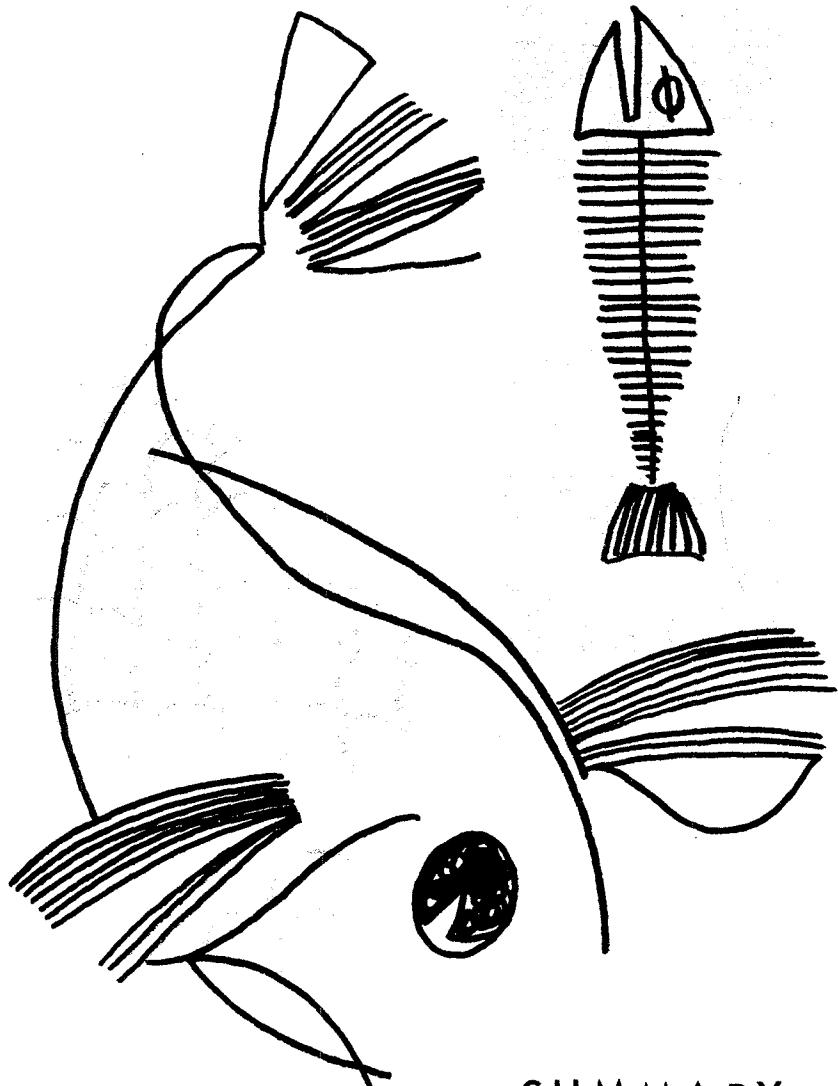


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SUMMARY REPORT
ATHABASCA RIVER
POLLUTION SURVEY

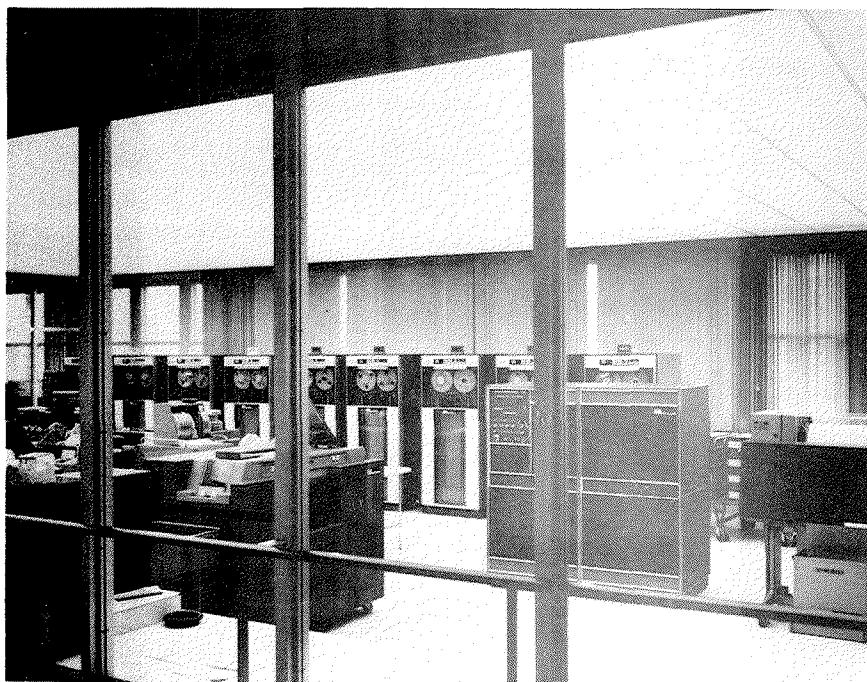
1969 - 1970



ENVIRONMENTAL HEALTH SERVICES DIVISION
GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF HEALTH



Data is transferred to punch cards
for computer processing



Facilities of the Government Data Centre
are utilized to process data

S U M M A R Y

Five sampling surveys were conducted on the waters of the Athabasca River and its tributaries during the winter of 1969 - 1970. Samples were taken to analyze the river waters for chemical composition and bacteriological constituents on a regular basis.

Loadings of Biochemical Oxygen Demanding materials were not found to be high. Dissolved Oxygen levels remained above the Provincial Board of Health guideline of 5 mg/l.

The water quality in the Athabasca River and its tributaries was found to be generally acceptable throughout the winter of 1969 - 1970. However, relatively high odor and colour values were observed on occasions during the past winter. The color can be attributed to a large extent on natural causes.



Eugene E. Kupchanko, P. Eng.
Head,
Water Pollution Control Section

September 14, 1970

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 the chemical, physical and bacteriological characteristics of Alberta's water under changing conditions.
2. To indicate 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 action toward the preservation of streams for all beneficial uses.

SCOPE OF ANALYSIS:

The frequency of sampling is admittedly limited. The choice and number of methods used for the field surveillance program depends upon the purposes in view, the nature of the problems encountered, the periods over which observations are taken, and on local circumstances. The routine analyses shown in this report represent the minimum of bacteriological, biochemical and chemical analyses which are considered to justify the program.

SAMPLING STATIONS AND PROCEDURES:

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

1. Water used for municipal, industrial, agricultural and recreational purposes.
2. Near known or suspected sources of pollution.
3. Near the boundary to determine the quality of water leaving the Province.

The flow data indicated with the chemical analyses are provisional data only, as provided by the Department of Mines, Energy and Resources.

Stations were established at bridges whenever practical for convenience.

Routine samples include two liters for general chemical analyses, one liter each for phenolics and oils and grease, and about 100 milliliters in a sterile bottle for bacteriological analysis.

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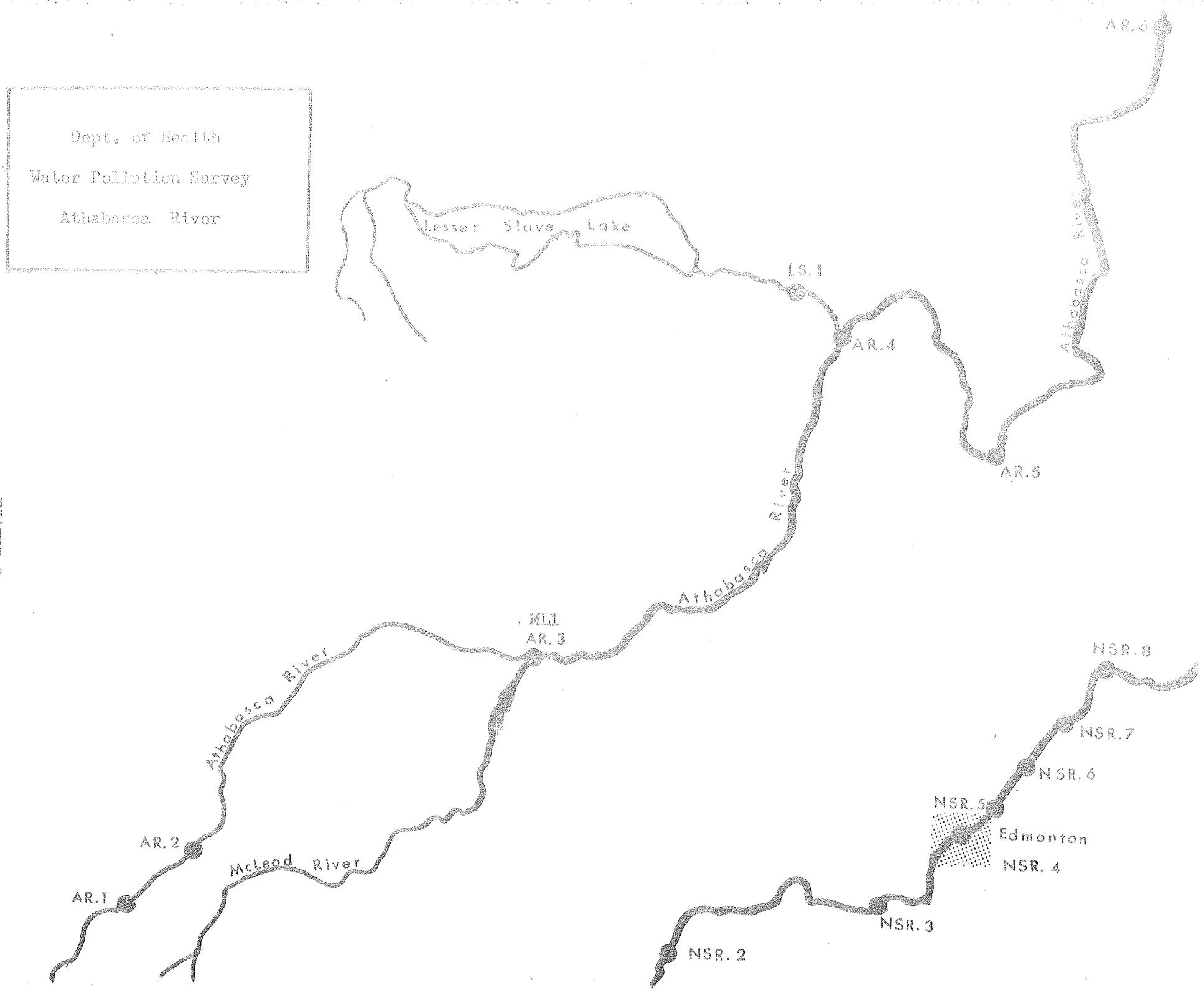
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SUMMARY REPORT

INTRODUCTION

The Athabasca River and its tributaries are used as a water supply source and receiving stream for the wastes of three major industries and several sewage treatment facilities (Table I). A total of five sampling surveys were conducted and the following locations were used as sampling sites and points of reference (Figure 1):

- | | |
|------|--|
| AR 1 | Hinton - above North Western Pulp and Power outfall |
| AR 2 | Obed Ferry |
| AR 3 | Whitecourt Bridge - Highway 43 |
| AR 4 | Smith - C.P.R. Bridge |
| AR 5 | Athabasca Townsite |
| AR 6 | Fort McMurray (Tar Island)
above G.C.O.S. outfall |
| ML 1 | McLeod River - Highway 43 Bridge
at Whitecourt |
| LS 1 | Lesser Slave River, 5 miles above
Smith |



FLOWS IN THE ATHABASCA RIVER

The statistical distribution of river flow rates recorded at Hinton (Station No. 07AD002) is presented in Figure 2. Flow rates at the 1% frequency level and 10% frequency level were 950 cubic feet per second (c.f.s.) and 1060 c.f.s., respectively.

The maximum monthly flow at Hinton for the period of October 1, 1969 to March 31, 1970 was 3600 c.f.s. (October). Ice conditions at this station began December 15, 1969 and continued until April 1, 1970. The minimum daily or critical flow was 950 c.f.s. (January 15, 1970). The minimum average monthly flow was 1020 c.f.s. recorded during the month of March (Figure 3).

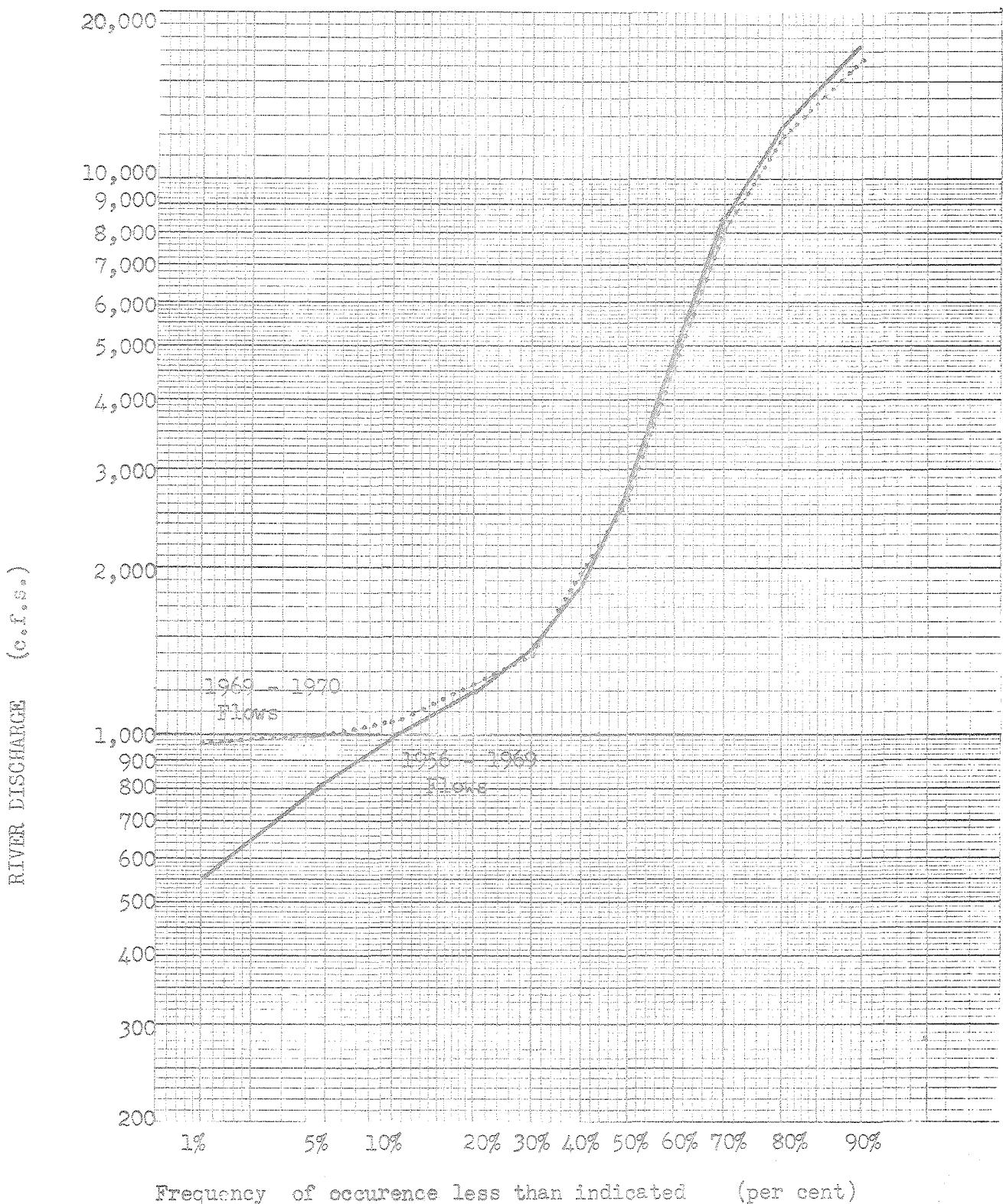
Near Windfall (Station No. 07AE001), the minimum daily flow was 1200 c.f.s. (November 19, 1969). The minimum average monthly flow was 1450 c.f.s. during December (Figure 4).

At Athabasca (Station No. 07BE001), the minimum daily flow was 2600 c.f.s. (March 2, 1970). The minimum average monthly flow was 2774 c.f.s. during February (Figure 5). Ice conditions began December 5, 1969 and continued until April 17, 1970.

River flow rates of the Lesser Slave River at Highway #2 (Station No. 07BK006) were relatively constant and ranged from a minimum of 419 c.f.s. on January 11, 1970 to a maximum of 983 c.f.s. on October 11, 1969 (Figure 6).

Downstream of Fort McMurray (Station No. 07DA001), the minimum flow rate was 4500 c.f.s. (February 16, 1970). The minimum average monthly flow was 4660 c.f.s. during February (Figure 7).

