COUNT/ML	30	30	8000	7500	7000

* DENOTES DATA NOT AVAILABLE

DAY	22	22	3	17	1	15	12
MONTH	APR	SEP	NOV	NOV	DEC	DEC	JAN
YEAR	1970	1970	1970	1970	1971	1970	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1430	1530	1430	1430	1530	1630	1500
TEMPERATURE, DEG.CENT.	4.0	12.0	1.5	1.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.50	27.10	28.20	27.80	*0.00	*0.00	27.50
DISSOLVED OXYGEN, MG/L	12.6	10.0	13.9	13.5	13.0	12.8	12.1
PERCENT SATURATION	105.	102.	105.	102.	*00.	*00.	90.
BIOCHEM. OX. DEMAND MG/L	2.3	0.9	0.1	0.9	1.1	3.4	0.5
HYDROGEN ION CONC.,PH	8.1	8.5	8.3	8.2	8.2	8.1	8.1
ALKALINITY MG/L	126	134	*000	*000	*000	*000	164
THRESHOLD ODOR NO.,TYPE	8 M	2 M	1 M	2 M	2 M	1 M	1 M
TOTAL RESIDUE MG/L ,	298	270	360	246	302	550	240
IGNITION LOSS MG/L	62	62	202	62	102	90	*00
TURBIDITY AS SIO2 MG/L	36	3	3	2	4	57	7
TOTAL HARDNESS MG/L	160	132	220	200	192	200	20[illegible]
CHLORIDES MG/L	4	0	1	2	1	1	1
AMMONIA NITROGEN MG/L	0.2	0.6	0.1	0.1	0.2	0.2	0.2
NITRATE NITROGEN MG/L	0.1	0.0	0.0	0.1	0.0	0.1	0.4
SULFATES AS SO4 MG/L	*00	*00	70	71	62	79	66
TOTAL PHOS.AS PO4 MG/L	0.5	0.0	0.1	0.0	0.2	0.6	0.0
PHENOLS PPB	5	0	4	3	9	5	1
OILS & GREASES MG/L	0.9	2.5	0.8	0.9	1.5	1.0	0.3
FLUORIDES MG/L	0.09	0.18	*.00	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	49	0	0	11	13	33	240
MPN OF E COLI/100ML	22	0	0	0	4	6	34
STD. PLATE COUNT/ML	650	130	80	100	30	1000	10

* DENOTES DATA NOT AVAILABLE

DAY MONTH YEAR	26 JAN 1971	9 FEB 1971	23 FEB 1971	9 MAR 1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G
INITIAL SAMPLING TIME	1400	1600	1545	1530
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.90	27.30	*0.00	27.45
DISSOLVED OXYGEN, MG/L	10.8	10.8	11.0	11.0
PERCENT SATURATION	79.	81.	*00.	82.
BIOCHEM. OX. DEMAND MG/L	0.5	1.5	0.9	1.9
HYDROGEN ION CONC.,PH	8.0	8.2	8.0	8.0
ALKALINITY MG/L	179	150	156	180
THRESHOLD ODOR NO.,TYPE	1 M	4 CH	2 M	2 M
TOTAL RESIDUE MG/L	296	328	304	302
IGNITION LOSS MG/L	72	*00	28	146
TURBIDITY AS SIO2 MG/L	6	4	4	2
TOTAL HARDNESS MG/L	214	206	206	220
CHLORIDES MG/L	1	0	0	2
AMMONIA NITROGEN MG/L	0.2	0.2	0.1	0.3
NITRATE NITROGEN MG/L	0.4	0.3	0.4	0.3
SULFATES AS SO4 MG/L	83	64	70	55
TOTAL PHOS.AS PO4 MG/L	0.2	0.7	0.0	0.1
PHENOLS PPB	3	0	10	1
OILS & GREASES MG/L	0.4	1.5	1.4	0.6
COLIFORM M.P.N./100ML.	79	1600	350	240
MPN OF E COLI/100ML	49	170	170	79
STD. PLATE COUNT/ML	100	55000	3000	12000

* DENOTES DATA NOT AVAILABLE

DAY	22	4	10	17	22	4	13
MONTH	APR	MAY	JUN	JUN	SEP	NOV	NOV
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	930	1430	1100	830	1430	1430	1700
TEMPERATURE, DEG.CENT.	*0.0	*0.0	*0.0	13.0	13.0	1.0	1.0
BAROMETRIC PRES. IN.HG	*0.00	*0.00	*0.00	27.80	27.30	27.90	27.40
DISSOLVED OXYGEN, MG/L	11.5	*0.0	*0.0	*0.0	10.1	13.0	13.1
PERCENT SATURATION	*00.	*00.	*00.	*00.	104.	98.	101.
BIOCHEM. OX. DEMAND MG/L	1.7	1.9	1.1	0.9	1.2	0.1	0.7
HYDROGEN ION CONC.,PH	8.1	8.5	8.3	9.4	8.6	8.5	8.1
ALKALINITY MG/L	121	157	122	224	135	170	163
THRESHOLD ODOR NO.,TYPE	100 M	8 M	4 M	32 M	2 M	2 M	2 M
TOTAL RESIDUE MG/L ,	402	292	400	1359	222	282	246
IGNITION LOSS MG/L	92	126	174	206	62	56	129
TURBIDITY AS SIO2 MG/L	46	17	84	1900	4	3	3
TOTAL HARDNESS MG/L	124	184	220	164	138	200	202
CHLORIDES MG/L	4	2	3	3	0	4	3
AMMONIA NITROGEN MG/L	0.3	0.2	0.0	0.3	0.3	0.3	0.6
NITRATE NITROGEN MG/L	0.5	0.1	0.3	1.2	0.2	0.0	0.2
SULFATES AS SO4 MG/L	60	78	46	44	55	80	96
TOTAL PHOS.AS PO4 MG/L	0.7	0.2	0.4	2.9	0.1	0.2	0.1
PHENOLS PPB	5	2	1	12	1	3	15
OILS & GREASES MG/L	0.3	2.1	0.4	9.6	3.4	0.9	1.5
FLUORIDES MG/L	0.10	0.15	0.18	0.16	0.18	0.21	0.01
COLIFORM M.P.N./100ML.	79	*00000	220	36	33	180	41
MPN OF E COLI/100ML	17	*00000	26	7	17	26	6
STD. PLATE COUNT/ML	11000	*00000	1100	2800	50	600	400
RIVER DISCHARGE C.F.S.	5090.	3180.	15800.	33400.	2670.	1860.	1870.

* DENOTES DATA NOT AVAILABLE

DAY	2	17	13	27	10	24	1
MONTH	DEC	DEC	JAN	JAN	FEB	FEB	MAR
YEAR	1970	1970	1971	1971	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	C	G	G	G	G	G
INITIAL SAMPLING TIME	1345	930	1500	1800	1500	1100	163
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.0	0.0	0.
BAROMETRIC PRES. IN.HG	27.70	27.70	27.80	27.80	*0.00	27.00	*0.0
DISSOLVED OXYGEN, MG/L	13.1	14.1	15.5	10.2	10.2	10.9	10.
PERCENT SATURATION	97.	104.	114.	75.	*00.	83.	*00.
BIOCHEM. OX. DEMAND MG/L	0.9	0.3	0.4	0.5	0.6	1.0	1.
HYDROGEN ION CONC.,PH	8.1	8.2	7.9	7.8	8.1	8.2	7.
ALKALINITY MG/L	175	174	158	173	112	165	181
THRESHOLD ODOR NO.,TYPE	2 M	8 M	8 M	1 M	1 M	1 M	1
TOTAL RESIDUE MG/L ,	280	312	232	288	300	280	354
IGNITION LOSS MG/L	118	32	38	56	74	34	13
TURBIDITY AS SIO2 MG/L	2	6	4	2	4	4	
TOTAL HARDNESS MG/L	206	210	204	203	206	206	21.
CHLORIDES MG/L	1	1	1	1	0	2	
AMMONIA NITROGEN MG/L	0.1	0.0	0.2	0.1	0.1	0.2	0.2
NITRATE NITROGEN MG/L	0.0	0.0	0.4	0.4	0.3	0.4	0.
SULFATES AS SO4 MG/L	66	73	57	73	78	70	66
TOTAL PHOS.AS PO4 MG/L	0.1	0.1	0.1	0.0	0.6	0.0	0.
PHENOLS PPB	7	2	1	1	2	2	
OILS & GREASES MG/L	1.3	1.5	0.7	1.1	0.7	2.0	1.
FLUORIDES MG/L	0.27	0.30	0.30	0.16	*.00	0.44	0.54
COLIFORM M.P.N./100ML.	10	2400+	140	49	540	240	7
MPN OF E COLI/100ML	0	1	11	49	170	27	1
STD. PLATE COUNT/ML	120	52000	2000	100	10000	250	120
RIVER DISCHARGE C.F.S.	2070.	2360.	1850.	1890.	1740.	1470.	*0000.
CHEMICAL OXYGEN DEMAND MG/L			4	6	27	3	5