Statistical Flow Analysis for the Athabasca River at Hinton



Frequency of occurrence less than indicated (per cent)

1956-1969	Maximum Flow	36,200	cubic feet per second
	Minimum Flow	382	cubic feet per second
1969-1970	Maximum Flow	35,000	cubic feet per second
(April-March)	Minimum Flow	950	cubic feet per second

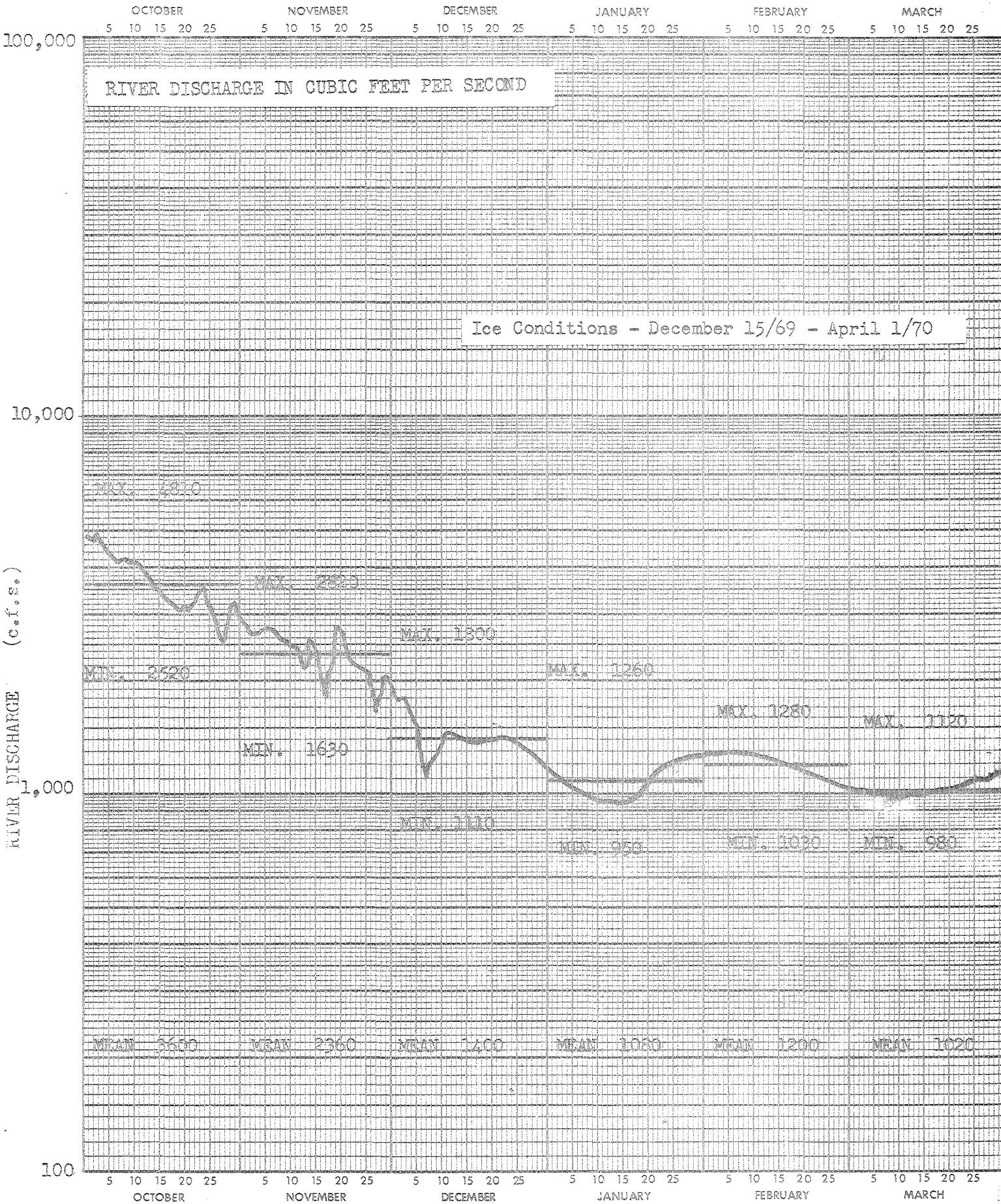
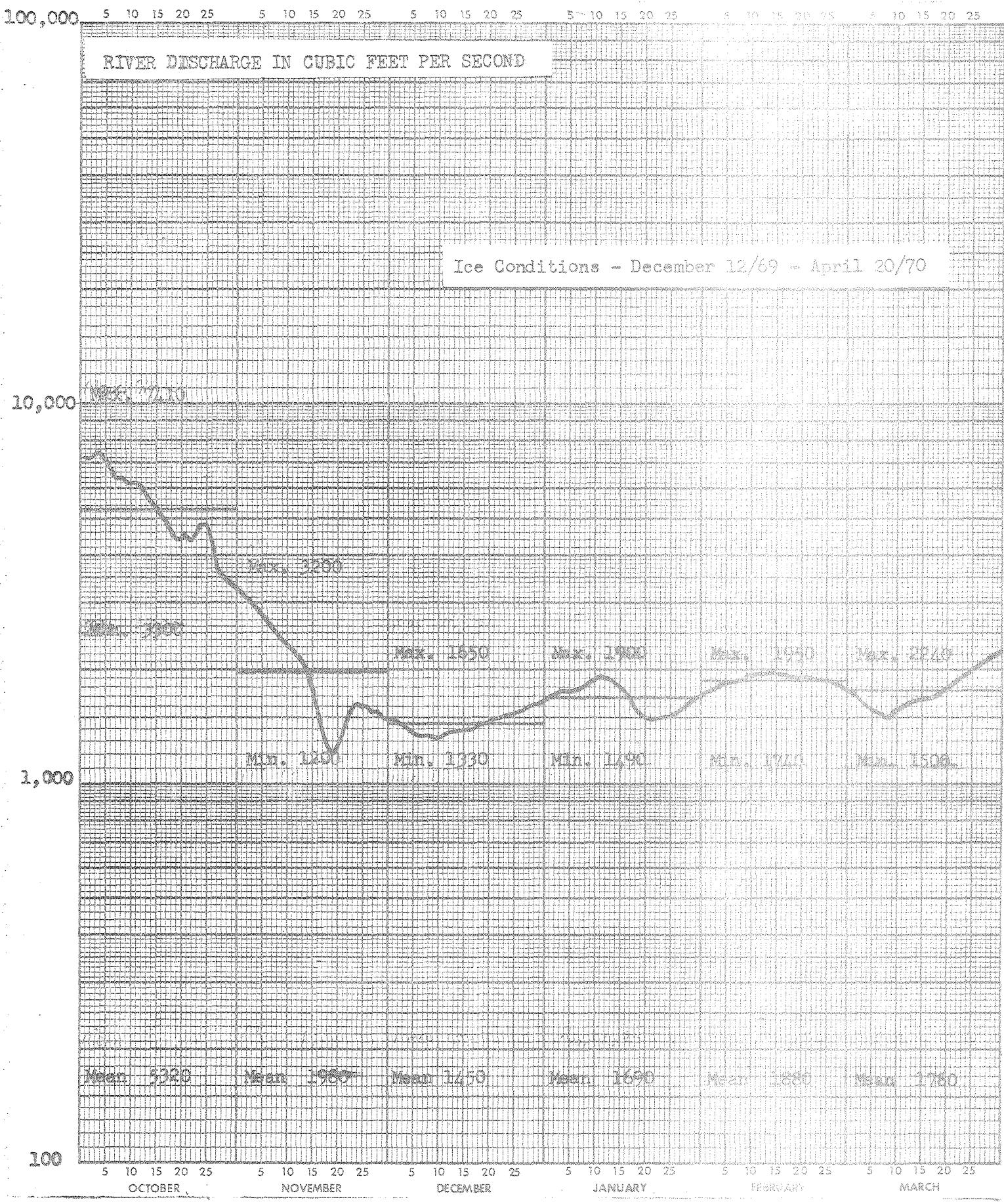


FIGURE 3

ATHABASCA RIVER AT HINTON

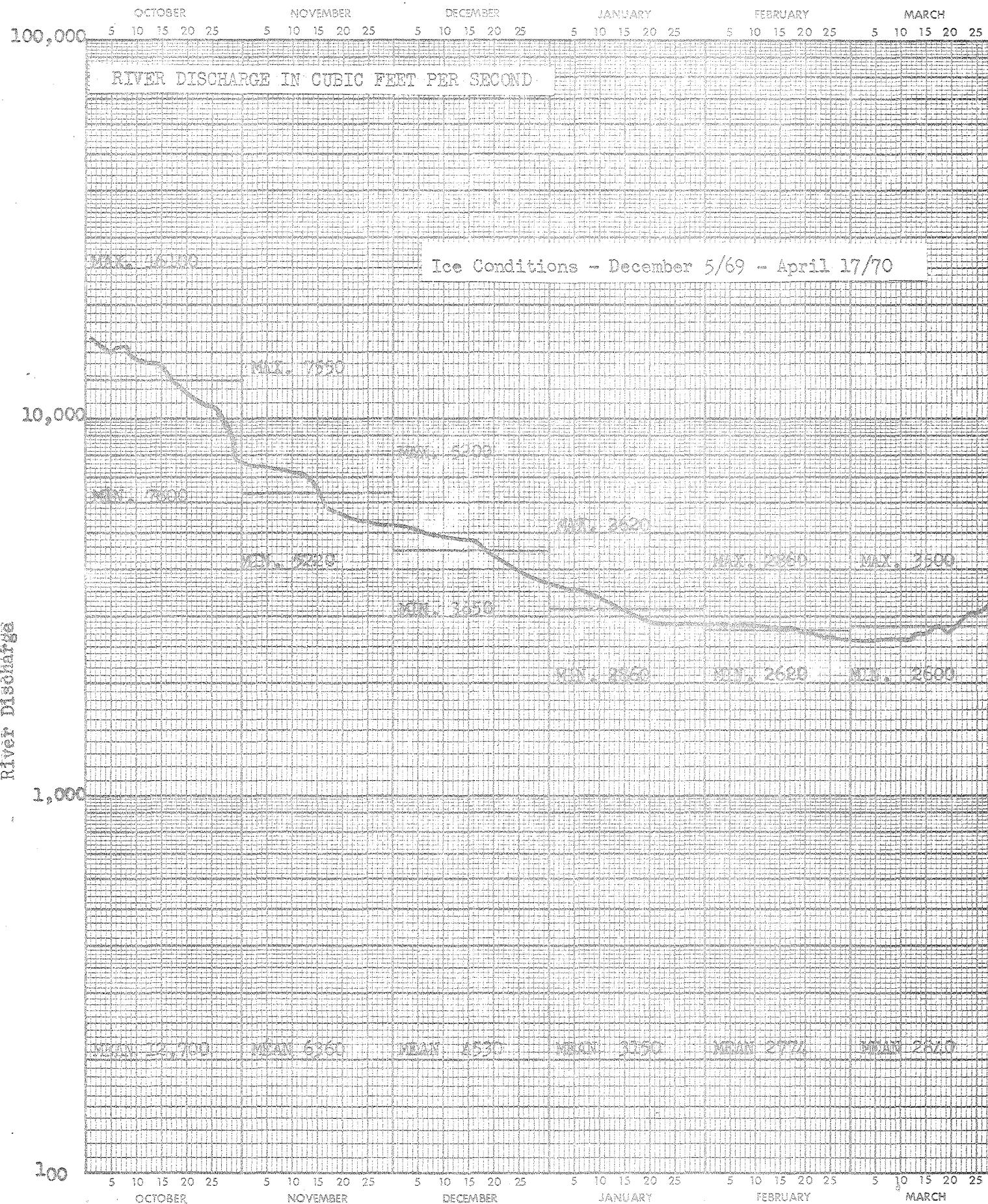
STATION NO. 07AD002



ATHABASCA RIVER NEAR WINDFALL

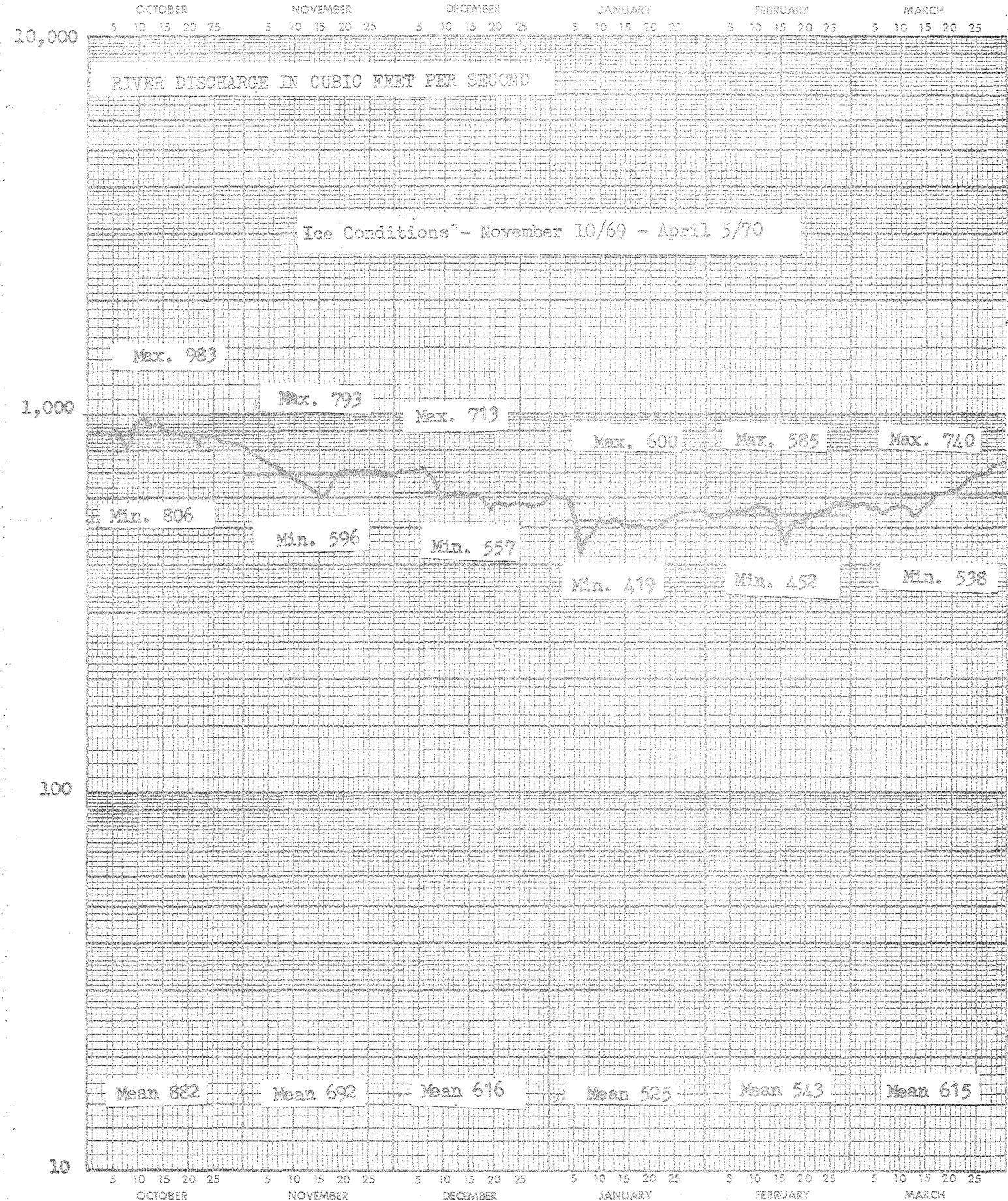
STATION NO. 074E001

FIGURE A



ATHABASCA RIVER AT ATHABASCA

STATION NO. 07B001



LESSER SLAVE RIVER AT HIGHWAY #2

STATION NO. 07BK006

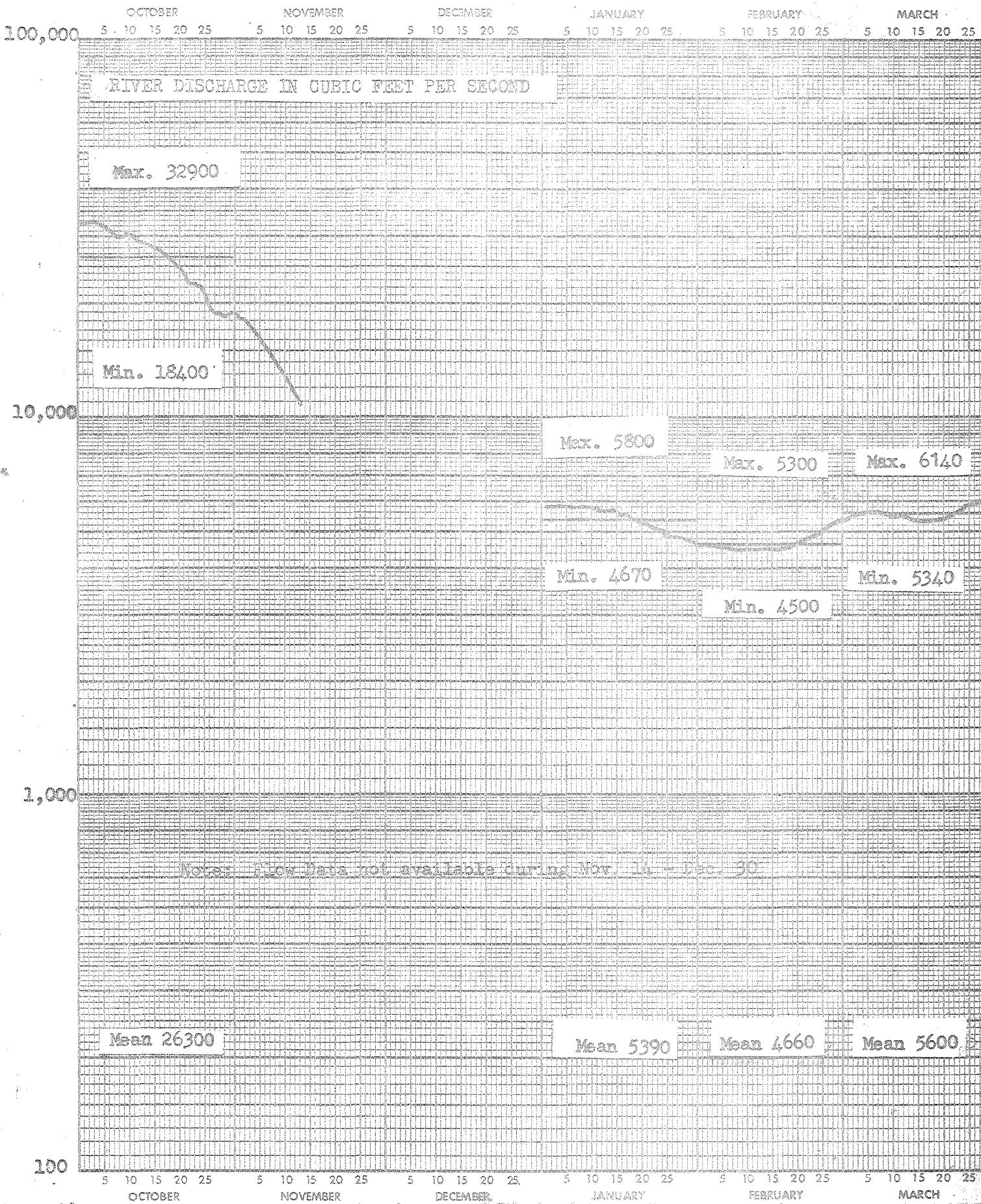


FIGURE 7

TABLE I

ATHABASCA RIVER USERS AND EFFLUENT DISCHARGERS

<u>Type of Discharge and Treatment</u>	<u>Source</u>	<u>Discharged to:</u>
1. Industrial Waste (secondary)	NORTH WESTERN PULP AND POWER LIMITED	Athabasca River
2. Domestic Sewage	HINTON	NWP&P Treatment Facility
3. Domestic Sewage (anaerobic lagoon)	WHITECOURT	Athabasca River
4. Domestic Sewage (raw)	ATHABASCA	Athabasca River
5. Domestic Sewage (anaerobic lagoon)	FORT McMURRAY	Clearwater River
6. Industrial Waste (A.P.I. Separators) (Settling Ponds)	GREAT CANADIAN OIL SANDS LIMITED	Athabasca River

DRINKING WATER USERS

<u>User</u>	<u>Source</u>	<u>Type of Treatment</u>
Hinton	Athabasca River	Complete (through NWP&P)
Whitecourt	McLeod River	Chlorination
Athabasca	Athabasca River	Complete
Fort McMurray	Athabasca River	Complete

DISSOLVED OXYGEN AND BIOCHEMICAL OXYGEN DEMAND

Dissolved oxygen concentrations above Hinton were near saturation throughout the past winter. An average Biochemical Oxygen Demand of 0.9 mg/l was noted during the five surveys at this sampling site. At Whitecourt, the average Biochemical Oxygen Demand was 0.9 mg/l and the dissolved oxygen concentrations remained near saturation except on one survey. The February 11, 1970 sampling survey showed somewhat depressed oxygen concentrations (6.6 mg/l) as far downstream as Athabasca. Recovery of the dissolved oxygen to 11.5 mg/l could be seen at Fort McMurray (Figure 8).

The average Biochemical Oxygen Demand was 2.4 mg/l at Fort McMurray while the minimum observed dissolved oxygen concentration at this location was 11.5 mg/l.

Maximum, minimum and median profiles of both Dissolved Oxygen and Biochemical Oxygen Demand levels are presented in Figure 8.

LOADINGS TO THE ATHABASCA RIVER

Total loadings to the Athabasca River are shown in Table II. These loadings are compiled from samples taken at the three major industries situated on the Athabasca River and its tributaries. A maximum Biochemical Oxygen Demanding load of 29,069 lbs/day (December 9, 1969) was recorded. A Tannins and Lignins loading of 14,000 lbs/day was observed during the October 14, 1969 survey. During this survey, the Ammonia Nitrogen loading was also the maximum observed (5,800 lbs/day).

Oil and Grease loadings remained consistent throughout the winter, varying from 960 lbs/day to 1,199 lbs/day. Phenolic loadings ranged from 28.1 lbs/day to 81.5 lbs/day.

TABLE II
TOTAL LOADINGS TO THE ATHABASCA RIVER (LBS/DAY)

<u>SAMPLING DATE</u>	<u>Oct. 14/69</u>	<u>Nov. 17/69</u>	<u>Dec. 9/69</u>	<u>Feb. 10/70</u>
River Discharge (c.f.s.) Hinton	3,470	2,080	1,270	1,260
Biochemical Oxygen Demand	18,907	13,310	29,069	24,157
Chemical Oxygen Demand	125,107	152,669	133,161	139,144
Total Residue	320,214	321,751	289,696	313,332
Ignition Loss	108,213	122,562	97,060	107,064
Non-filtrable Residue	13,699	14,208	45,593	40,409
Ignition Loss	10,945	10,645	32,542	37,304
Oil and Grease	960	1,199	1,049	968
Phenols	81.2	81.5	28.1	26.9
Chlorides	96,000	91,103	65,112	77,830
Phosphates	100	132.9	668.5	343.9
Sulphates	12,000	19,928	55,390	41,630
Tannins and Lignins	14,000	949	1,432.5	9,502.5
Ammonia Nitrogen	5,800.0	1,366.6	955.0	1,810.0
Nitrate Nitrogen	140.0	113.9	—	18.1
Hydrogen Sulfide	—	—	—	17.8

FIGURE 8. Maximum, Minimum Values of River Components Downstream of Hinton

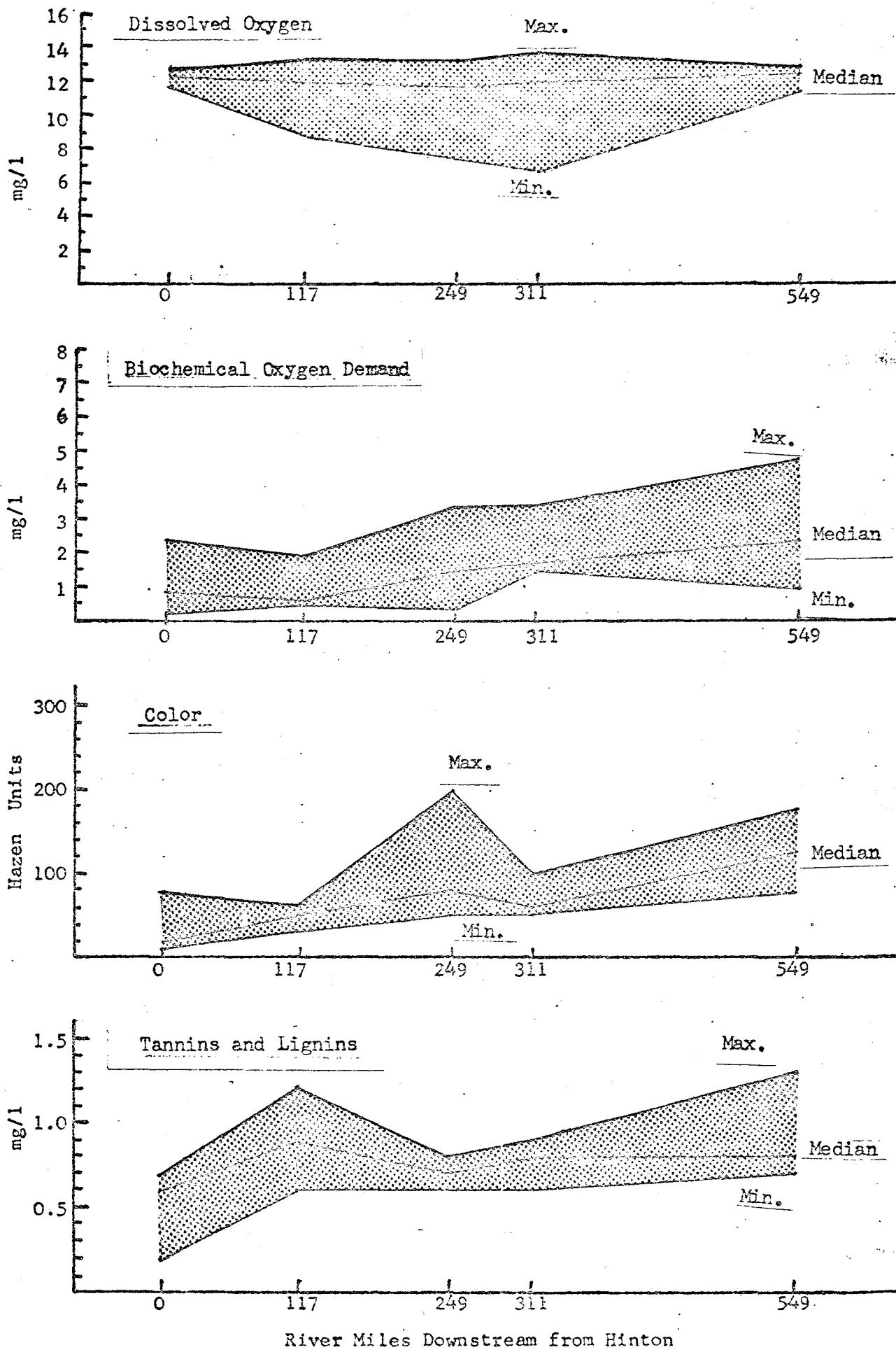


FIGURE 8

FIGURE 9. Maximum, Minimum Values of River Components Downstream of Hinton

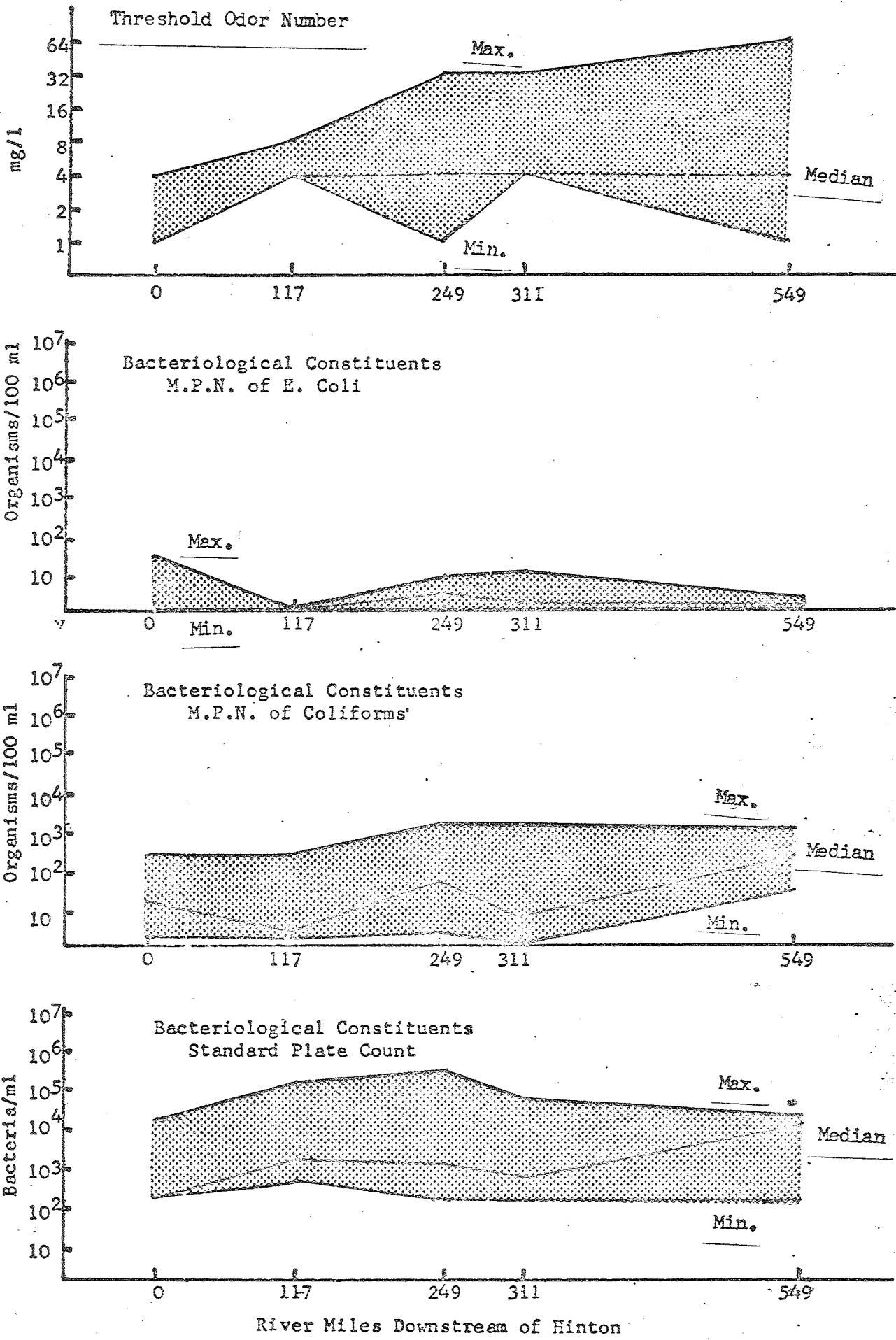


FIGURE 9

FIGURE 10. Maximum, Minimum Values of River Components Downstream of Hinton

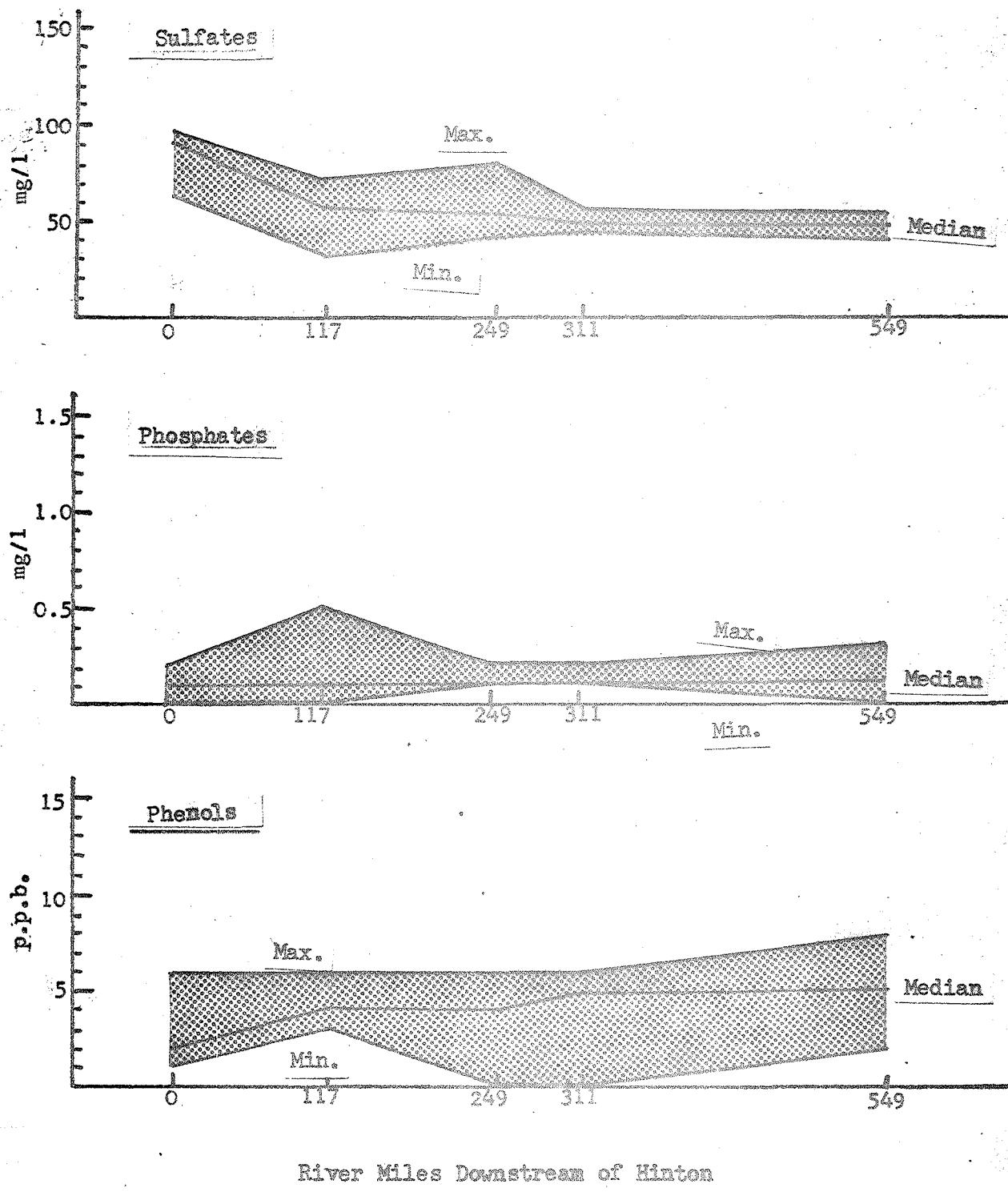


FIGURE 10

THRESHOLD ODOR NUMBER

Samples taken upstream of Hinton revealed an odor range of 1 to 4 with a Musty odor type. Odor values at Obed were of a "Wood Resin" nature with strengths ranging from 16 to 32. "Wood Resin" odors were observed as far downstream as Athabasca on December 10, 1969 and February 11, 1970 (4WR and 32 WR, respectively).

Four of the five samples taken at Fort McMurray revealed Musty odors ranging from 1 to 8. The sample taken February 1, 1970 revealed a chemical hydrocarbon odor with a strength of 64. Figure 9 shows the maximum, minimum and median odor profiles.

BACTERIOLOGICAL CONSTITUENTS

Low bacteriological counts were observed upstream of Hinton. Minimal levels of bacteriological indicators were observed along the Athabasca River throughout the winter of 1969-1970. Profiles of these constituents are shown in Figure 9.

COLOUR

The average colour values at Hinton and Fort McMurray were 29 and 130 Hazen units, respectively. The average colour value at Athabasca was 47 Hazen units. Profiles of colour value are depicted in Figure 8. The maximum colour value observed during the sampling was 200 Hazen Units, observed at Smith (November 20, 1969). Colour values rose steadily downstream resulting in an average increase of 90 Hazen units between Hinton and Tar Island. This increase could be due in part to natural causes, as the Lesser Slave River imparts a high amount of colour to the Athabasca River.