* DENOTES DATA NOT AVAILABLE

NS5 NORTH SASKATCHEWAN RIVER AT FORT SASKATCHEWAN BRIDGE 1970-71

DAY	22	22	4	18	2	17	13
MONTH	APR	SEP	NOV	NOV	DEC	DEC	JAN
YEAR	1970	1970	1970	1970	1970	1970	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1230	1300	1330	1615	1300	1600	1300
TEMPERATURE, DEG.CENT.	*0.0	13.0	1.0	1.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	27.38	28.00	27.50	27.75	27.90	27.80
DISSOLVED OXYGEN, MG/L	11.9	10.7	14.3	13.0	11.5	11.1	14.7
PERCENT SATURATION	*00.	110.	108.	100.	85.	82.	108.
BIOCHEM. OX. DEMAND MG/L	5.9	3.1	1.6	2.5	1.7	1.3	3.5
HYDROGEN ION CONC.,PH	7.8	8.6	8.0	8.1	7.8	8.1	7.9
ALKALINITY MG/L	121	136	*000	*000	*000	*000	168
THRESHOLD ODOR NO.,TYPE	50 M	16 M	4 M	4 M	16 M	4 M	4 C
TOTAL RESIDUE MG/L ,	286	378	302	242	274	328	247
IGNITION LOSS MG/L	98	166	160	134	92	*00	*00
TURBIDITY AS SIO2 MG/L	34	6	4	3	1	3	10
CHLORIDES MG/L	4	4	7	8	2	3	1
AMMONIA NITROGEN MG/L	1.0	0.7	1.1	1.2	0.9	0.7	0.9
NITRATE NITROGEN MG/L	0.2	0.0	0.1	0.1	0.0	0.6	0.4
SULFATES AS SO4 MG/L	56	48	*00	*00	*00	*00	*00
TOTAL PHOS.AS PO4 MG/L	0.7	0.8	0.6	0.8	0.7	0.7	0.7
PHENOLS PPB	2	5	3	14	4	9	2
OILS & GREASES MG/L	0.6	1.9	0.9	2.5	4.6	1.2	1.0
FLUORIDES MG/L	0.13	0.20	*.00	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	18000	1800	350	23	250	31	140
MPN OF E COLI/100ML	90	38	6	6	16	1	0
STD. PLATE COUNT/ML	4800	150000	4300	200000	12000	5000	200000
DETERGENTS MG/L	0.00	0.30	0.30	*0.00	0.20	*0.00	0.50
CHEMICAL OXYGEN DEMAND MG/L							7.

* DENOTES DATA NOT AVAILABLE

NS5 NORTH SASKATCHEWAN RIVER AT FORT SASKATCHEWAN BRIDGE 1970-71

DAY MONTH YEAR	27 JAN 1971	10 FEB 1971	24 FEB 1971	10 MAR 1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G
INITIAL SAMPLING TIME	1600	1400	1430	1500
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.90	*0.00	27.00	*0.00
DISSOLVED OXYGEN, MG/L	10.2	9.5	10.0	10.1
PERCENT SATURATION	75.	*00.	76.	*00.
BIOCHEM. OX. DEMAND MG/L	3.6	5.2	2.5	4.0
HYDROGEN ION CONC.,PH	7.9	8.0	8.1	7.7
ALKALINITY MG/L	176	280	165	181
THRESHOLD ODOR NO.,TYPE	4 C	4 C	4 C	1 C
TOTAL RESIDUE MG/L	324	344	280	336
IGNITION LOSS MG/L	62	*00	78	94
TURBIDITY AS SIO2 MG/L	10	12	8	7
CHLORIDES MG/L	5	6	7	5
AMMONIA NITROGEN MG/L	1.1	1.4	1.2	1.4
NITRATE NITROGEN MG/L	0.3	0.4	0.4	0.3
SULFATES AS SO4 MG/L	*00	*00	*00	70
TOTAL PHOS.AS PO4 MG/L	0.7	1.5	0.8	1.0
PHENOLS PPB	3	5	2	1
OILS & GREASES MG/L	0.8	0.8	1.7	0.3
COLIFORM M.P.N./100ML.	180000	160000	8100	3400
MPN OF E COLI/100ML	2600	2100	2200	2700
STD. PLATE COUNT/ML	1,100,000	100000	250000	18000
DETERGENTS MG/L	*0.00	*0.00	*0.00	0.20
CHEMICAL OXYGEN DEMAND MG/L	14.	40.	10.	7.

* DENOTES DATA NOT AVAILABLE

NS6 NORTH SASKATCHEWAN RIVER AT VINCA BRIDGE 1970-71

DAY	17	23	15	22	22	4	18
MONTH	JUN	JUN	JUL	APR	SEP	NOV	NOV
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1230	1100	*000	1100	1030	1230	1530
TEMPERATURE, DEG.CENT.	14.0	*0.0	*0.0	*0.0	11.0	1.0	1.0
BAROMETRIC PRES. IN.HG	28.00	*0.00	*0.00	*0.00	27.45	28.10	27.50
DISSOLVED OXYGEN, MG/L	*0.0	*0.0	*0.0	10.3	9.4	13.1	13.0
PERCENT SATURATION	*00.	*00.	*00.	*00.	92.	98.	100.
BIOCHEM. OX. DEMAND MG/L	4.7	4.0	1.0	3.5	4.0	1.6	2.7
HYDROGEN ION CONC.,PH	9.2	8.3	8.6	7.8	8.4	8.1	8.1
ALKALINITY MG/L	221	132	130	105	137	*000	*000
THRESHOLD ODOR NO.,TYPE	16 M	8 C	32 C	50 M	8 M	8 M	8 M
TOTAL RESIDUE MG/L ,	1242	448	332	300	288	314	318
IGNITION LOSS MG/L	320	126	120	90	118	98	100
TURBIDITY AS SIO2 MG/L	2400	525	600	44	6	4	3
CHLORIDES MG/L	9	9	9	6	3	8	12
AMMONIA NITROGEN MG/L	0.7	0.6	0.2	1.4	1.2	2.1	1.7
NITRATE NITROGEN MG/L	0.6	0.2	0.2	0.7	0.3	1.1	0.2
SULFATES AS SO4 MG/L	38	34	34	64	54	*00	*00
TOTAL PHOS.AS PO4 MG/L	0.1	0.3	0.2	1.2	0.6	0.6	0.9
PHENOLS PPB	16	1	2	6	4	3	12
OILS & GREASES MG/L	*.0	6.0	2.7	*.0	*.0	*.0	*.0
FLUORIDES MG/L	*.00	*.00	*.00	*.00	*.00	*.00	0.02
COLIFORM M.P.N./100ML.	45	*00000	35000	1800+	920	1800+	19
MPN OF E COLI/100ML	1	*00000	930	15	9	12	3
STD. PLATE COUNT/ML	32000	*00000	600000	3800	220000	2600	95000

* DENOTES DATA NOT AVAILABLE

NS6 NORTH SASKATCHEWAN RIVER AT VINCA BRIDGE 1970-71

DAY	2	17	13	27	10	24	1
MONTH	DEC	DEC	JAN	JAN	FEB	FEB	MA
YEAR	1970	1970	1971	1971	1971	1971	197
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1200	1400	1230	1400	1230	1300	1300
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.0	0.0	0.
BAROMETRIC PRES. IN.HG	27.75	27.92	27.80	28.01	*0.00	27.10	*0.0
DISSOLVED OXYGEN, MG/L	10.0	12.2	13.6	9.9	8.7	9.6	10.
PERCENT SATURATION	74.	90.	100.	72.	*00.	73.	*00
BIOCHEM. OX. DEMAND MG/L	2.0	0.9	1.2	3.0	2.6	3.2	2.
HYDROGEN ION CONC.,PH	7.8	8.0	7.1	7.4	7.8	8.1	7.
ALKALINITY MG/L	*000	*000	166	176	211	168	18
THRESHOLD ODOR NO.,TYPE	8 M	4 M	2 M	4 C	4 CH	2 C	1
TOTAL RESIDUE MG/L	294	294	254	336	386	372	378
IGNITION LOSS MG/L	126	34	80	68	142	154	8
TURBIDITY AS SIO2 MG/L	1	*00	7	2	9	7	
CHLORIDES MG/L	4	2	1	6	0	8	2
AMMONIA NITROGEN MG/L	1.4	1.7	1.5	2.3	1.9	2.1	2.
NITRATE NITROGEN MG/L	0.1	0.2	0.7	1.1	0.5	0.5	0.
SULFATES AS SO4 MG/L	*00	*00	*00	*00	*00	*00	7
TOTAL PHOS.AS PO4 MG/L	0.9	0.9	0.9	15.0	1.0	0.7	1.
PHENOLS PPB	6	8	3	1	5	4	
OILS & GREASES MG/L	*.0	*.0	1.0	0.8	0.6	1.5	0.3
FLUORIDES MG/L	0.28	0.30	0.30	0.19	0.28	0.42	0.4
COLIFORM M.P.N./100ML.	22	2400	400	9200	9200	180000	1400
MPN OF E COLI/100ML	17	12	36	2400	170	2800	210
STD. PLATE COUNT/ML	10000	33000	62000	65000	18000	200000	2000

* DENOTES DATA NOT AVAILABLE

NS7 NORTH SASKATCHEWAN RIVER AT WASKATENAU BRIDGE 1970-71

DAY	22	22	4	18	2	17	13
MONTH	APR	SEP	NOV	NOV	DEC	DEC	JAN
YEAR	1970	1970	1970	1970	1970	1970	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	930	1000	1130	1200	1100	1230	1100
TEMPERATURE, DEG.CENT.	*0.0	11.0	0.5	1.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	27.50	28.10	27.40	27.80	27.90	27.80
DISSOLVED OXYGEN, MG/L	10.3	9.7	12.5	12.7	9.5	9.3	12.7
PERCENT SATURATION	*00.	95.	92.	98.	70.	68.	94.
BIOCHEM. OX. DEMAND MG/L	2.7	2.5	2.4	2.0	3.3	1.1	1.0
HYDROGEN ION CONC.,PH	7.8	8.7	8.0	8.2	7.8	8.0	8.1
ALKALINITY MG/L	97	136	*000	*000	*000	*000	175
THRESHOLD ODOR NO.,TYPE	100 M	8 M	16 M	4 M	16 M	32 C	1 C
TOTAL RESIDUE MG/L	298	254	412	338	280	344	273
IGNITION LOSS MG/L	106	124	108	130	80	*00	*00
TURBIDITY AS SIO2 MG/L	18	4	39	3	1	1	7
CHLORIDES MG/L	5	6	12	8	5	5	4
AMMONIA NITROGEN MG/L	1.4	0.6	1.6	1.1	1.6	1.3	0.9
NITRATE NITROGEN MG/L	0.4	0.1	0.6	0.2	0.0	0.1	0.9
SULFATES AS SO4 MG/L	66	53	*00	*00	*00	*00	*00
TOTAL PHOS.AS PO4 MG/L	1.0	1.0	0.6	0.8	1.3	0.9	0.6
PHENOLS PPB	9	4	5	13	11	6	1
OILS & GREASES MG/L	*.0	*.0	*.0	*.0	*.0	*.0	1.0
COLIFORM M.P.N./100ML.	81	350	170	11	28	2400+	35
MPN OF E COLI/100ML	13	0	6	0	17	14	1
STD. PLATE COUNT/ML	2000	16000	25000	1500	6800	23000	23000

* DENOTES DATA NOT AVAILABLE

DAY	27	10	24	10
MONTH	JAN	FEB	FEB	MAR
YEAR	1971	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G
INITIAL SAMPLING TIME	1100	1145	1200	1200
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	28.03	*0.00	27.20	*0.00
DISSOLVED OXYGEN, MG/L	11.5	8.8	9.9	10.8
PERCENT SATURATION	84.	*00.	75.	*00.
BIOCHEM. OX. DEMAND MG/L	2.1	4.9	2.6	2.9
HYDROGEN ION CONC.,PH	7.8	7.8	8.1	7.6
ALKALINITY MG/L	176	196	168	192
THRESHOLD ODOR NO.,TYPE	2 M	2 C	1 C	1 M
TOTAL RESIDUE MG/L	356	352	312	338
IGNITION LOSS MG/L	62	*00	110	134
TURBIDITY AS SIO2 MG/L	2	3	3	2
CHLORIDES MG/L	19	9	9	20
AMMONIA NITROGEN MG/L	1.5	1.2	1.4	1.5
NITRATE NITROGEN MG/L	0.7	0.6	0.7	0.6
SULFATES AS SO4 MG/L	*00	*00	*00	85
TOTAL PHOS.AS PO4 MG/L	0.8	0.9	0.7	1.2
PHENOLS PPB	5	13	10	1
OILS & GREASES MG/L	*.0	0.7	0.4	0.3
COLIFORM M.P.N./100ML.	54	18000	8100	5400
MPN OF E COLI/100ML	3	320	1500	150
STD. PLATE COUNT/ML	12000	100	300000	4000

* DENOTES DATA NOT AVAILABLE

DAY	23	4	19	2	16	13	26
MONTH	APR	NOV	NOV	DEC	DEC	JAN	JAN
YEAR	1970	1970	1970	1970	1970	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	830	930	1030	1015	1000	1000	930
TEMPERATURE, DEG.CENT.	*0.0	1.0	1.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	*0.00	27.70	27.91	27.80	27.45	28.50
DISSOLVED OXYGEN, MG/L	10.4	11.5	*0.0	9.2	8.5	10.3	8.5
PERCENT SATURATION	*00.	*00.	*00.	68.	63.	77.	61.
BIOCHEM. OX. DEMAND MG/L	3.8	1.0	2.1	1.0	1.4	1.6	2.8
HYDROGEN ION CONC.,PH	8.0	8.0	8.2	7.8	8.2	8.1	7.9
ALKALINITY MG/L	116	*000	*000	*000	*000	186	170
THRESHOLD ODOR NO.,TYPE	100 M	8 M	8 M	4 M	16 C	2 M	8 C
TOTAL RESIDUE MG/L	322	420	348	354	400	293	454
IGNITION LOSS MG/L	114	146	112	96	*00	*00	116
TURBIDITY AS SIO2 MG/L	30	3	5	1	1	4	1
CHLORIDES MG/L	10	9	33	19	27	2	17
AMMONIA NITROGEN MG/L	1.2	0.6	2.2	2.2	1.1	0.8	1.4
NITRATE NITROGEN MG/L	0.3	0.4	0.3	0.1	0.1	0.3	0.6
SULFATES AS SO4 MG/L	60	*00	*00	*00	*00	*00	*00
TOTAL PHOS.AS PO4 MG/L	0.8	0.3	0.8	1.3	0.6	0.5	1.5
PHENOLS PPB	12	5	12	10	6	6	3
OILS & GREASES MG/L	1.8	0.5	2.5	1.2	2.5	0.3	0.8
FLUORIDES MG/L	0.14	*.00	*.00	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	33	46	0	28	1800+	24	1800+
MPN OF E COLI/100ML	7	0	0	0	7	3	4
STD. PLATE COUNT/ML	4200	450000	1300	520000	120000	230000	85000