MERCURY

One survey to determine mercury in the Athabasca River yielded total mercury concentrations of 0.10 p.p.b. both at Hinton on January 20, 1970 and at Tar Island on January 21, 1970. Total mercury represents the analysis of an unfiltered sample and is an indication of the mercury in the suspended sediment. The maximum soluble mercury concentration in surface water as set out in Water Quality Criteria has been established at 0.10 p.p.b.

SULFATES, PHOSPHATES, PHENOOLS

Concentration profiles of sulfates, phosphates and phenols were satisfactory and are depicted in Figure 10. Maximum values of sulfates ranged from 96 mg/l above Hinton to 54 mg/l at Tar Island. Similarly, maximum values of phosphates ranged from 0.2 mg/l to 0.3 mg/l. The maximum values of phenols ranged from 6.0 p.p.b. to 8.0 p.p.b.

CONCLUSIONS

The water quality in the Athabasca River during the winter of 1969-1970 was generally acceptable with the exception of high odor values. Bacteriological constituents remained at minimal levels throughout the winter. High loadings of Biochemical Oxygen Demanding materials were not evident and, hence, Dissolved Oxygen concentrations remained at satisfactory levels throughout the entire sampling schedule.



P. Shewchuk, P. Eng.,
Water Pollution Control Section.

September 14, 1970

A P P E N D I X

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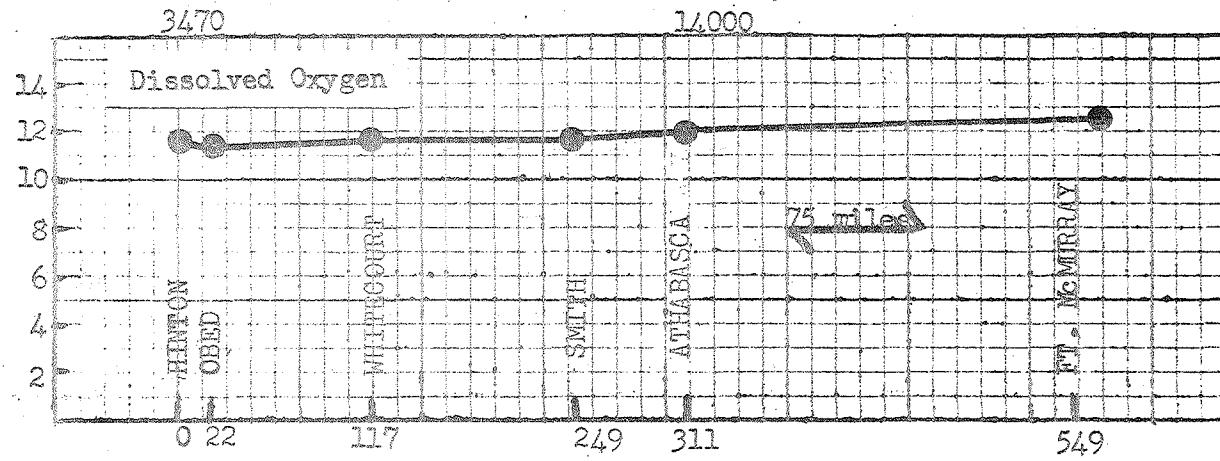
	<u>Page No.</u>
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River Profiles of Constituents	A4 - A18
Analytical Results of Athabasca River System	A19 - A32
Colour Codes	A33

WATER POLLUTION CONTROLODOR TYPE

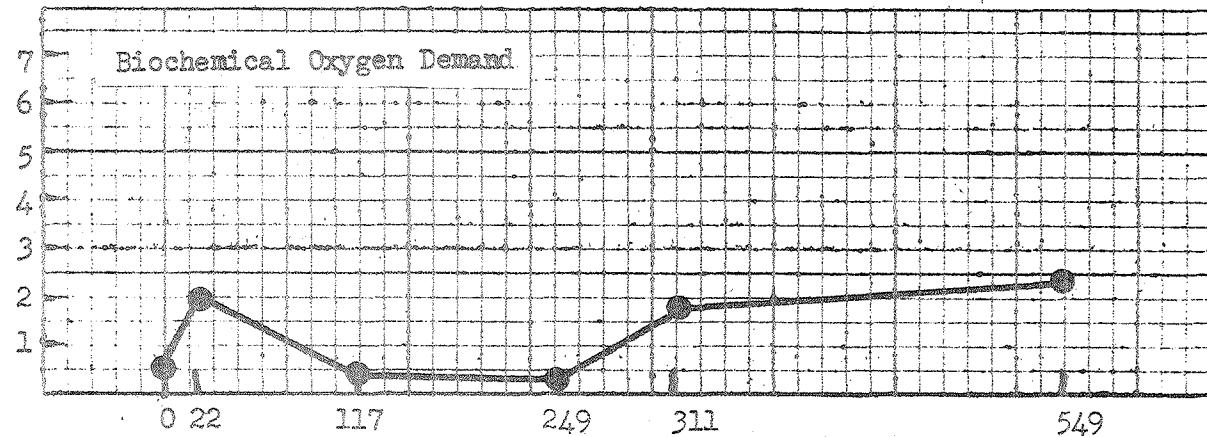
Abbreviation	Nature of Odor	Description - Such as Odors of
A AC	Aromatic (spicy) cucumber	Camphor, cloves, lavender, lemon Synura
B BG BN BS BV	Balsamic (flowery) geranium nasturtium sweetish violet	Geranium violet, vanilla Asterionella Aphanizomenon Coelosphaerium Mallomonas
C	Chemical	Industrial wastes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

ATHABASCA RIVER SAMPLING RESULTS - October 14, 1969

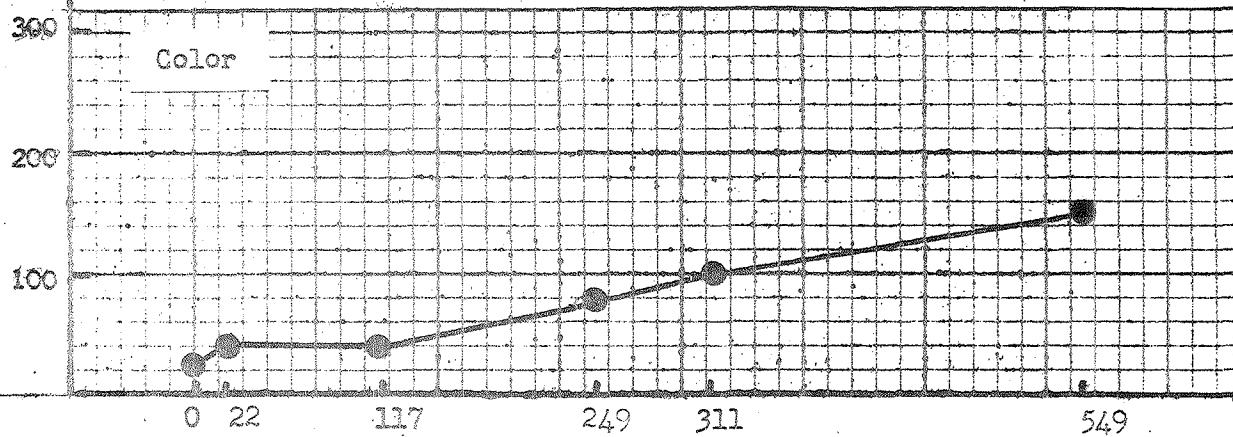
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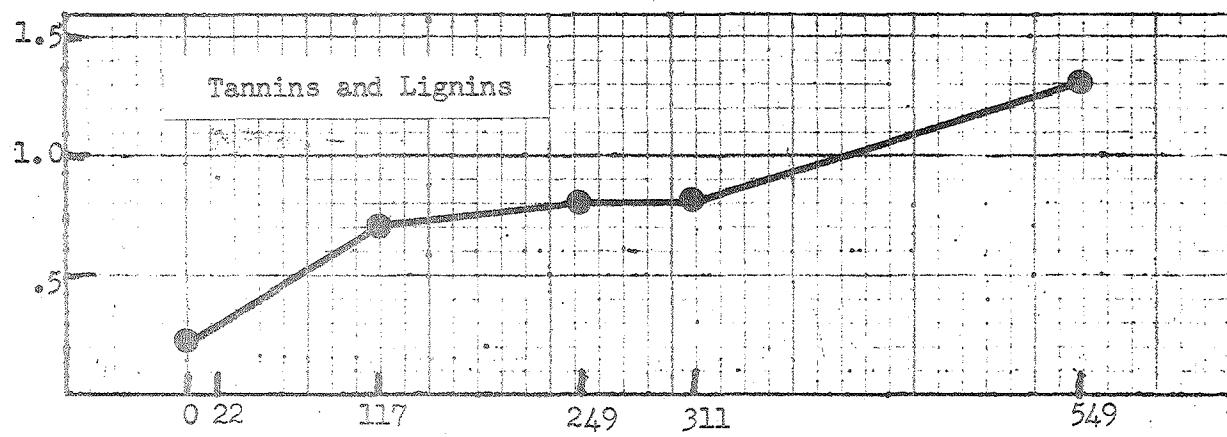
mg/l



Hazen Units



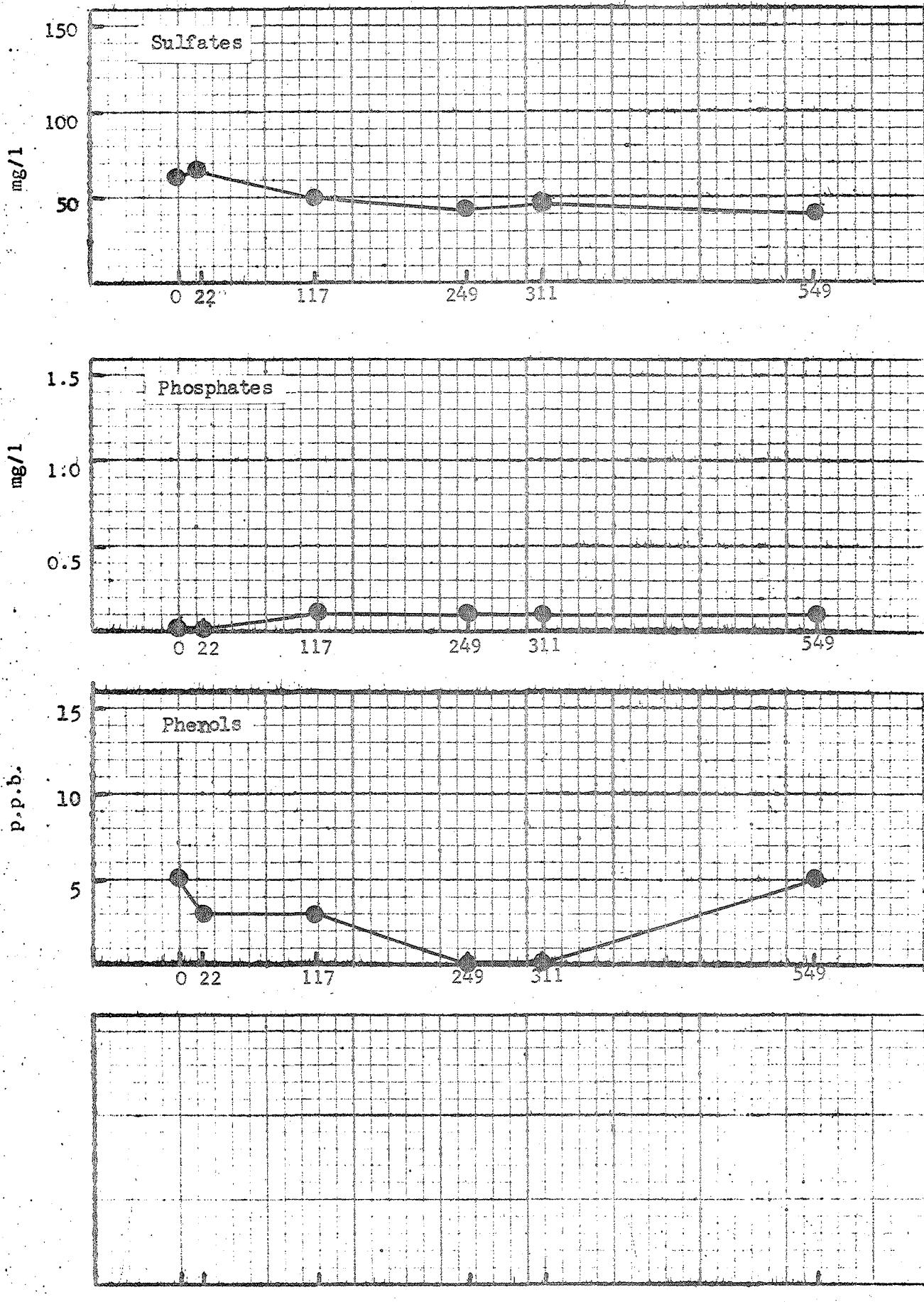
mg/l



RIVER MILES DOWNSTREAM FROM HINTON

ATHABASCA RIVER SAMPLING RESULTS - October 14, 1969

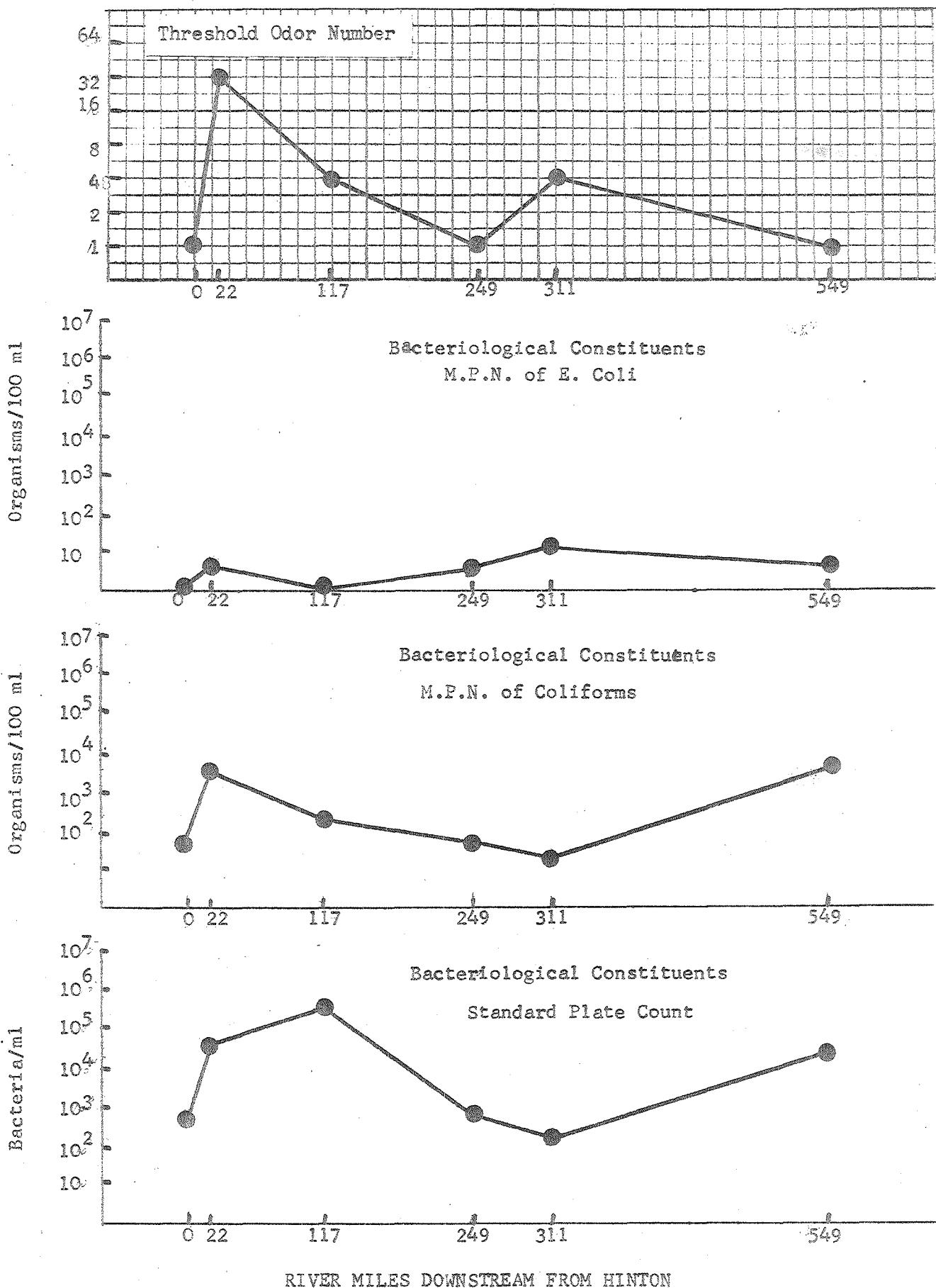
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RIVER MILES DOWNSTREAM FROM HINTON