* DENOTES DATA NOT AVAILABLE

DAY	10	24	10
MONTH	FEB	FEB	MAR
YEAR	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G
INITIAL SAMPLING TIME	930	1030	1030
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	27.70	27.30	27.80
DISSOLVED OXYGEN, MG/L	7.8	7.5	8.1
PERCENT SATURATION	58.	56.	60.
BIOCHEM. OX. DEMAND MG/L	2.3	1.9	1.2
HYDROGEN ION CONC.,PH	7.8	8.0	8.2
ALKALINITY MG/L	191	180	197
THRESHOLD ODOR NO.,TYPE	2 M	2 C	1 C
TOTAL RESIDUE MG/L	404	316	314
IGNITION LOSS MG/L	*00	76	122
TURBIDITY AS SIO2 MG/L	3	2	2
CHLORIDES MG/L	22	19	16
AMMONIA NITROGEN MG/L	1.5	1.6	1.7
NITRATE NITROGEN MG/L	0.4	0.6	0.3
SULFATES AS SO4 MG/L	*00	*00	75
TOTAL PHOS.AS PO4 MG/L	1.1	0.8	0.8
PHENOLS PPB	7	8	0
OILS & GREASES MG/L	*.0	2.4	1.0
COLIFORM M.P.N./100ML.	17	81	540
MPN OF E COLI/100ML	0	5	220
STD. PLATE COUNT/ML	1100000	1900000	2100

* DENOTES DATA NOT AVAILABLE

DAY	23	15	23	4	19	2	16
MONTH	APR	JUL	SEP	NOV	NOV	DEC	DEC
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1100	1400	1200	1030	1400	1200	1145
TEMPERATURE, DEG.CENT.	*0.0	*0.0	9.0	1.0	1.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	*0.00	27.71	*0.00	27.76	28.00	28.00
DISSOLVED OXYGEN, MG/L	12.1	*0.0	11.9	13.1	*0.0	8.3	9.5
PERCENT SATURATION	*00.	*00.	111.	*00.	*00.	61.	70.
BIOCHEM. OX. DEMAND MG/L	4.0	1.2	4.3	3.9	2.2	1.1	1.7
HYDROGEN ION CONC.,PH	7.8	8.5	8.7	7.7	8.3	8.1	8.2
ALKALINITY MG/L	110	161	130	*000	*000	*000	*000
THRESHOLD ODOR NO.,TYPE	100 M	4 C	16 M	8 M	8 M	4 M	8 C
TOTAL RESIDUE MG/L	304	392	290	296	380	348	336
IGNITION LOSS MG/L	100	112	92	86	108	124	*00
TURBIDITY AS SIO2 MG/L	38	650	17	3	3	1	3
CHLORIDES MG/L	10	5	8	15	17	17	5
AMMONIA NITROGEN MG/L	1.2	0.4	0.0	1.0	1.4	2.4	0.7
NITRATE NITROGEN MG/L	0.5	0.3	0.1	0.6	0.4	0.1	0.1
SULFATES AS SO4 MG/L	60	38	52	*00	*00	*00	*00
TOTAL PHOS.AS PO4 MG/L	0.7	0.4	0.4	0.5	0.6	1.0	0.5
PHENOLS PPB	11	2	3	4	4	12	2
OILS & GREASES MG/L	0.8	1.6	7.7	0.8	2.4	3.4	1.3
FLUORIDES MG/L	0.15	0.21	0.14	*.00	*.00	*.00	*.00
COLIFORM M.P.N./100ML.	240	*00000	7	4	13	9	1800+
MPN OF E COLI/100ML	27	*00000	2	2	7	2	1
STD. PLATE COUNT/ML	11000	*00000	5000	620000	300	45000	63000

* DENOTES DATA NOT AVAILABLE

DAY	13	26	10	24	10
MONTH	JAN	JAN	FEB	FEB	MAR
YEAR	1971	1971	1971	1971	1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1300	1100	1200	1200	1230
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	28.10	28.60	27.70	27.50	28.00
DISSOLVED OXYGEN, MG/L	9.8	*0.0	5.7	6.4	9.7
PERCENT SATURATION	71.	*00.	42.	48.	71.
BIOCHEM. OX. DEMAND MG/L	1.8	1.0	2.7	1.8	1.1
HYDROGEN ION CONC.,PH	8.1	7.9	8.0	8.0	8.0
ALKALINITY MG/L	187	184	176	173	194
THRESHOLD ODOR NO.,TYPE	2 C	2 C	2 M	1 M	1 C
TOTAL RESIDUE MG/L ,	309	366	408	370	360
IGNITION LOSS MG/L	*00	84	*00	100	138
TURBIDITY AS SIO2 MG/L	9	7	3	2	2
CHLORIDES MG/L	23	20	2	25	0
AMMONIA NITROGEN MG/L	1.5	1.3	1.6	1.6	1.6
NITRATE NITROGEN MG/L	0.7	0.6	0.6	0.6	0.6
SULFATES AS SO4 MG/L	*00	*00	*00	*00	72
TOTAL PHOS.AS PO4 MG/L	0.8	0.6	0.6	0.8	1.0
PHENOLS PPB	4	1	2	7	0
OILS & GREASES MG/L	0.3	1.5	*.0	2.0	1.2
COLIFORM M.P.N./100ML.	24	22	79	72	130
MPN OF E COLI/100ML	15	2	14	10	22
STD. PLATE COUNT/ML	12000	2700	1000	20000	400

* DENOTES DATA NOT AVAILABLE

DAY	23	5	17	23	4	19	2
MONTH	APR	MAY	JUN	SEP	NOV	NOV	DEC
YEAR	1970	1970	1970	1970	1970	1970	1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G	G
INITIAL SAMPLING TIME	1300	1400	1400	*000	1430	*000	1430
TEMPERATURE, DEG.CENT.	0.0	0.0	15.0	9.0	1.0	1.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	*0.00	*0.00	27.80	*0.00	27.80	28.10
DISSOLVED OXYGEN, MG/L	10.5	*0.0	*0.0	10.2	*0.0	*0.0	9.0
PERCENT SATURATION	*00.	*00.	*00.	95.	*00.	*00.	66.
BIOCHEM. OX. DEMAND MG/L	5.3	2.8	4.2	3.0	3.9	0.7	0.4
HYDROGEN ION CONC.,PH	8.0	8.5	8.9	8.7	8.0	8.4	8.0
ALKALINITY MG/L	111	145	138	127	169	191	203
THRESHOLD ODOR NO.,TYPE	50 M	8 M	8 M	8 M	16 M	8 M	4 M
TOTAL RESIDUE MG/L ,	362	308	348	296	396	348	386
IGNITION LOSS MG/L	126	82	96	80	134	86	122
TURBIDITY AS SIO2 MG/L	47	18	52	9	4	3	3
TOTAL HARDNESS MG/L	122	158	170	126	210	230	238
CHLORIDES MG/L	12	1	3	22	28	33	15
AMMONIA NITROGEN MG/L	1.1	0.5	0.7	0.0	1.3	1.4	1.9
NITRATE NITROGEN MG/L	0.4	0.3	0.2	0.1	0.6	0.6	0.1
SULFATES AS SO4 MG/L	58	68	38	46	74	84	89
TOTAL PHOS.AS PO4 MG/L	0.8	0.6	0.4	0.3	0.9	0.7	1.0
PHENOLS PPB	6	2	12	0	4	4	11
OILS & GREASES MG/L	0.9	1.7	0.3	7.0	1.0	1.5	1.0
FLUORIDES MG/L	0.17	0.13	0.26	0.18	0.25	0.01	*.00
COLIFORM M.P.N./100ML.	27	6	72	7	4	7	0
MPN OF E COLI/100ML	12	0	0	4	0	0	0
STD. PLATE COUNT/ML	6000	7000	46000	3500	570000	400	370000
DETERGENTS MG/L	0.00	*0.00	0.20	0.40	0.20	*0.00	0.20
RIVER DISCHARGE C.F.S.	*0000.	4520.	9600.	3760.	*0000.	*0000.	*0000.

* DENOTES DATA NOT AVAILABLE

DAY / MONTH / YEAR	16 DEC 1970	13 JAN 1971	26 JAN 1971	10 FEB 1971	24 FEB 1971	10 MAR 1971
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G	G
INITIAL SAMPLING TIME	1345	1500	1430	1400	1345	1400
TEMPERATURE, DEG.CENT.	0.0	0.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	28.00	28.20	28.60	27.70	27.50	28.00
DISSOLVED OXYGEN, MG/L	9.2	8.5	6.1	5.6	5.7	6.5
PERCENT SATURATION	67.	62.	44.	41.	42.	48.
BIOCHEM. OX. DEMAND MG/L	1.3	2.5	1.3	1.2	2.2	3.1
HYDROGEN ION CONC.,PH	8.2	8.1	7.9	7.7	8.0	7.9
ALKALINITY MG/L	199	202	179	181	179	188
THRESHOLD ODOR NO.,TYPE	4 M	8 M	2 C	1 M	1 C	1 C
TOTAL RESIDUE MG/L	306	332	374	464	420	362
IGNITION LOSS MG/L	108	54	90	96	98	116
TURBIDITY AS SIO2 MG/L	1	10	3	9	2	2
TOTAL HARDNESS MG/L	225	226	222	214	212	204
CHLORIDES MG/L	13	13	26	48	44	23
AMMONIA NITROGEN MG/L	0.6	1.4	1.4	1.6	1.4	1.6
NITRATE NITROGEN MG/L	0.1	0.6	0.8	0.6	0.7	0.7
SULFATES AS S04 MG/L	77	55	63	85	52	75
TOTAL PHOS.AS P04 MG/L	0.4	0.7	0.6	5.6	0.8	0.7
PHENOLS PPB	2	4	4	5	7	1
OILS & GREASES MG/L	1.4	0.6	1.9	2.3	2.1	1.0
FLUORIDES MG/L	0.32	0.31	0.25	0.30	0.40	0.44
COLIFORM M.P.N./100ML.	1800	240	350	240	28	33
MPN OF E COLI/100ML	33	14	6	7	3	11
STD. PLATE COUNT/ML	100000	78000	1450	5000	25000	300
DETERGENTS MG/L	*0.00	*0.00	*0.00	*0.00	*0.00	0.10
CHEMICAL OXYGEN DEMAND MG/L		11	13	34	10	9

* DENOTES DATA NOT AVAILABLE

NS1 NORTH SASKATCHEWAN RIVER AT BRAZEAU DAM 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	9.4	13.7	4.8	8.9
BOD MG/L	0.7	1.7	0.3	0.6
HYDROGEN ION CONC.,PH	7.9	8.3	7.5	8.0
ALKALINITY MG/L	144.	153.	126.	149.
TOTAL RESIDUE MG/L	244.	304.	220.	234.
INGITION LOSS MG/L	74.	110.	38.	68.
TURBIDITY AS SIO2 MG/L	1.	4.	1.	1.
TOTAL HARDNESS MG/L	168.	180.	154.	170.
CHLORIDES MG/L	1.	4.	0.	1.
AMMONIA NITROGEN MG/L	0.2	0.3	0.0	0.2
SULFATES AS SO4 MG/L	51.	70.	40.	52.
NITRATE NITROGEN MG/L	0.2	0.5	0.0	0.1
TOTAL PHOS.AS PO4 MG/L	0.1	0.3	0.0	0.1
PHENOLS PPB	3.	7.	0.	2.
OILS AND GREASES MG/L	1.5	3.6	0.4	0.9
COLIFORMS M.P.N./100ML	39.	350.	0.	0.
M.P.N. OF E COLI/100ML	2.	14.	0.	0.
STANDARD PLATE COUNT/ML	1404.	10000.	1.	10.

NS2 NORTH SASKATCHEWAN RIVER AT DRAYTON VALLEY 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	12.2	13.4	10.6	12.4
BOD MG/L	0.9	1.9	0.1	0.7
HYDROGEN ION CONC.,PH	8.1	8.3	7.8	8.1
ALKALINITY MG/L	162.	190.	141.	158.
TOTAL RESIDUE MG/L	289.	384.	227.	298.
IGNITION LOSS MG/L	93.	138.	54.	76.
TURBIDITY AS SIO2 MG/L	4.	8.	1.	4.
TOTAL HARDNESS MG/L	199.	212.	184.	200.
CHLORIDES MG/L	2.	4.	0.	1.
AMMONIA NITROGEN MG/L	0.1	0.3	0.0	0.1
SULFATES AS SO4 MG/L	68.	79.	57.	69.
NITRATE NITROGEN MG/L	0.2	0.4	0.0	0.1
TOTAL PHOS.AS PO4 MG/L	0.2	0.4	0.0	0.1
PHENOLS PPB	3.	8.	0.	2.
OILS AND GREASES MG/L	1.4	2.7	0.7	1.0
COLIFORMS M.P.N./100ML	225.	920.	0.	79.
M.P.N. OF E COLI/100ML	12.	49.	0.	11.
STANDARD PLATE COUNT/ML	2907.	8000.	0.	1000.

NS3 NORTH SASKATCHEWAN RIVER AT DEVON BRIDGE 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	12.1	13.9	10.8	12.1
BOD MG/L	1.2	3.4	0.1	0.9
HYDROGEN ION CONC.,PH	8.1	8.3	8.0	8.1
ALKALINITY MG/L	166.	180.	150.	164.
TOTAL RESIDUE MG/L	325.	550.	240.	302.
INGITION LOSS MG/L	101.	202.	28.	90.
TURBIDITY AS SIO2 NG/L	10.	57.	2.	4.
TOTAL HARDNESS MG/L	207.	220.	192.	206.
CHLORIDES MG/L	1.	2.	0.	1.
AMMONIA NITROGEN MG/L	0.2	0.3	0.1	0.2
SULFATES AS SO4 MG/L	69.	83.	55.	70.
NITRATE NITROGEN MG/L	0.2	0.4	0.0	0.3
TOTAL PHOS.AS P04 MG/L	0.2	0.7	0.0	0.1
PHENOLS PPB	4.	10.	0.	3.
OILS AND GREASES MG/L	0.9	1.5	0.3	0.9
COLIFORMS M.P.N./100ML	285.	1600.	0.	79.
M.P.N. OF E COLI/100ML	57.	170.	0.	34.
STANDARD PLATE COUNT/ML	7924.	55000.	10.	100.