ATHABASCA RIVER SAMPLING RESULTS - OCTOBER 14, 1969

3470 River Discharge c.f.s. 14000

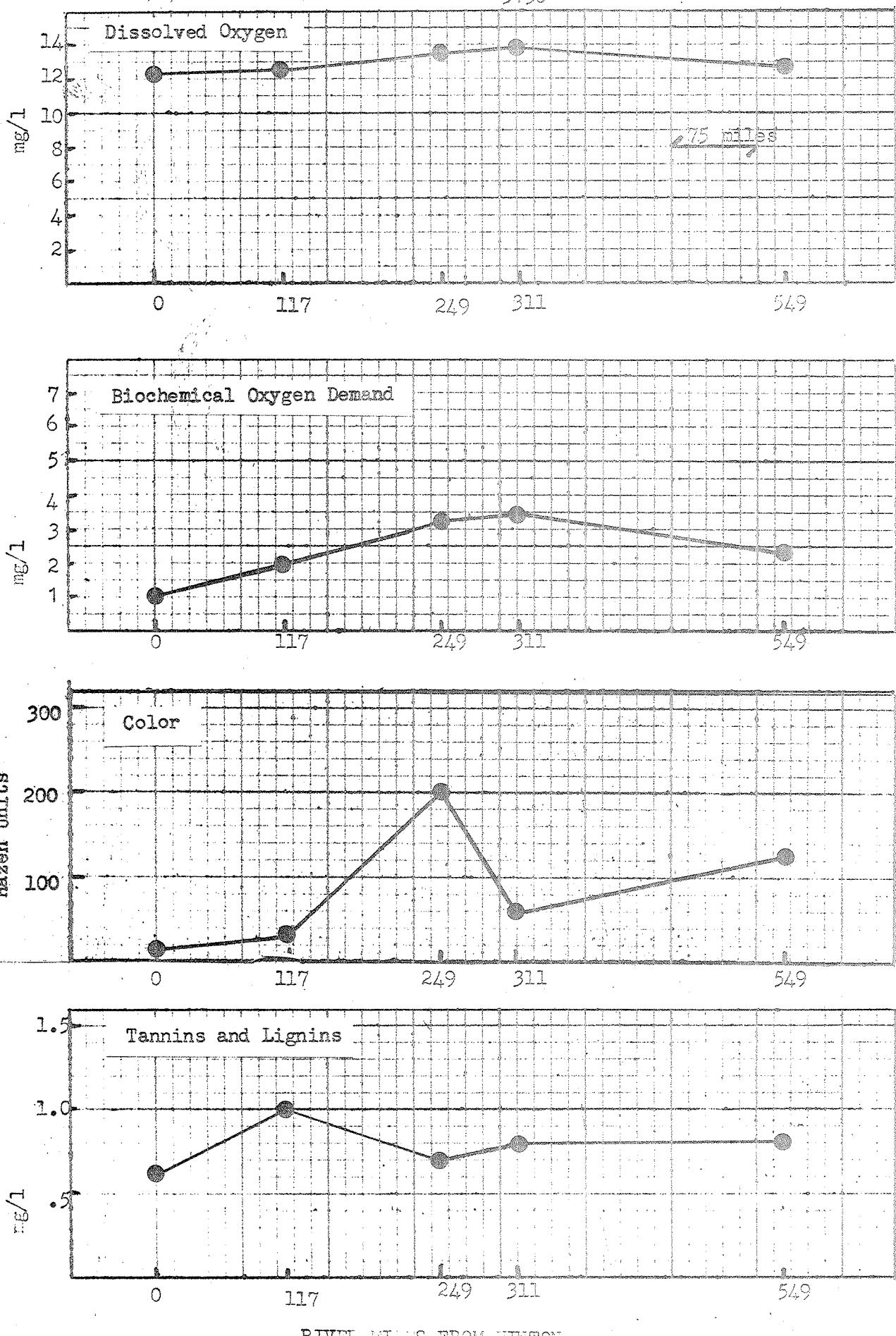


ATTHABASCA RIVER RESULTS
NOVEMBER 18 - 20, 1969

RIVER DISCHARGE C.I.S.

2080

5750



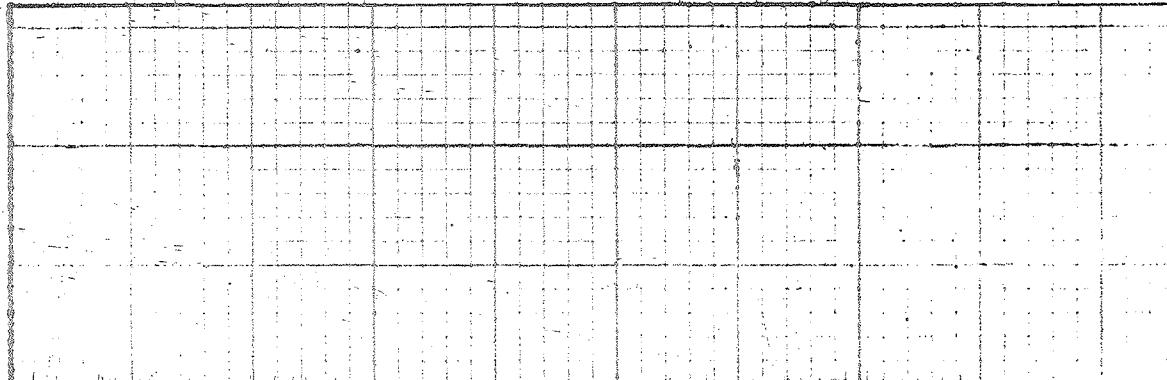
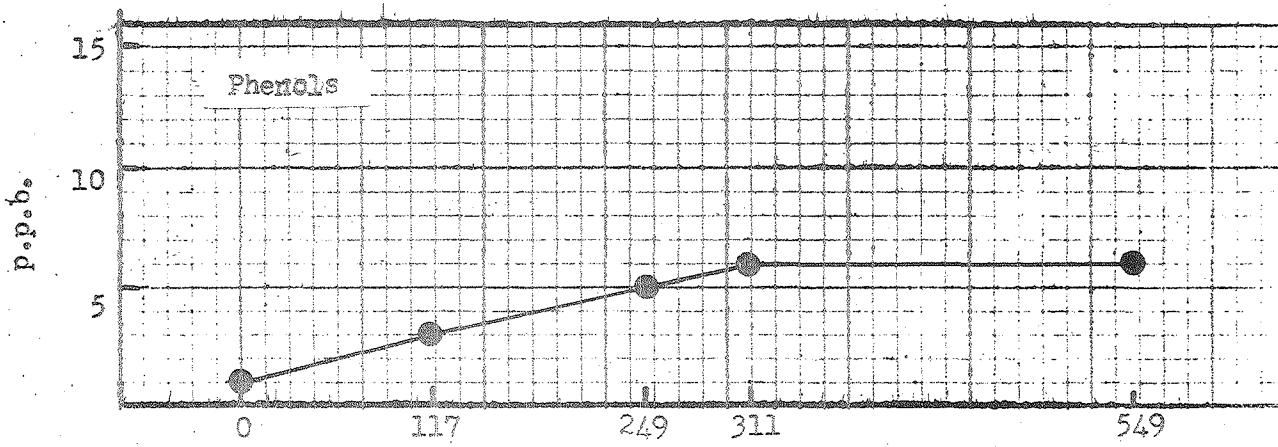
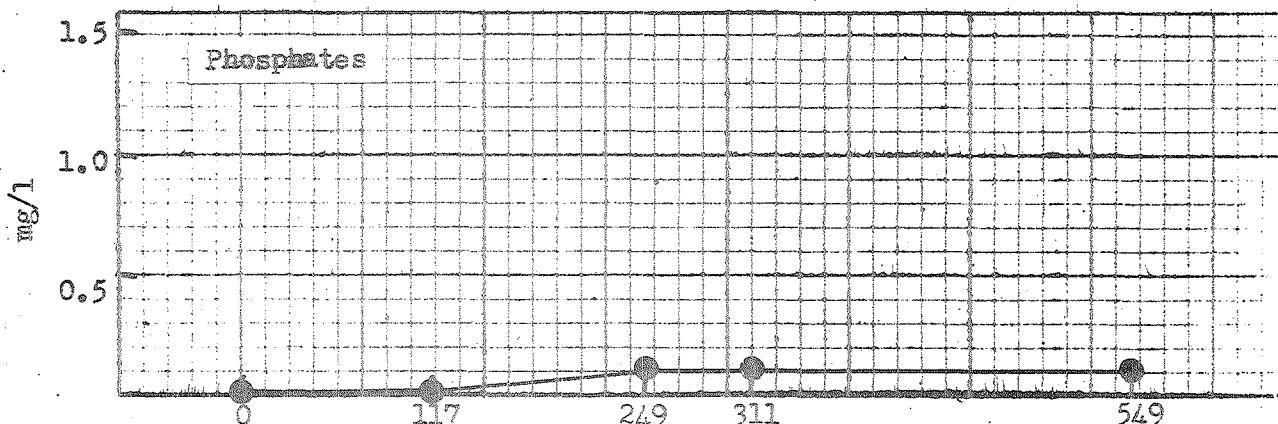
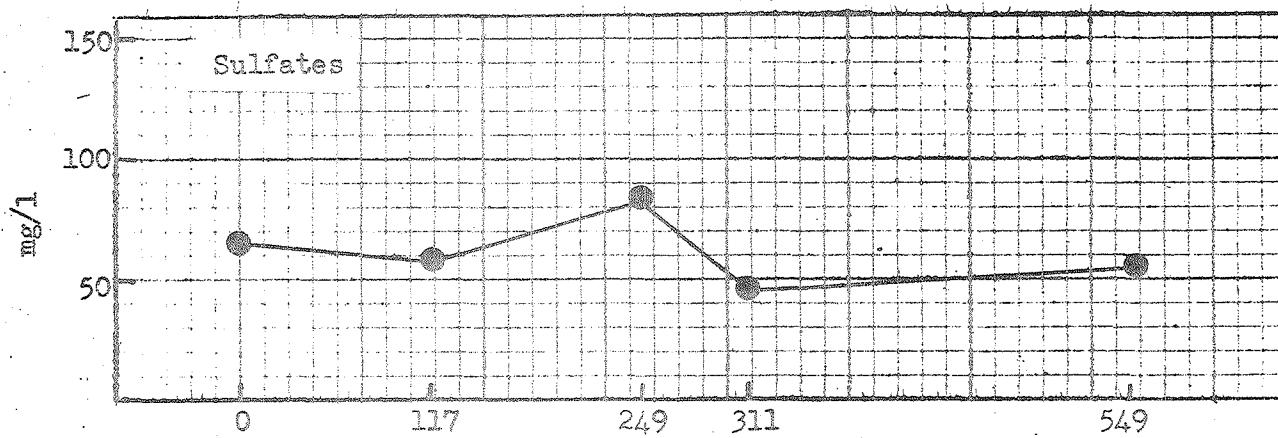
RIVER MILES FROM HINTON

ATTHABASCA RIVER SAMPLING RESULTS - NOVEMBER 18 - 20, 1969

RIVER DISCHARGE C.M.S.

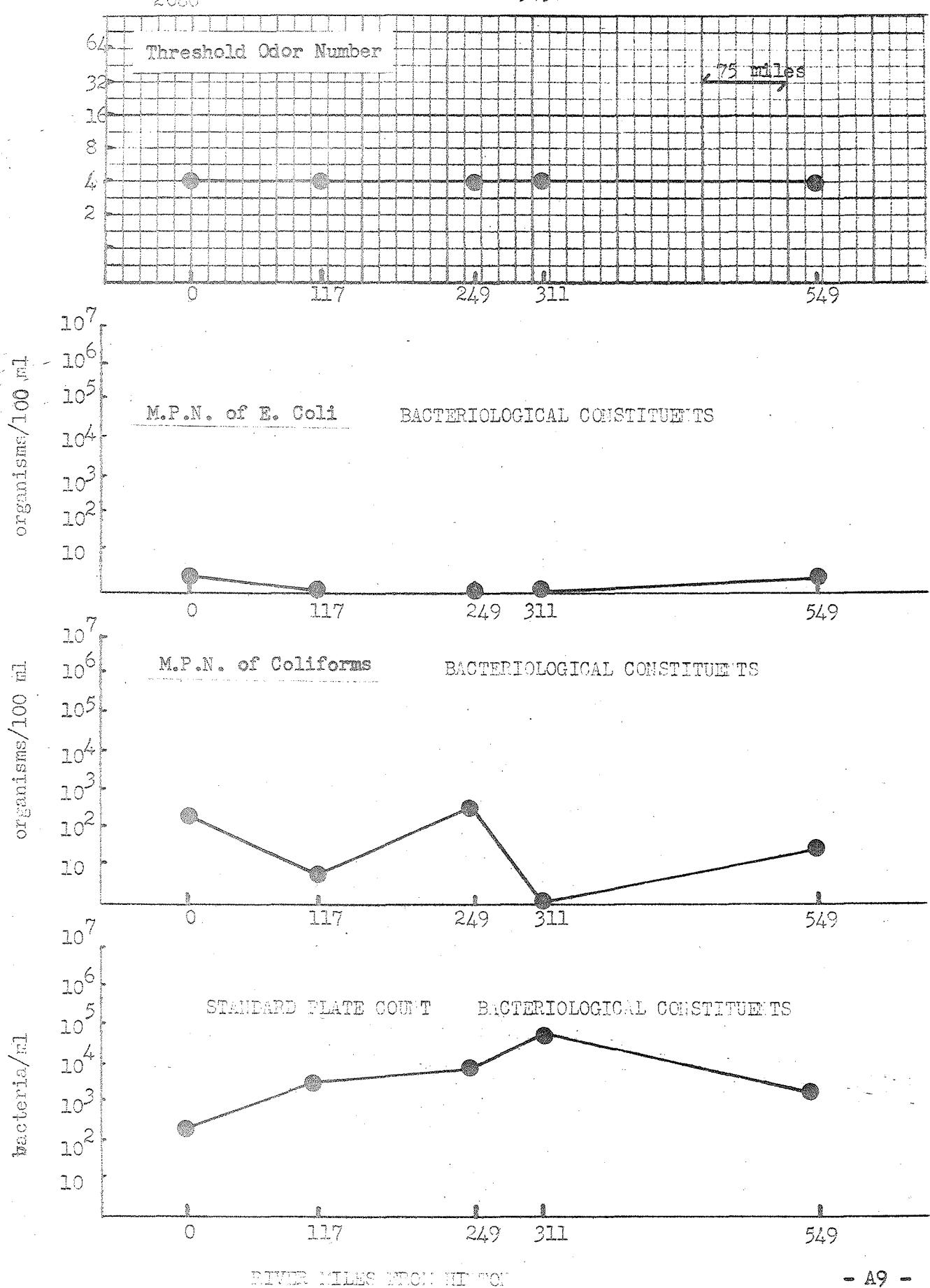
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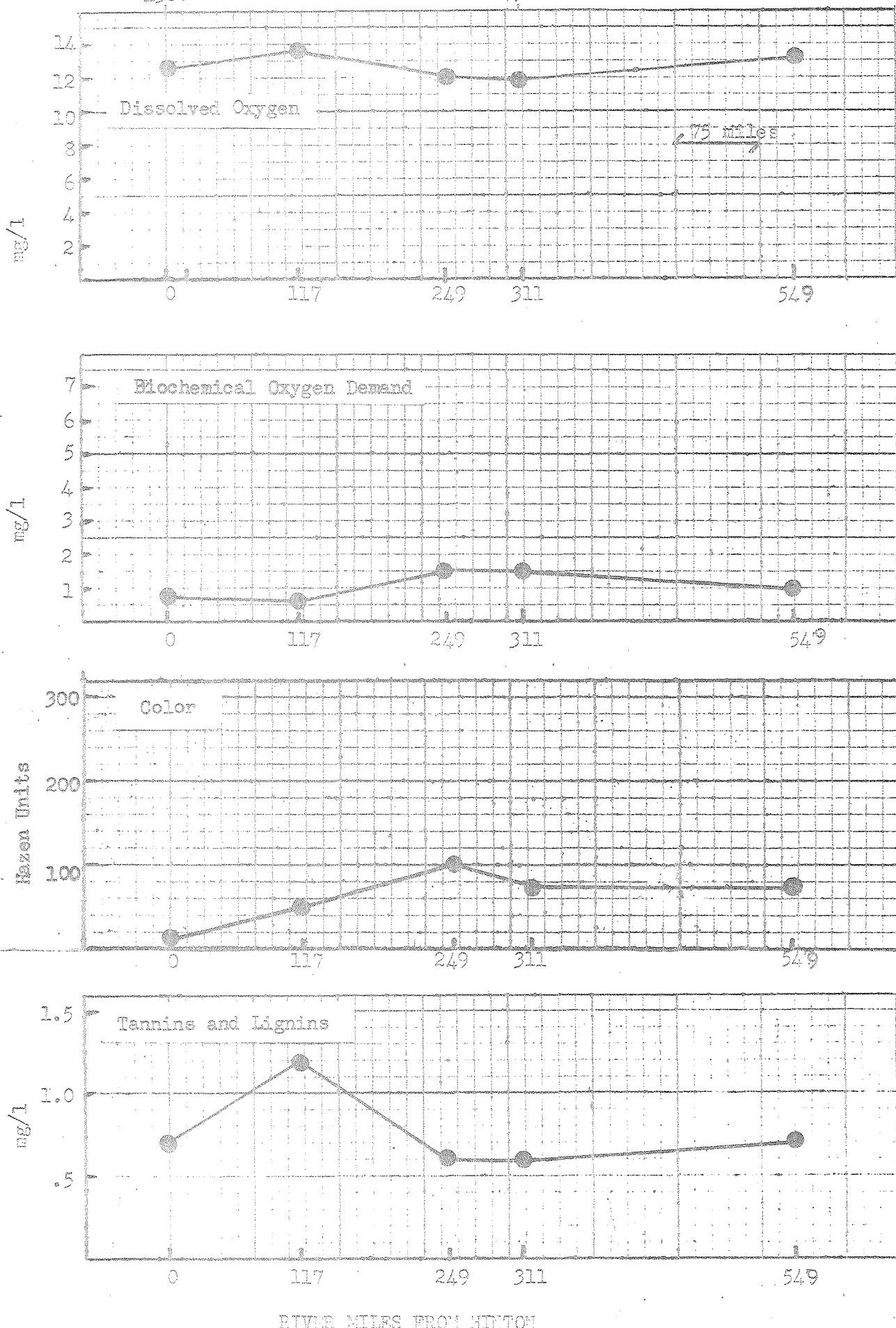