NS4 NORTH SASKATCHEWAN RIVER AT 105ST.BRIDGE 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	12.3	15.5	10.2	13.0
BOD MG/L	0.6	1.3	0.1	0.6
HYDROGEN ION CONC.,PH	8.0	8.5	7.0	8.1
ALKALINITY MG/L	163.	181.	112.	170.
TOTAL RESIDUE MG/L	286.	354.	232.	282.
INGITION LOSS MG/L	74.	134.	32.	56.
TURBIDITY AS SIO2 MG/L	4.	8.	2.	4.
TOTAL HARDNESS MG/L	206.	212.	200.	206.
CHLORIDES MG/L	2.	5.	0.	1.
AMMONIA NITROGEN MG/L	0.2	0.6	0.0	0.2
SULFATES AS SO4 MG/L	73.	96.	57.	73.
NITRATE NITROGEN MG/L	0.2	0.4	0.0	0.2
TOTAL PHOS.AS PO4 MG/L	0.2	0.7	0.0	0.1
PHENOLS PPB	4.	15.	1.	2.
OILS AND GREASES MG/L	1.2	2.0	0.7	1.3
FLUORIDES MG/L	0.28	0.54	0.01	0.27
COLIFORMS M.P.N./100ML	409.	2400.+	10.	140.
M.P.N. OF E COLI/100ML	34.	170.	0.	17.
STANDARD PLATE COUNT/ML	7408.	52000.	100.	600.

NS5 NORTH SASKATCHEWAN RIVER AT FORT SASKATCHEWAN BRIDGE 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	11.6	14.7	9.5	11.1
BOD MG/L	2.9	5.2	1.3	2.5
HYDROGEN ION CONC.,PH	8.0	8.1	7.7	8.0
ALKALINITY MG/L	194.	280.	165.	176.
TOTAL RESIDUE MG/L	297.	344.	242.	302.
INGITION LOSS MG/L	103.	160.	62.	92.
TURBIDITY AS SIO2 MG/L	6.	12.	1.	7.
CHLORIDES MG/L	5.	8.	1.	5.
AMMONIA NITROGEN MG/L	1.1	1.4	0.7	1.1
NITRATE NITROGEN MG/L	0.3	0.6	0.0	0.3
TOTAL PHOS.AS PO4 MG/L	0.8	1.5	0.6	0.7
PHENOLS PPB	5.	14.	1.	3.
OILS AND GREASES MG/L	1.5	4.6	0.3	1.0
COLIFORMS M.P.N./100ML	39144.	180000.	23.	350.
M.P.N. OF E COLI/100ML	1070.	2700.	0.	16.
STANDARD PLATE COUNT/ML	217625.	950000.	4300.	100000.
DETERGENTS MG/L,	0.30	0.50	0.20	0.20

NS6 NORTH SASKATCHEWAN RIVER AT VINCA BRIDGE 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	11.1	13.6	8.7	10.0
BOD MG/L	2.2	3.2	0.9	2.5
HYDROGEN ION CONC.,PH	7.8	8.1	7.1	7.9
ALKALINITY MG/L	181.	211.	166.	176.
TOTAL RESIDUE MG/L	327.	386.	254.	318.
IGNITION LOSS MG/L	99.	154.	34.	98.
TURBIDITY AS SIO2 MG/L	5.	9.	1.	4.
CHLORIDES MG/L	8.	29.	0.	6.
AMMONIA NITROGEN MG/L	1.9	2.3	1.4	1.9
NITRATE NITROGEN MG/L	0.6	1.1	0.1	0.5
TOTAL PHOS.AS PO4 MG/L	2.5	15.0	0.6	0.9
PHENOLS PPB	5.	12.	1.	4.
OILS AND GREASES MG/L	0.8	1.5	0.3	0.8
FLUORIDES MG/L	0.28	0.48	0.02	0.28
COLIFORMS M.P.N./100ML	22794.	180000.	19.	2100.
M.P.N. OF E COLI/100ML	2161.	14000.	4.	36.
STANDARD PLATE COUNT/ML	56178.	200000.	2600.	33000.

NS7 NORTH SASKATCHEWAN RIVER AT WASKATENAU BRIDGE 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	10.9	12.7	8.8	10.8
BOD MG/L	2.5	4.9	1.1	2.4
HYDROGEN ION CONC.,PH	7.9	8.2	7.6	8.0
ALKALINITY MG/L	181.	196.	168.	176.
TOTAL RESIDUE MG/L	334.	412.	273.	338.
IGNITION LOSS MG/L	104.	134.	62.	108.
TURBIDITY AS SIO2 MG/L	7.	39.	1.	3.
CHLORIDES MG/L	10.	20.	4.	9.
AMMONIA NITROGEN MG/L	1.3	1.6	0.9	1.4
NITRATE NITROGEN MG/L	0.4	0.7	0.0	0.6
TOTAL PHOS.AS PO4 MG/L	0.9	1.3	0.6	0.8
PHENOLS PPB	7.	13.	1.	6.
OILS AND GREASES MG/L	0.6	1.0	0.3	0.4
COLIFORMS M.P.N./100ML	4274.	18000.	11.	170.
M.P.N. OF E COLI/100ML	224.	1500.	0.	14.
STANDARD PLATE COUNT/ML	43933.	300000.	100.	12000.

NS8 NORTH SASKATCHEWAN RIVER AT DUVERNAY 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	8.9	11.5	7.5	8.5
BOD MG/L	1.7	2.8	1.0	1.6
HYDROGEN ION CONC.,PH	8.0	8.2	7.8	8.0
ALKALINITY MG/L	185.	197.	170.	186.
TOTAL RESIDUE MG/L	367.	454.	293.	354.
IGNITION LOSS MG/L	111.	146.	76.	112.
TURBIDITY AS SIO2 MG/L	2.	5.	1.	2.
CHLORIDES MG/L	18.	33.	2.	19.
AMMONIA NITROGEN MG/L	1.5	2.2	0.6	1.5
NITRATE NITROGEN MG/L	0.3	0.6	0.1	0.3
TOTAL PHOS.AS PO4 MG/L	0.9	1.5	0.3	0.8
PHENOLS PPB	6.	12.	0.	6.
OILS AND GREASES MG/L	1.4	2.5	0.3	1.0
COLIFORMS M.P.N./100ML	482.	1800.+	0.	46.
M.P.N. OF E COLI/100ML	27.	220.	0.	4.
STANDARD PLATE COUNT/ML	299822.	1100000.	1300.	190000.

N1C NORTH SASKATCHEWAN RIVER AT LINDBERGH 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED CXYGEN MG/L	8.9	13.1	5.7	9.5
BCD MG/L	1.9	3.9	1.0	1.8
HYDRCGEN ION CCNC.,PH	8.0	8.3	7.7	8.0
ALKALINITY .MG/L	183.	194.	173.	184.
TCTAL RESIDUE MG/L	353.	408.	296.	360.
INGITICN LCSS MG/L	107.	138.	84.	100.
TURBIDITY AS SIO2 MG/L	4.	8.	1.	3.
CHLORIDES MG/L	14.	25.	C.	17.
AMMCNIA NITROGEN MG/L	1.5	2.4	0.7	1.5
NITRATE NITROGEN MG/L	0.5	0.7	0.1	0.6
TCTAL PHOS.AS PO4 MG/L	0.7	1.0	0.5	0.6
PHENOLS PPB	4.	12.	C.	4.
CILS AND GREASES MG/L	1.7	3.4	0.3	1.5
CCLIFORMS M.P.N./100ML	239.	1800.+	5.	24.
M.P.N. CF E CCLI/100ML	9.	22.	2.	8.
STANDARD PLATE CCLNT/ML	84933.	620000.	300.	12000.