RIVER MILES DOWNSTREAM FROM HINTON

ANNUAL RIVER SAMPLES - OCTOBER 18-20, 1969



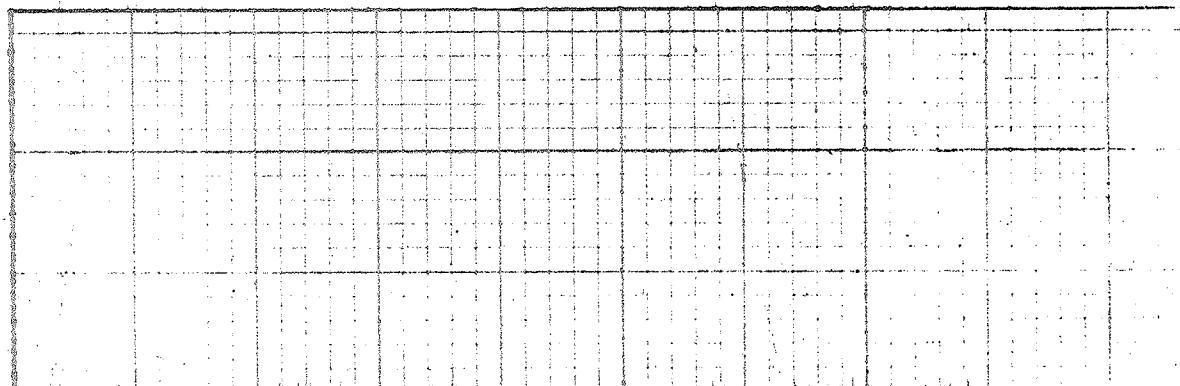
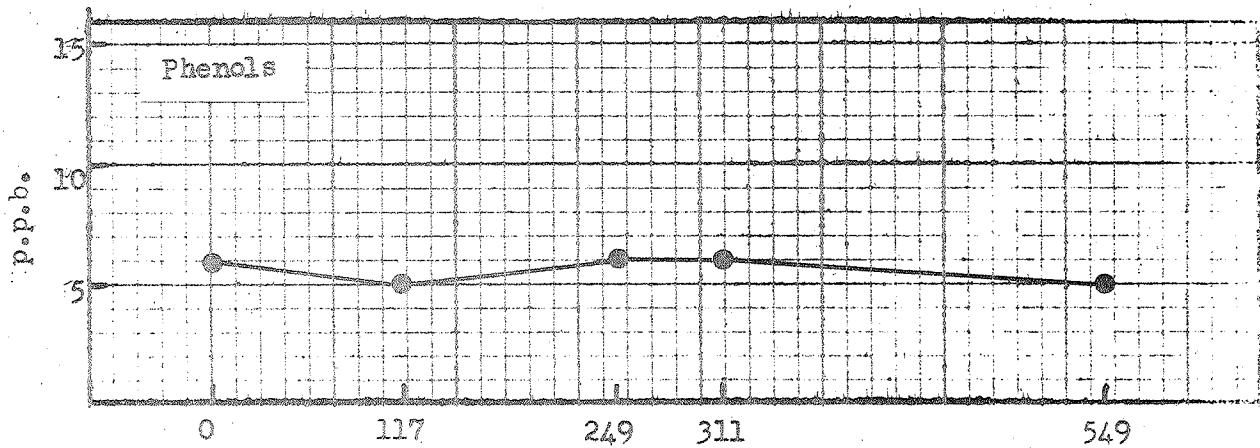
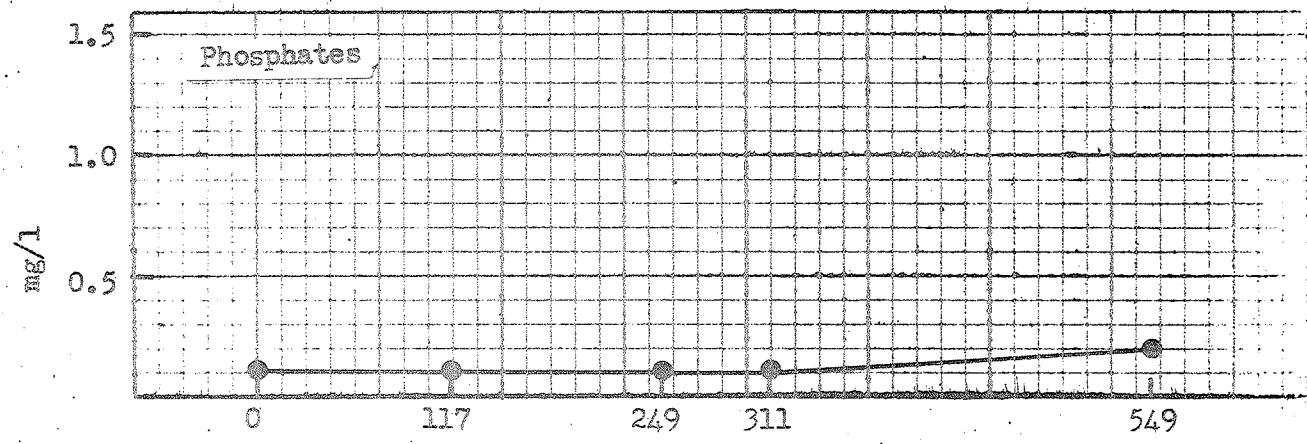
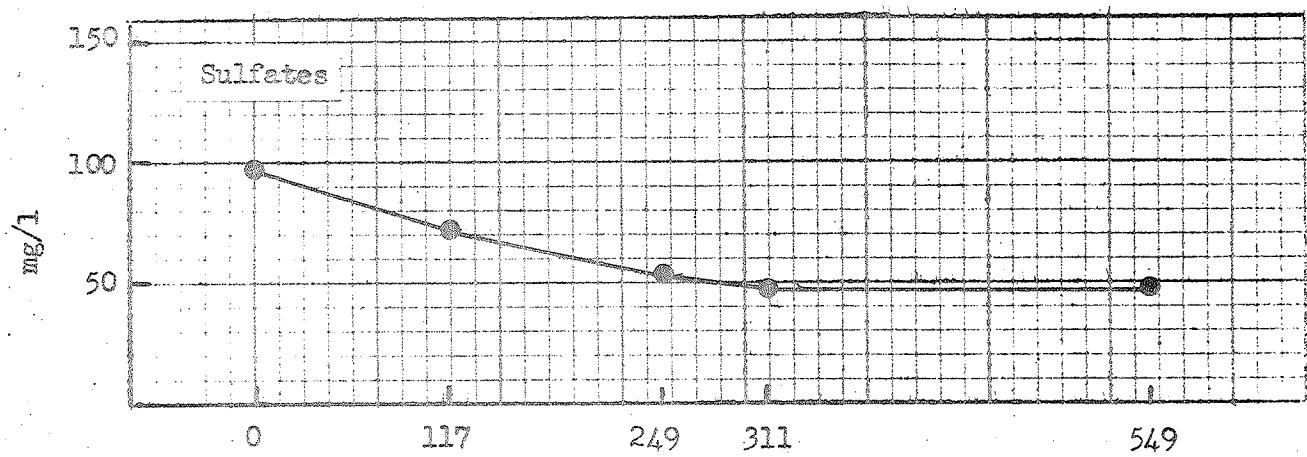
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ATHABASCA RIVER SAMPLING RESULTS - DECEMBER 9-10, 1969

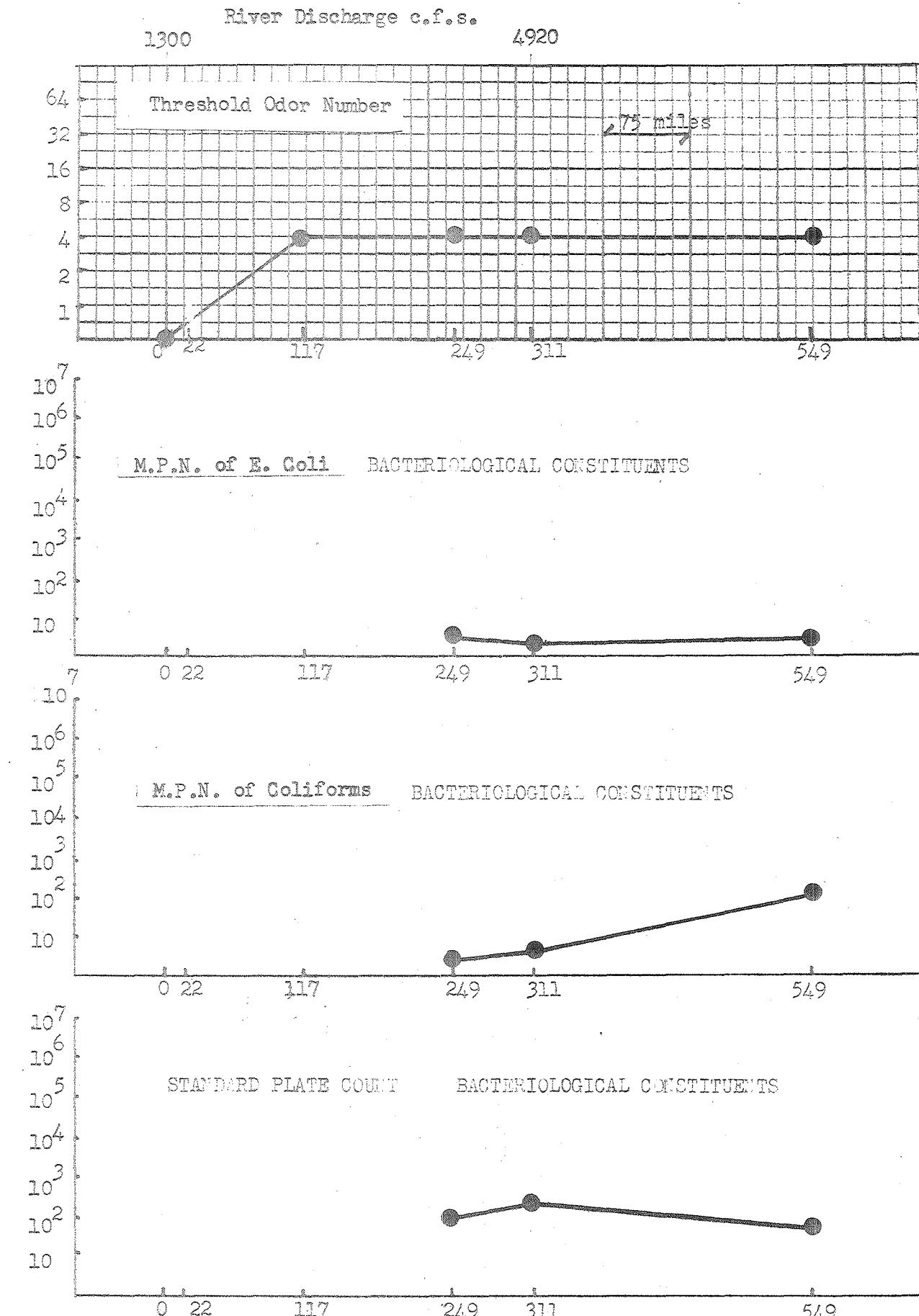
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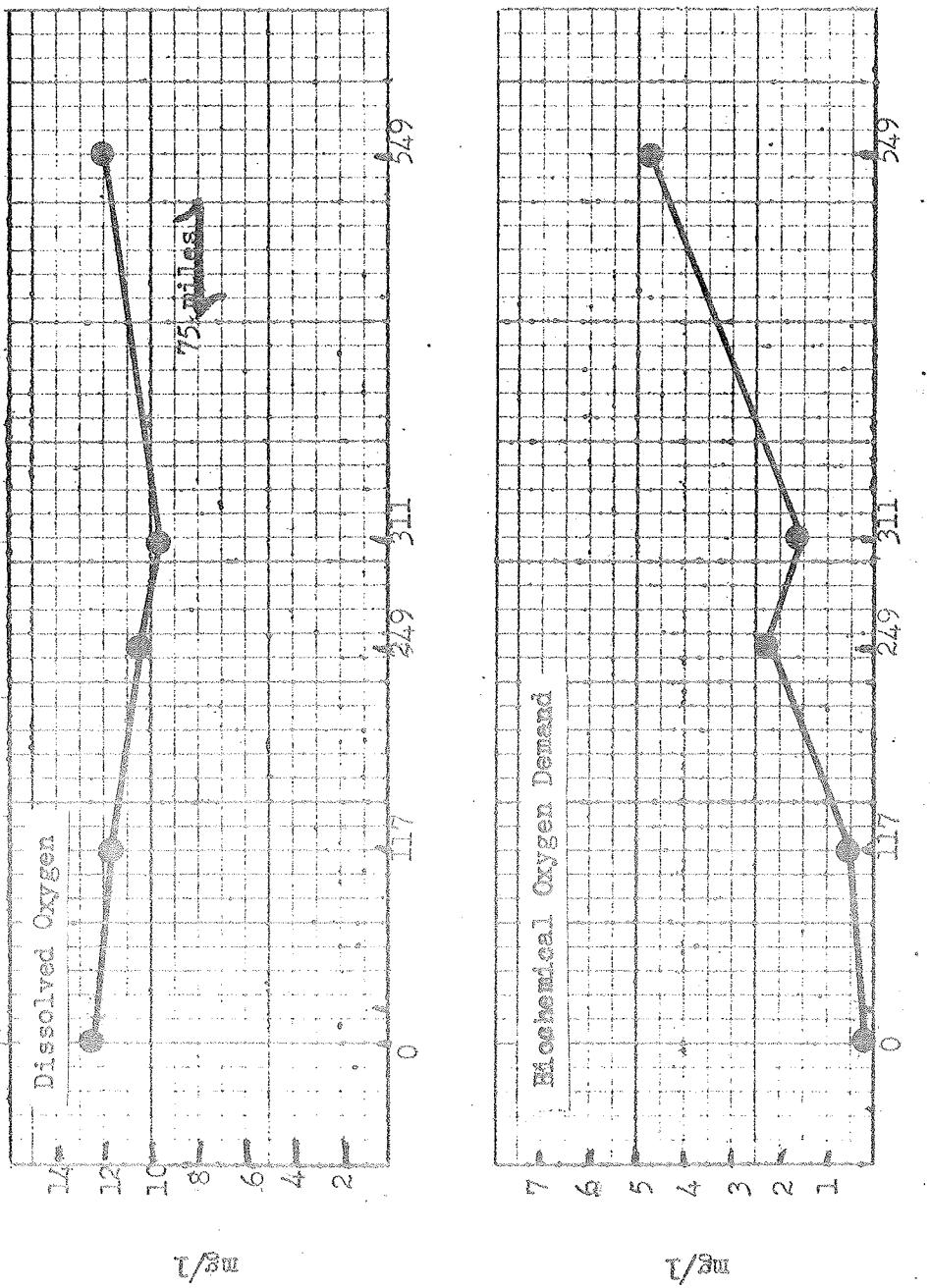
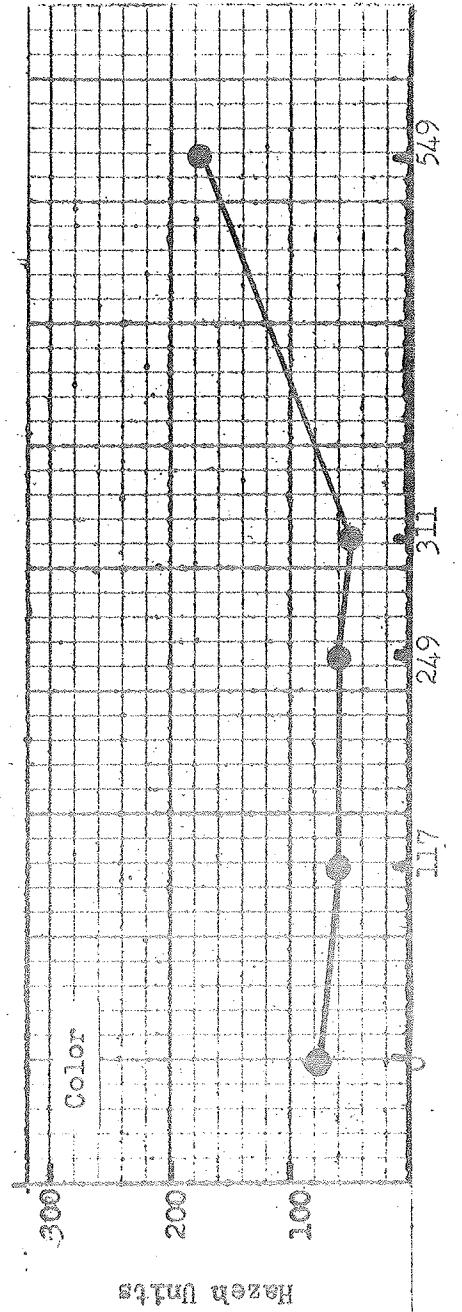
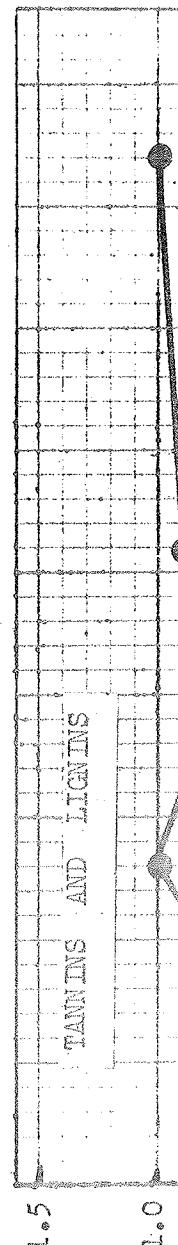
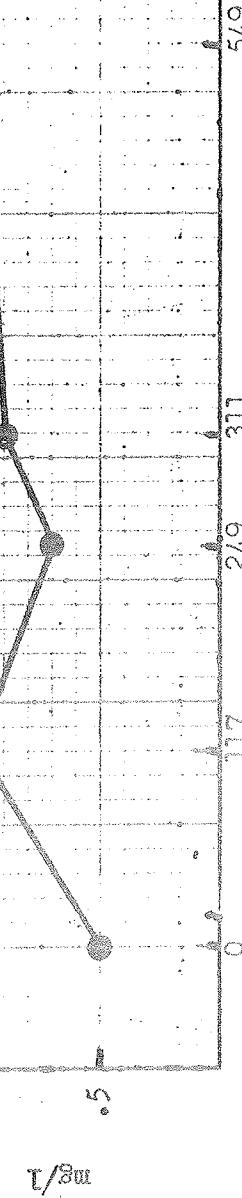