N11 NORTH SASKATCHEWAN RIVER AT LLOYDMINSTER FERRY 1970-71

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	7.2	9.2	5.6	6.5
BOD MG/L	1.8	3.9	0.4	1.3
HYDROGEN ION CONC.,PH	8.0	8.4	7.7	8.0
ALKALINITY MG/L	188.	203.	169.	188.
TOTAL RESIDUE MG/L	376.	464.	306.	374.
IGNITION LOSS MG/L	100.	134.	54.	98.
TURBIDITY AS SIO2 MG/L	4.	10.	1.	3.
TOTAL HARDNESS MG/L	220.	238.	204.	222.
CHLORIDES MG/L	27.	48.	13.	26.
AMMONIA NITROGEN MG/L	1.4	1.9	0.6	1.4
SULFATES AS SO4 MG/L	73.	89.	52.	75.
NITRATE NITROGEN MG/L	0.5	0.8	0.1	0.6
TOTAL PHOS.AS PO4 MG/L	1.3	5.6	0.4	0.7
PHENOLS PPB	5.	11.	1.	4.
OILS AND GREASES MG/L	1.4	2.3	0.6	1.4
FLUORIDES MG/L	0.29	0.44	0.01	0.30
COLIFORMS M.P.N./100ML	300.	1800.	0.	33.
M.P.N. OF E COLI/100ML	8.	33.	0.	7.
STANDARD PLATE COUNT/ML	127794.	570000.	300.	25000.

APPENDIX C

INDEX TO APPENDIX 'C'

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-151

Type of Sample Water

Source of Sample NSR at 105 Street Bridge

Date Sampled June 17/70 Date Received June 17/70

Results of Requested Tests: Herbicides and Pesticides - 4000 ml extracted

2,4-D Acid	0.06 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-152

Type of Sample Water

Source of Sample NSR at Vinca

Date Sampled June 17/70 Date Received June 17/70

Results of Requested Tests: Herbicides and Pesticides - 4000 ml. extracted

2,4-D Acid	0.08 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-153

Type of Sample Water

Source of Sample NSR - Lloydminster

Date Sampled June 17/70 Date Received June 18/70

Results of Requested Tests: Herbicides and Pesticides - 4000 ml. extracted

2,4-D Acid	0.2 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	Trace ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-154

Type of Sample Water

Source of Sample Vinca Ferry, NSR

Date Sampled June 23, 1970 Date Received June 23, 1970

Results of Requested Tests: 4000 ml. extracted

2,4-D Acid	0.2 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	0.09 ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	0.6 ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	Trace ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-155

Type of Sample Water

Source of Sample NSR - 105 Street Bridge

Date Sampled June 30, 1970 Date Received June 30, 1970

Results of Requested Tests: Herbicides and Pesticides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-156

Type of Sample water

Source of Sample NSR - Ft. Saskatchewan

Date Sampled June 30, 1970 Date Received June 30, 1970

Results of Requested Tests: Pesticides and Herbicides - 4000 ml. extracted

2,4-D Acid	0.4 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	0.1 ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

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ATTENTION: E. KUPCHANKO

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-187

Type of Sample water

Source of Sample NSR - Vinca

Date Sampled July 15/70 Date Received July 15/70

Results of Requested Tests: Herbicides and Pesticides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	0.1 ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-191

Type of Sample water

Source of Sample Whitemud Creek above Rainbow Valley

Date Sampled July 24/70 Date Received July 24/70

Results of Requested Tests: Pesticides and Herbicides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19/70 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-192

Type of Sample water

Source of Sample Whitemud Creek at mouth of N.S.R.

Date Sampled July 24/70 Date Received July 24/70

Results of Requested Tests: Pesticides and Herbicides - 4000 ml. extracted

2,4-D Acid	0.09 ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	0.6 ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-193

Type of Sample water

Source of Sample N.S.R. at Fort Saskatchewan

Date Sampled July 24/70 Date Received July 24/70

Results of Requested Tests: Herbicides and Pesticides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-194

Type of Sample Water

Source of Sample N.S.R. at Vinca Ferry

Date Sampled July 24/70 Date Received July 24/70

Results of Requested Tests: Pesticides and Herbicides - 4000 ml.

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	0.2 ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-195

Type of Sample water

Source of Sample N.S.R. at 105 Street Bridge

Date Sampled July 24/70 Date Received July 24/70

Results of Requested Tests: Pesticides and Herbicides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S-196

Type of Sample water

Source of Sample N.S.R. at 105 Street Bridge

Date Sampled July 28/70 Date Received July 28/70

Results of Requested Tests: Pesticides and Herbicides - 4000 ml. extracted

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	0.3 ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 19, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S - 197

Type of Sample Water

Source of Sample Whitemud Creek at mouth to NSR

Date Sampled July 28/70 Date Received July 28/70

Results of Requested Tests:

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 31, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S.-198

Type of Sample Water

Source of Sample Whitemud Creek above Rainbow

Date Sampled July 28/70 Date Received July 28/70

Results of Requested Tests:

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 31, 1970 Certified

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ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S - 199

Type of Sample Water

Source of Sample N.S.R. @ Vinca

Date Sampled July 28/70 Date Received July 28/70

Results of Requested Tests:

2,4-D Acid	N.D. /ug/l	o,p-DDT	N.D. /ug/l
2,4,5-T Acid	N.D. /ug/l	p,p-DDT	N.D. /ug/l
Silvex Acid	N.D. /ug/l	DDVP	N.D. /ug/l
MCPA Acid	N.D. /ug/l	Ronnel	N.D. /ug/l
Tordon Acid	N.D. /ug/l	Parathion	N.D. /ug/l
Dicamba Acid	N.D. /ug/l	Diazinon	N.D. /ug/l
Methoxychlor	N.D. /ug/l	Malathion	N.D. /ug/l
Lindane	N.D. /ug/l	2,4-D ethyl ester	N.D. /ug/l
Endrin	N.D. /ug/l	2,4-D isopropyl ester	N.D. /ug/l
Dieldrin	N.D. /ug/l	2,4-D n-butyl ester	N.D. /ug/l
Heptachlor	N.D. /ug/l	2,4-D iso-butyl ester	N.D. /ug/l
Heptachlor Epoxide	N.D. /ug/l	2,4,5-T methyl ester	N.D. /ug/l
Aldrin	N.D. /ug/l	2,4,5-T n-amyl ester	N.D. /ug/l
DDE	N.D. /ug/l	2,4,5-T isopropyl ester	N.D. /ug/l
DDD	N.D. /ug/l	2,4,5-T n-butyl ester	N.D. /ug/l

Trace is Defined as a quantity less than 0.01/ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 31, 1970 Certified

Form LHP-0010

ATTENTION: E. Kupchanko

ENVIRONMENTAL HEALTH SERVICES LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. S - 200

Type of Sample Water

Source of Sample N.S.R. @ Ft. Sask. Bridge

Date Sampled July 28/70 Date Received July 28/70

Results of Requested Tests:

2,4-D Acid	N.D. ug/l	o,p-DDT	N.D. ug/l
2,4,5-T Acid	N.D. ug/l	p,p-DDT	N.D. ug/l
Silvex Acid	N.D. ug/l	DDVP	N.D. ug/l
MCPA Acid	N.D. ug/l	Ronnel	N.D. ug/l
Tordon Acid	N.D. ug/l	Parathion	N.D. ug/l
Dicamba Acid	N.D. ug/l	Diazinon	N.D. ug/l
Methoxychlor	N.D. ug/l	Malathion	N.D. ug/l
Lindane	N.D. ug/l	2,4-D ethyl ester	N.D. ug/l
Endrin	N.D. ug/l	2,4-D isopropyl ester	N.D. ug/l
Dieldrin	N.D. ug/l	2,4-D n-butyl ester	N.D. ug/l
Heptachlor	N.D. ug/l	2,4-D iso-butyl ester	N.D. ug/l
Heptachlor Epoxide	N.D. ug/l	2,4,5-T methyl ester	N.D. ug/l
Aldrin	N.D. ug/l	2,4,5-T n-amyl ester	N.D. ug/l
DDE	N.D. ug/l	2,4,5-T isopropyl ester	N.D. ug/l
DDD	N.D. ug/l	2,4,5-T n-butyl ester	N.D. ug/l

Trace is Defined as a quantity less than 0.01 ug/l, But still detectable.