RIVER MILES DOWNSTREAM FROM HINTON

ANNAHAWSCA RIVER SAMPLING RESULTS
DECEMBER 9-10, 1969

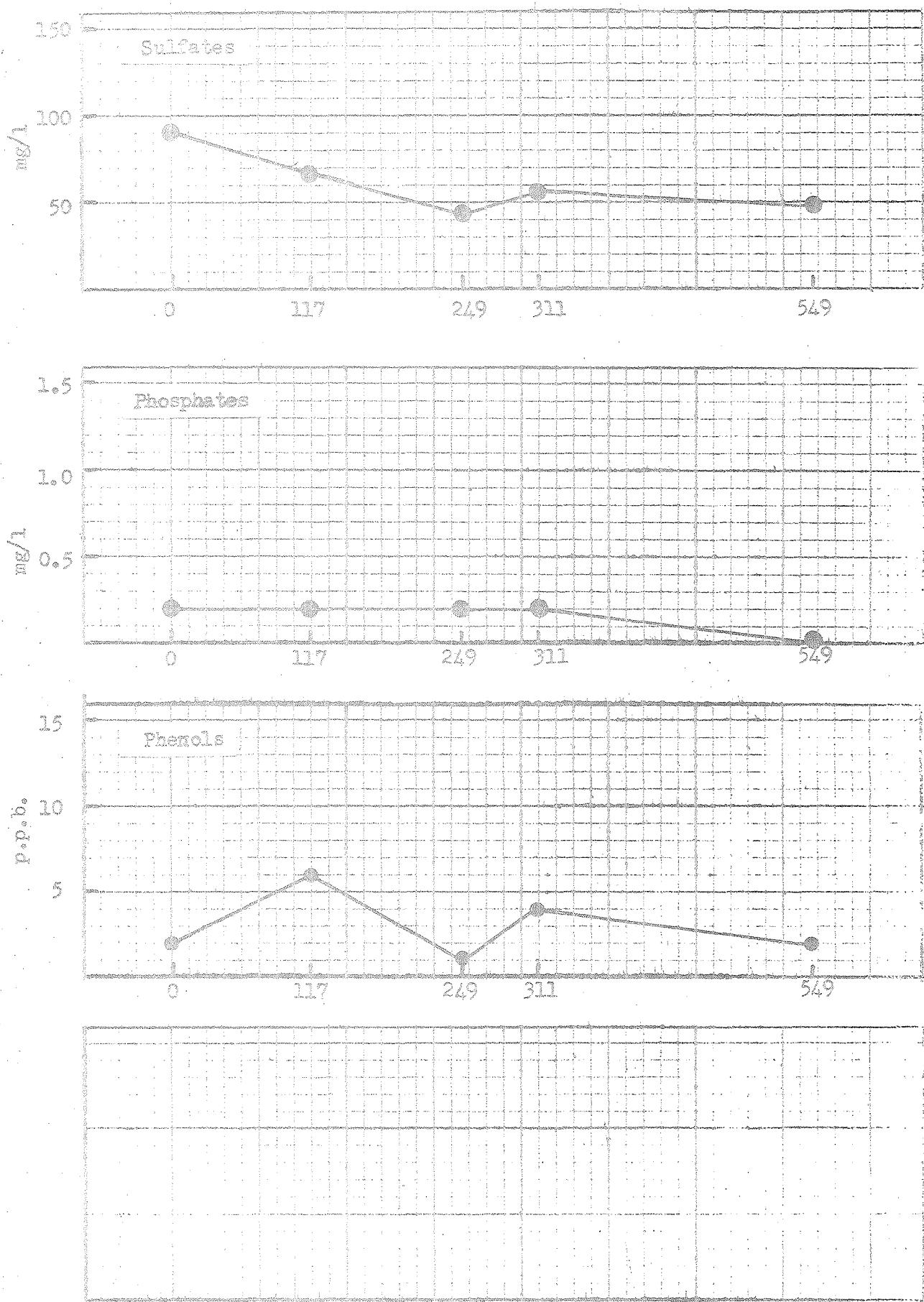


RIVER MILES DOWNSTREAM FROM HINTON



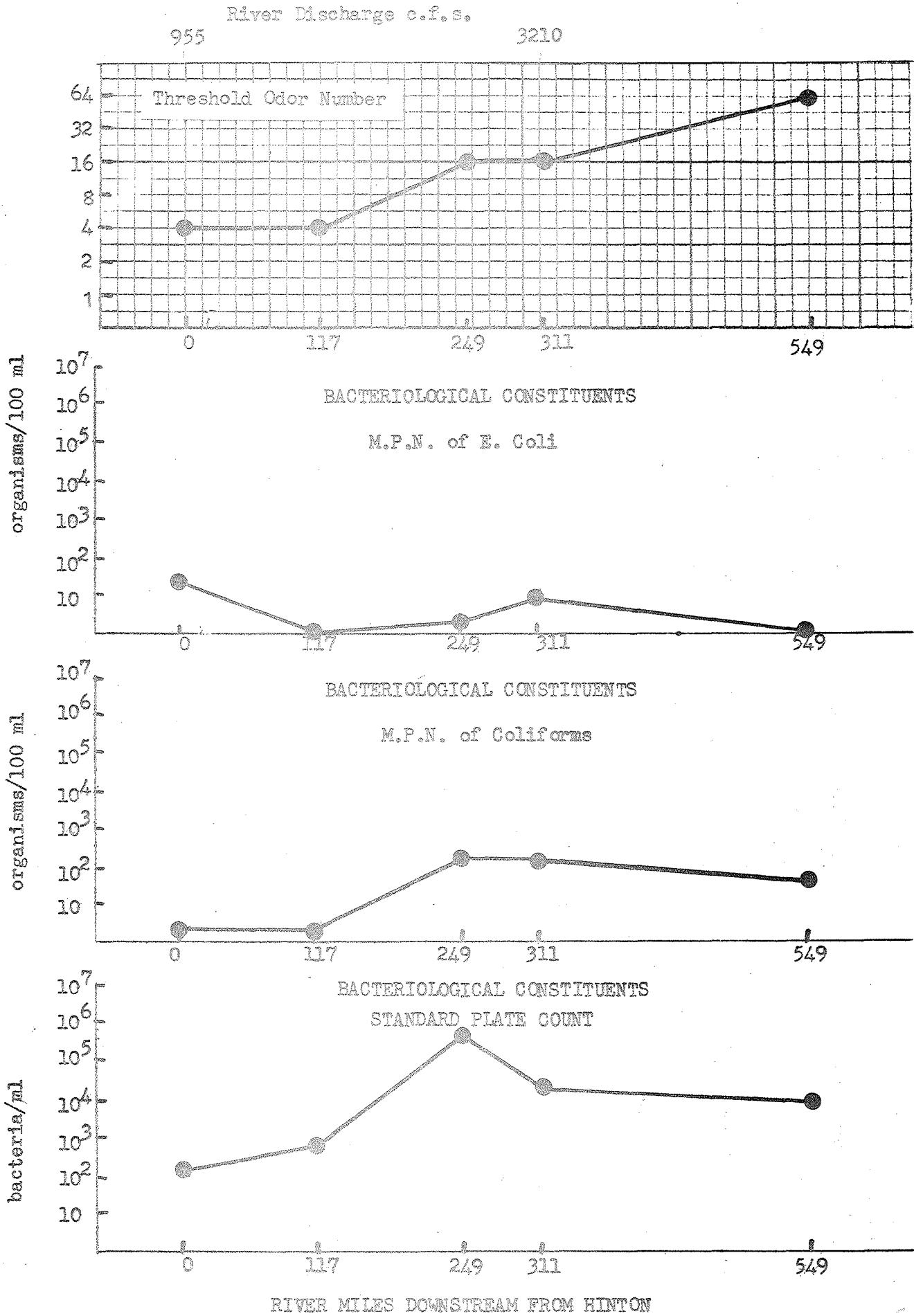
ATTHABASCA RIVER SAMPLING RESULTS January 13, 1970

ATLANTIC RIVER Sampling Results - JANUARY 13, 1970



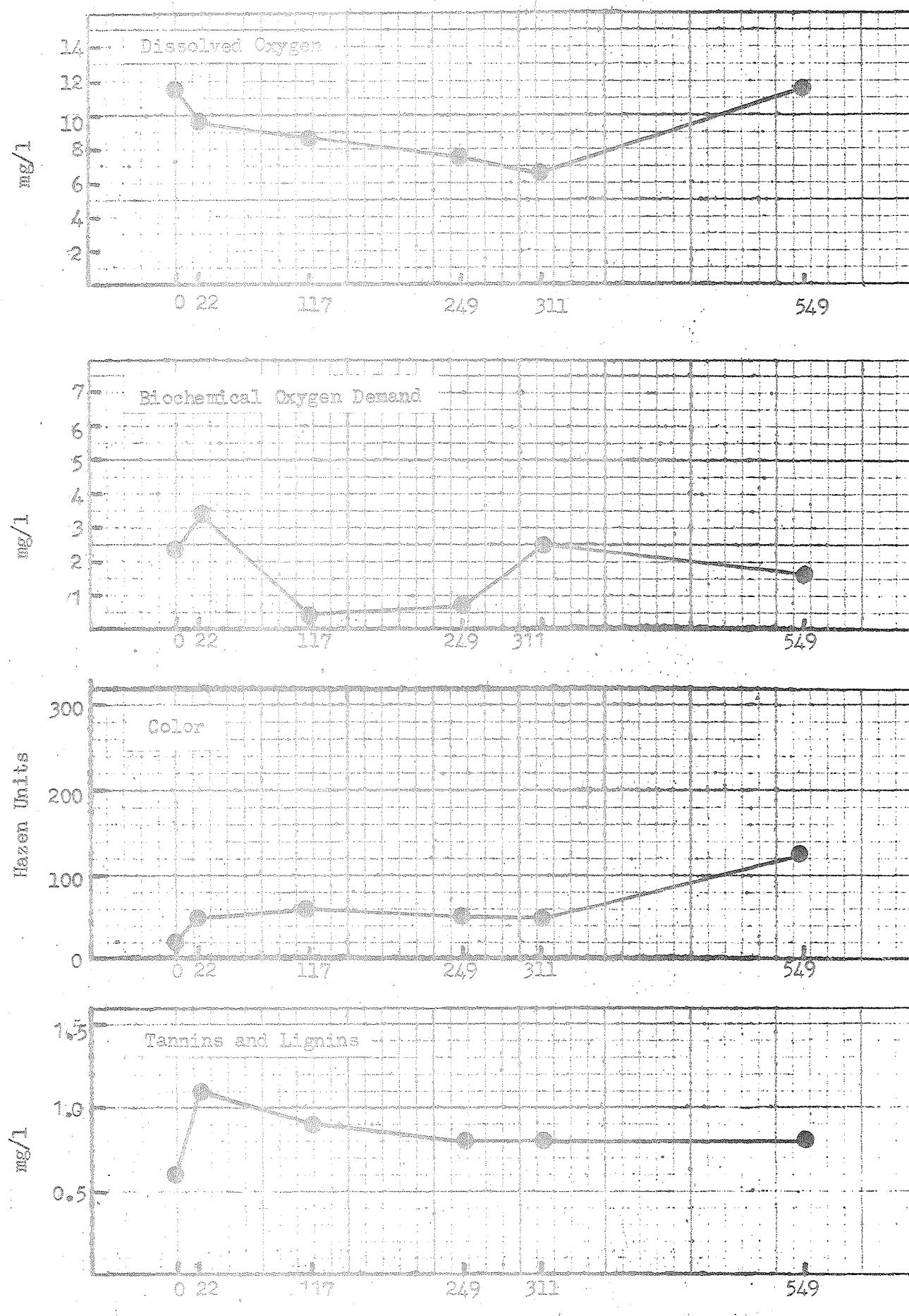
RIVER MILES DOWNSTREAM FROM HINTON

ATHABASCA RIVER SAMPLING RESULTS - JANUARY 13, 1970



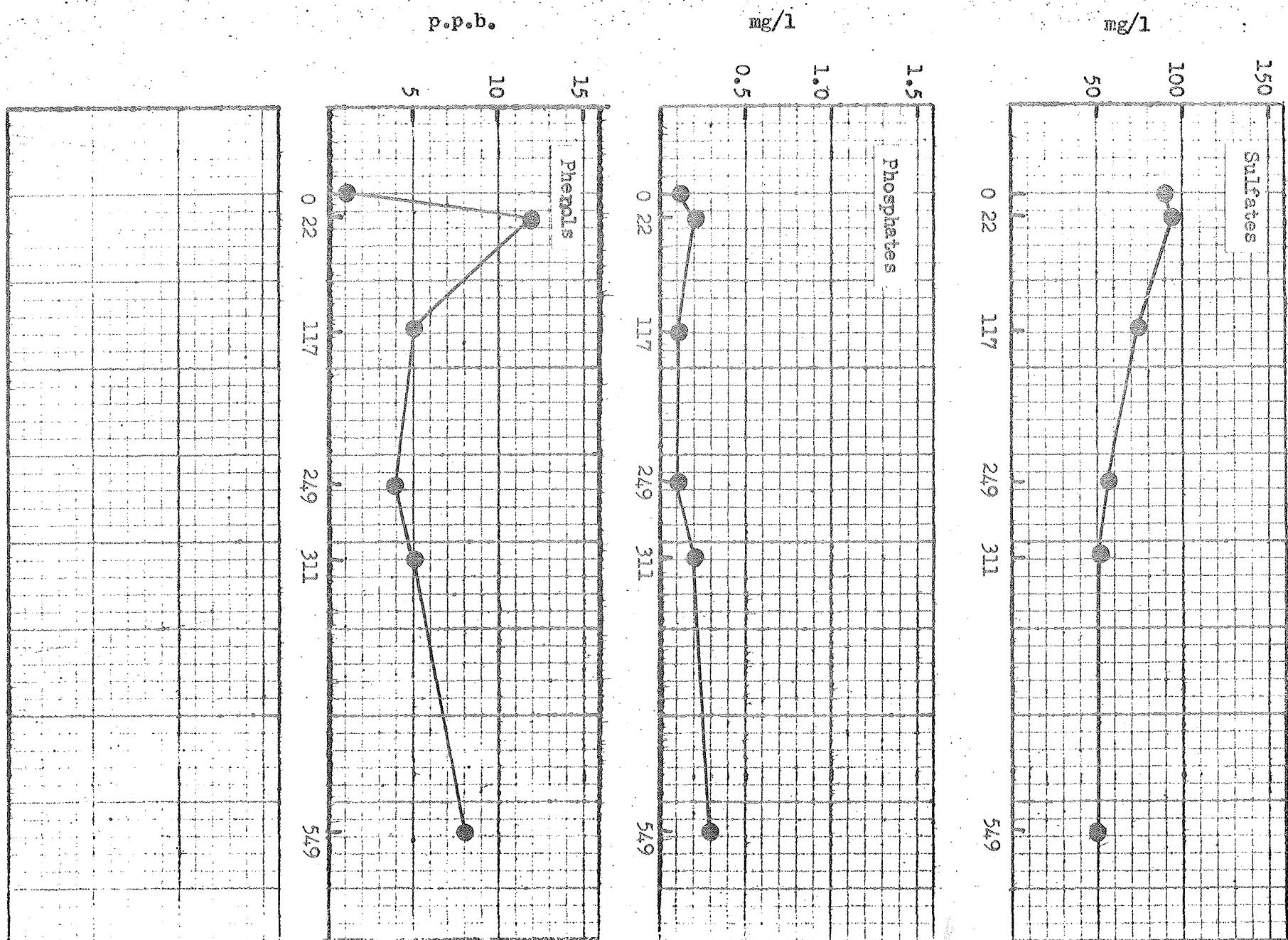
ATHABASCA RIVER SAMPLING RESULTS - February 11, 1970