N.D. - Not detected.

REMARKS:

Date: August 31, 1970 Certified

Form LHP-0010

ATTENTION: E. E. Kupchanko

DIVISION OF POLLUTION CONTROL
LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. 71P - 41

Type of Sample: Water Time: _____

Source of Sample: Storm Sewer Emily Murphy Park

Date Sampled: April 1/71 Date Received: April 1/71

ACIDS				ESTERS	
2, 4-D		Endrin		2, 4-D Methyl	
2,4,5-T		Methoxychlor		Ethyl	
Silvex		O, P-DDT		iso-Propyl	
MCPA		P, P-DDT		n-Propyl	
Tordon				iso-Butyl	
Dicamba		PHOSPHOROUS PESTICIDES		n-Butyl	
		Ronnel		n-Amyl	
CHLORINATED PESTICIDES		Parathion		2,4,5-T Methyl	
Lindane		Methyl Parathion		Ethyl	
Heptachlor		Malathion		iso-Propyl	
Aldrin		Diazinon	T	n-Propyl	
Heptachlor Epoxide		Ethion		iso-Butyl	
DDE		Methyl Trithion		n-Butyl	
DDD		Phorate		n-Amyl	
Dieldrin		PCB			

Trace is defined as a quantity less than 0.1/ug/l, but still detectable. All concentrations are in/ug/l of sample.

REMARKS: .05 ug/l Cl of unknown phosphorous (1 peak) plus 2 unknown trace peaks - 2 unknown trace peaks of Chlorinated Pesticide.

0.3 ug/l Cl of unknown Esters (2 peaks)

Date: May 4, 1971 Certified: [signature]

Form LHP-0012

ATTENTION: E. E. Kupchanko

DIVISION OF POLLUTION CONTROL
LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. 71P - 39

Type of Sample: Water Time: _____

Source of Sample: Storm Sewer Whitemud Road

Date Sampled: April 1/71 Date Received: April 1/71

ACIDS				ESTERS	
2, 4-D		Endrin		2, 4-D Methyl	
2,4,5-T		Methoxychlor		Ethyl	
Silvex		O, P-DDT		iso-Propyl	
MCPA		P, P-DDT		n-Propyl	
Tordon				iso-Butyl	
Dicamba		PHOSPHOROUS PESTICIDES		n-Butyl	
		Ronnel		n-Amyl	
CHLORINATED PESTICIDES		Parathion		2,4,5-T Methyl	
Lindane		Methyl Parathion		Ethyl	
Heptachlor		Malathion		iso-Propyl	
Aldrin		Diazinon		n-Propyl	
Heptachlor Epoxide		Ethion		iso-Butyl	
DDE		Methyl Trithion		n-Butyl	
DDD		Phorate	T	n-Amyl	
Dieldrin		PCB			

Trace is defined as a quantity less than 0.1/ug/l, but still detectable. All concentrations are in/ug/l of sample.

REMARKS: 8 phosphorous unknown trace peaks

.037/ug/l Cl of unknown Chlorinated Pesticide plus 4 trace peaks

.523 /ug/l of unknown Esters (6 peaks)

Date: May 4, 1971 Certified: _____

Form LHP-0012

ATTENTION: E. E. Kupchanko

DIVISION OF POLLUTION CONTROL
LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. 71P - 40

Type of Sample: Water Time: _____

Source of Sample: Storm Sewer South end of Quenel Bridge

Date Sampled: April 1/71 Date Received: April 1/71

ACIDS				ESTERS	
2, 4-D		Endrin		2, 4-D Methyl	
2,4,5-T		Methoxychlor		Ethyl	
Silvex		O, P-DDT		iso-Propyl	
MCPA		P, P-DDT		n-Propyl	
Tordon				iso-Butyl	
Dicamba		PHOSPHOROUS PESTICIDES		n-Butyl	
		Ronnel		n-Amyl	
CHLORINATED PESTICIDES		Parathion		2,4,5-T Methyl	
Lindane		Methyl Parathion		Ethyl	
Heptachlor		Malathion		iso-Propyl	
Aldrin		Diazinon		n-Propyl	
Heptachlor Epoxide		Ethion		iso-Butyl	
DDE		Methyl Trithion		n-Butyl	
DDD		Phorate		n-Amyl	
Dieldrin		PCB			

Trace is defined as a quantity less than 0.1/ug/l, but still detectable. All concentrations are in/ug/l of sample.

REMARKS: 2 phosphorous unknown trace peaks.

.05 ug/l Cl of unknown Chlorinated Pesticide (1 peak) plus 3 trace peaks

.062 ug/l of unknown Esters (3 peaks)

Date: May 4, 1971 Certified: [signature]

Form LHP-0012
C-20

ATTENTION: E. E. Kupchanko

DIVISION OF POLLUTION CONTROL
LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. 71P - 54

Type of Sample: Water Time: _____

Source of Sample: North Saskatchewan River - 105th Bridge

Date Sampled: May 21/71 Date Received: May 21/71

ACIDS				ESTERS	
2, 4-D		Endrin		2, 4-D Methyl	
2,4,5-T		Methoxychlor		Ethyl	
Silvex		O, P-DDT		iso-Propyl	
MCPA		P, P-DDT		n-Propyl	
Tordon				iso-Butyl	
Dicamba		PHOSPHOROUS PESTICIDES		n-Butyl	
		Ronnel		n-Amyl	
CHLORINATED PESTICIDES		Parathion		2,4,5-T Methyl	
Lindane		Methyl Parathion		Ethyl	
Heptachlor		Malathion		iso-Propyl	
Aldrin		Diazinon		n-Propyl	
Heptachlor Epoxide		Ethion		iso-Butyl	
DDE		Methyl Trithion		n-Butyl	
DDD		Phorate		n-Amyl	
Dieldrin		PCB			

Trace is defined as a quantity less than 0.1 µg/l, but still detectable. All concentrations are in µg/l of sample.

REMARKS: Trace peak of unknown Chlorinated Pesticides
4.82 µg/l Cl of unknown Esters -7 peaks plus
3 trace peaks ; 5 phosphorous trace peaks

Date: June 29/71 Certified: [signature]

Form LHP-0012

ATTENTION: E. E. Kupchanko

DIVISION OF POLLUTION CONTROL
LABORATORY
ANALYTICAL REPORT/HERBICIDES AND PESTICIDES

Lab. Sample No. 71P - 55

Type of Sample: Water Time: _____

Source of Sample: North Saskatchewan River - Vinca

Date Sampled: May 21/71 Date Received: May 21/71

ACIDS				ESTERS	
2, 4-D		Endrin		2, 4-D Methyl	
2,4,5-T		Methoxychlor		Ethyl	
Silvex		O, P-DDT		iso-Propyl	
MCPA		P, P-DDT		n-Propyl	
Tordon				iso-Butyl	
Dicamba		PHOSPHOROUS PESTICIDES		n-Butyl	
		Ronnel		n-Amyl	
CHLORINATED PESTICIDES		Parathion		2,4,5-T Methyl	
Lindane		Methyl Parathion		Ethyl	
Heptachlor		Malathion		iso-Propyl	
Aldrin		Diazinon		n-Propyl	
Heptachlor Epoxide		Ethion		iso-Butyl	
DDE		Methyl Trithion		n-Butyl	
DDD		Phorate		n-Amyl	
Dieldrin		PCB			

Trace is defined as a quantity less than 0.1 µg/l, but still detectable. All concentrations are in µg/l of sample.

REMARKS: Tace peak of unknown Chlorinated Pesticides

3.6 µg/l Cl of unknown Esters -6 peaks plus

2 trace peaks 6 phosphorous trace peaks

Date: June 29/71 Certified: [signature]

Form LHP-0012