RIVER DISCHARGE C.D.O. 1260 2810



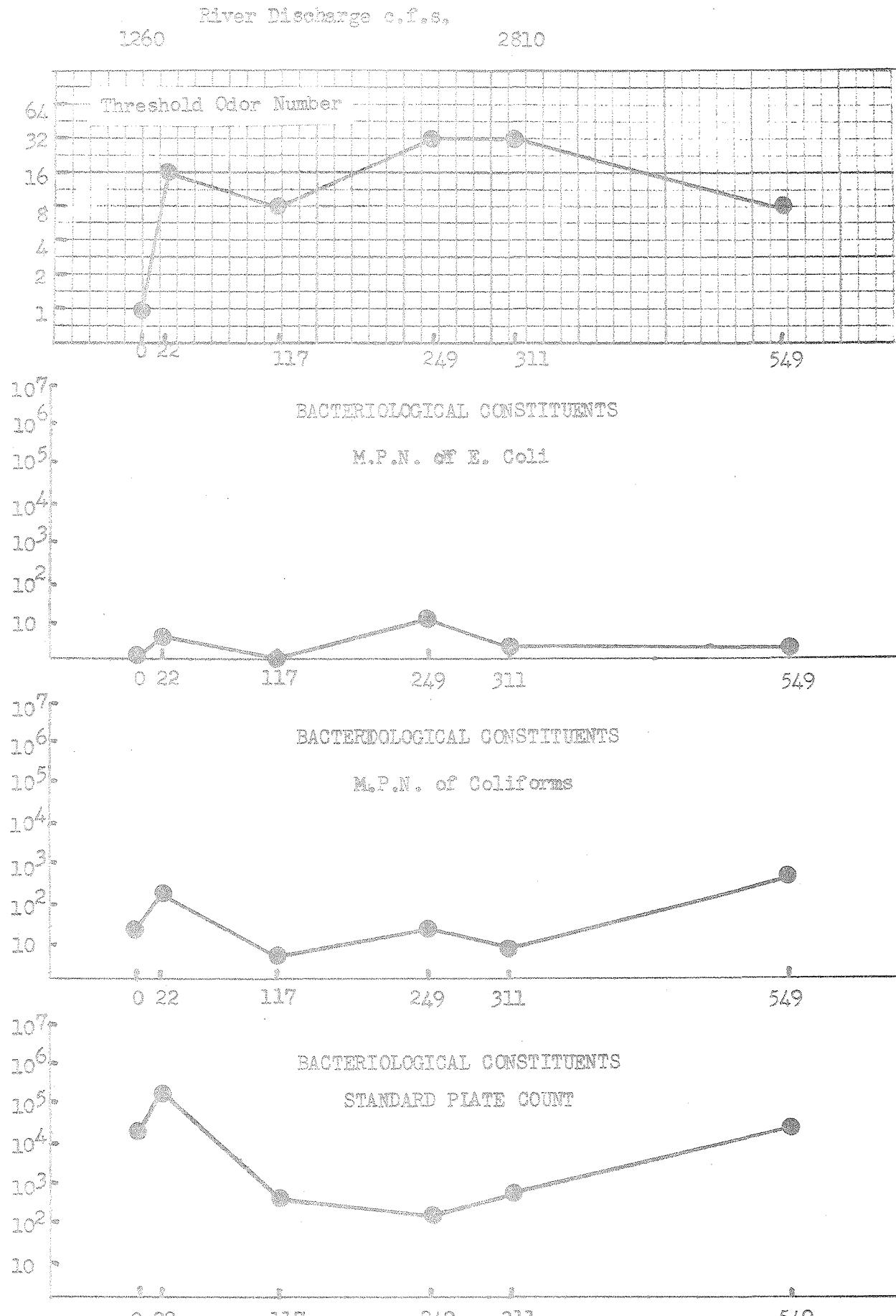
RIVER MILES DOWNSTREAM FROM HINTON

ATHABASCA RIVER SAMPLING RESULTS - FEBRUARY 11, 1970



ATMABASCA RIVER SAMPLING RESULTS - February 11, 1970

bacteria/ml organisms/100 ml



ARL ATHABASCA RIVER ABOVE HINTON

1969-70

DAY MONTH YEAR	14 OCT 1969	18 NOV 1969	9 DEC 1969	13 JAN 1970	11 FEB 1970
COMPOSITE CR. GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1340	1500	900	1100	1030
TEMPERATURE, DEG.CENT.	1.0	1.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	26.84	*0.00	26.25	26.90	26.90
DISSOLVED OXYGEN, MG/L	11.5	12.3	12.7	12.2	11.4
PERCENT SATURATION	90.	*00.	99.	93.	87.
BIOCHEM. CX. DEMAND MG/L	0.6	1.0	0.7	0.1	2.3
HYDROGEN ION CONC., PH	8.2	8.0	8.0	7.8	7.9
ALKALINITY MG/L	131	133	143	141	127
THRESHOLD ODOR NO., TYPE	1 M	4 M	1	4 M	1 M
TOTAL RESIDUE MG/L	176	280	272	314	306
IGNITION LOSS MG/L	4	100	66	144	120
TURBIDITY AS SiO2 MG/L	2	14	6	2	4
TOTAL HARDNESS MG/L	148	176	214	208	192
CHLORIDES MG/L	1	1	0	0	0
AMMONIA NITROGEN MG/L	0.0	0.3	0.1	0.0	0.0
NITRATE NITROGEN MG/L	0.3	0.1	0.2	0.1	0.0
SULFATES AS SO4 MG/L	64	66	96	90	90
TOTAL PHOSPHS. AS PO4 MG/L	0.0	0.0	0.1	0.2	0.1
COLOR					
HAZEN UNITS MG/L	25 R-P	15 R-P	10 R-P	75 OR	20 R-P
DOMINANT WAVELENGTH NM	500C	505C	505C	591	520C
LUMINANCE PERCENT	99.0	99.0	99.0	92.0	97.0
PURITY PERCENT	1.2	1.5	1.4	0.9	0.3
PHENOLS PPB	5	1	6	2	1
OILS & GREASES MG/L	*.0	*.0	*.0	1.5	0.0
FLUORIDES MG/L	0.50	0.07	0.15	0.14	0.17
TANNINS & LIGNINS MG/L	0.2	0.6	0.7	0.5	0.6
CCLIFORM M.P.N./100ML	79.	350.	*000.	4.	33.
MPN OF E. COLI/100ML	0.0	1.8	*00.0	54.0	0.0
STD. PLATE COUNT/ML	750	200	*CCC00	200	21000
RIVER DISCHARGE C.F.S.	3470.	2080.	1270.	655.	1260.

* DENOTES DATA NOT AVAILABLE

ATL ATHABASCA RIVER ABOVE HINTON

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	12.02	12.70	11.40	12.20
BOD	MG/L	0.94	2.30	0.10	0.70
HYDROGEN ION CONC., PP		7.98	8.20	7.80	8.00
ALKALINITY	MG/L	135.00	143.00	127.00	133.00
TOTAL RESIDUE	MG/L	269.60	314.00	176.00	314.00
INCINERATION LOSS	MG/L	86.80	144.00	4.00	100.00
TURBIDITY AS SiO ₂	MG/L	5.60	14.00	2.00	4.00
TOTAL HARDNESS	MG/L	187.60	214.00	148.00	192.00
CHLORIDES	MG/L	0.40	1.00	0.00	0.00
AMMONIA NITROGEN	MG/L	0.08	0.30	0.00	0.00
SULFATES AS SO ₄	MG/L	81.20	96.00	64.00	90.00
NITRATE NITROGEN	MG/L	0.14	0.30	0.00	0.10
TOTAL PHOSPHATE AS PO ₄	MG/L	0.08	0.20	0.00	0.10
PHENOLS	PPB	3.00	6.00	1.00	2.00
FLUORIDES	MG/L	0.21	0.50	0.07	0.15
TANNINS & LIGNINS	MG/L	0.52	0.70	0.20	0.60
COLIFORMS M.P.N./100ML		117.	350.	4.	33.
M.P.N. OF E. COLI/100ML		14.	54.	0.	0.
STANDARD PLATE COUNT/ML		5538.	21000.	200.	200.

AR2 ATHABASCA RIVER AT CBED

1969-70

DAY MONTH YEAR	14 OCT 1969	11 FEB 1970
COMPOSITE CR GRAB SAMPLE	6	6
INITIAL SAMPLING TIME	1300	1130
TEMPERATURE, DEG.CENT.	5.0	0.0
BAROMETRIC PRES. IN.HG	29.92	27.05
DISSOLVED OXYGEN, MG/L	11.2	9.6
PERCENT SATURATION	88.	73.
BICHEM. CX. DEMAND MG/L	2.0	3.3
HYDROGEN ION CONC., PH	8.2	7.7
ALKALINITY MG/L	109	134
THRESHOLD ODOR NO., TYPE	32 WR	16 WR
TOTAL RESIDUE MG/L	312	372
IGNITION LOSS MG/L	66	166
TURBIDITY AS SIC2 MG/L	3	20
CHLORIDES MG/L	5	15
AMMONIA NITROGEN MG/L	0.3	0.5
NITRATE NITROGEN MG/L	0.1	0.1
SULFATES AS SO4 MG/L	6.8	9.4
TOTAL PHCS. AS PC4 MG/L	0.0	0.2
COLOR		
HAZEN UNITS MG/L	40	50
HUE R-P GISHY		
Dominant wavelength mu	5650	565
LUMINANCE PERCENT	96.0	94.0
PURITY PERCENT	0.1	0.6
PHENOLS PPB	3	12
TANNINS & LIGNINS MG/L	0.9	1.1
COLIFORM M.P.N./100ML	1600.	160.
MPN OF E. COLI/100ML	6.8	4.5
STD. PLATE COUNT/ML	52000	190000

* DENOTES DATA NOT AVAILABLE

AR3 ATHABASCA RIVER AT WHITECOURT BRIDGE

1969-70

DAY MONTH YEAR	28 JUL 1969	14 AUG 1969	18 NOV 1969	9 DEC 1969	13 JAN 1970	11 FEB 1970
COMPOSITE CR GRAB SAMPLE	G	G	G	G	G	G
INITIAL SAMPLING TIME	1200	1615	1130	1200	1600	1430
TEMPERATURE, DEG.CENT.	*0.0	5.0	1.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	27.64	*0.00	27.10	27.20	27.70
DISSOLVED OXYGEN, MG/L	*0.0	11.8	12.4	12.2	11.9	8.7
PERCENT SATURATION	*00.	100.	*00.	100.	90.	64.
BICHEM. OX. DEMAND MG/L	1.4	0.4	1.8	0.6	0.5	0.4
HYDROGEN ION CONC., PH	8.0	8.2	8.1	8.2	7.9	7.5
ALKALINITY MG/L	82	128	163	179	172	161
THRESHOLD ODOR NO., TYPE	8 N	4 M	4 WR	4 WR	4 N	8 WR
TOTAL RESIDUE MG/L	336	248	328	274	366	298
IGNITION LOSS MG/L	92	66	152	100	122	120
TURBIDITY AS SiO ₂ MG/L	48	3	23	8	2	2
TOTAL HARDNESS MG/L	*00	*00	199	*00	*00	*00
CHLORIDES MG/L	2	3	8	4	8	11
AMMONIA NITROGEN MG/L	0.5	0.2	0.3	0.5	0.2	0.3
NITRATE NITROGEN MG/L	0.2	0.0	0.0	0.2	0.1	0.1
SULFATES AS SO ₄ MG/L	32	48	58	72	68	74
TOTAL PHOS. AS PO ₄ MG/L	0.5	0.1	0.0	0.1	0.2	0.1
COLOR						
HAZEN UNITS MG/L	*00000	40	30	50	60	60
HUE	*00.0	GREEN	8-P	GISHY	GISHY	YISHO
DOMINANT WAVELENGTH NM	*000	509	5006	571	567	584
LUMINANCE PERCENT	*0.0	97.0	98.0	96.0	94.0	93.0
PURITY PERCENT	*00.0	6.2	6.2	0.9	1.0	0.8
PHENOLS PPB	4	3	3	5	6	5
FLUORIDES MG/L	*.00	*.00	0.11	0.21	0.13	*.00
TANNINS & LIGNINS MG/L	0.6	0.7	1.0	1.2	1.0	0.9
COLIFORM M.P.N./100ML	*000	350	7	*000	4	5
MPN CF E CCLI/100ML	*00.0	0.0	0.0	*00.0	0.0	0.0
STD. PLATE COUNT/ML	*00000	220000	2000	*00000	700	550
RIVER DISCHARGE C.F.S.	13800.	5500.	1250.	1330.	1870.	1920.

* DENOTES DATA NOT AVAILABLE

AB3 ATHABASCA RIVER AT WHITECURT BRIDGE

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	11.60	13.20	8.70	11.90
BOD	MG/L	0.85	1.80	0.40	0.50
HYDROGEN ION CONC., PH		7.98	8.20	7.50	8.00
ALKALINITY	MG/L	147.50	179.00	82.00	161.00
TOTAL RESIDUE	MG/L	308.33	366.00	248.00	274.00
IGNITION LOSS	MG/L	108.67	152.00	66.00	100.00
TURBIDITY AS SiO ₂	MG/L	14.33	48.00	2.00	13.00
CHLORIDES	MG/L	6.00	11.00	2.00	4.00
AMMONIA NITROGEN	MG/L	0.33	0.50	0.20	0.30
SULFATES AS SO ₄	MG/L	58.67	74.00	32.00	58.00
NITRATE NITROGEN	MG/L	0.10	0.20	0.00	0.10
TOTAL PHOS. AS PO ₄	MG/L	0.17	0.50	0.00	0.10
PHENOLS	PPB	4.33	6.00	3.00	4.00
TANNINS & LIGNINS	MG/L	0.90	1.20	0.60	0.90
COLIFORMS M.P.N./100ML		91.	350.	4.	5.
M.P.N. CFU E.COLI/100ML		C.	0.	C.	0.
STANDARD PLATE COUNT/ML		57050.	220000.	700.	2000.

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AR4 ATHABASCA RIVER ABOVE SMITH

1969-70

DAY MONTH YEAR	14 CCT 1969	20 NCV 1969	10 DEC 1969	22 JAN 1970	11 FEB 1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1100	1145	1000	1215	1300
TEMPERATURE, DEG.CENT.	5.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	28.80	28.00	*0.00	27.75	28.20
DISSOLVED OXYGEN, MG/L	11.7	12.4	12.0	10.4	7.6
PERCENT SATURATION	95.	98.	*00.	77.	55.
BIOCHEM. OX. DEMAND MG/L	0.3	3.3	1.5	2.2	0.7
HYDROGEN ION CONC., PH	8.1	8.0	7.9	7.5	7.8
ALKALINITY MG/L	131	173	175	151	178
THRESHOLD ODOR NO., TYPE	1 M	4 M	4 WR	16 M	32 WR
TOTAL RESIDUE MG/L	232	236	280	242	278
IGNITION LOSS MG/L	118	102	92	88	110
TURBIDITY AS SIC ₂ MG/L	9	11	18	3	2
CHLORIDES MG/L	3	4	6	4	9
AMMONIA NITROGEN MG/L	0.4	0.4	0.6	0.3	0.3
NITRATE NITROGEN MG/L	0.3	0.2	0.2	0.8	0.1
SULFATES AS SO ₄ MG/L	42	82	53	44	57
TOTAL PHOS.AS PO ₄ MG/L	0.1	0.1	0.1	0.2	0.1
COLOR					
HAZEN UNITS MG/L	75	200	100	60	50
HUE	OR	YISPO	OR	GISHY	GISHY
DOMINANT WAVELENGTH MU	591	581	592	574	571
LUMINANCE PERCENT	92.0	78.0	91.0	95.0	96.0
PURITY PERCENT	0.9	5.1	1.4	1.2	0.9
PHENOLS PPB	0	5	6	1	4
TANNINS & LIGNINS MG/L	0.8	0.7	0.6	0.7	0.8
COLIFORM M.P.N./100ML	79.	680.	5.	180.	33.
MPN OF E COLI/100ML	6.8	0.0	4.5	1.8	13.0
STD. PLATE COUNT/KL	800	81000	200-450000	150	

* DENOTES DATA NOT AVAILABLE

AB3 ATHABASCA RIVER AT WHITECOURT BRIDGE

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	11.60	13.20	8.70	11.90
BOD	MG/L	0.85	1.80	0.40	0.50
HYDROGEN ION CONC., PH		7.98	8.20	7.50	8.00
ALKALINITY	MG/L	147.50	179.00	82.00	161.00
TOTAL RESIDUE	MG/L	308.33	366.00	248.00	274.00
IGNITION LOSS	MG/L	108.67	152.00	66.00	100.00
TURBIDITY AS SiO ₂	MG/L	14.33	48.00	2.00	13.00
CHLORIDES	MG/L	6.00	11.00	2.00	4.00
AMMONIA NITROGEN	MG/L	0.33	0.50	0.20	0.30
SULFATES AS SO ₄	MG/L	58.67	74.00	32.00	58.00
NITRATE NITROGEN	MG/L	0.10	0.20	0.00	0.10
TOTAL PHOS. AS PO ₄	MG/L	0.17	0.50	0.00	0.10
PHENOLS	PPB	4.33	6.00	3.00	4.00
TANNINS & LIGNINS	MG/L	0.90	1.20	0.60	0.90
COLIFORMS M.P.N./100ML		91.	350.	4.	5.
M.P.N. CF E COLI/100ML		0.	0.	0.	0.
STANDARD PLATE COUNT/ML		57050.	220000.	700.	2000.

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AR4 ATHABASCA RIVER ABOVE SMITH

1969-70

DAY MONTH YEAR	14 OCT 1969	20 NOV 1969	10 DEC 1969	22 JAN 1970	11 FEB 1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1100	1145	1000	1215	1300
TEMPERATURE, DEG.CENT.	5.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	28.80	28.00	*0.00	27.75	28.20
DISSOLVED OXYGEN, MG/L	11.7	13.4	12.0	10.4	7.6
PERCENT SATURATION	95.	98.	*00.	77.	55.
BIOCHEM. OX. DEMAND MG/L	0.3	3.3	1.5	2.2	0.7
HYDROGEN ION CONC., PH	8.1	8.0	7.9	7.5	7.8
ALKALINITY MG/L	131	173	175	151	178
THRESHOLD ODOR NO., TYPE	1 M	4 M	4 WR	16 M	32 HR
TOTAL RESIDUE MG/L	232	236	280	242	278
IGNITION LOSS MG/L	118	102	92	88	110
TURBIDITY AS SIC2 MG/L	9	11	18	3	2
CHLORIDES MG/L	3	4	6	4	9
AMMONIA NITROGEN MG/L	0.4	0.4	0.6	0.3	0.3
NITRATE NITROGEN MG/L	0.3	0.2	0.2	0.8	0.1
SULFATES AS SO4 MG/L	42	82	53	44	57
TOTAL PHOS.AS PO4 MG/L	0.1	0.1	0.1	0.2	0.1
COLOR					
HAZEN UNITS MG/L	75	200	100	60	50
HUE	OR	YISFO	OR	GISHY	GISHY
DOMINANT WAVELENGTH MU	591	581	592	574	571
LUMINANCE PERCENT	92.0	78.0	91.0	95.0	96.0
PURITY PERCENT	0.9	5.1	1.4	1.2	0.9
PHENOLS PPB	0	5	6	1	4
TANNINS & LIGNINS MG/L	0.8	0.7	0.6	0.7	0.8
COLIFORM M.P.N./100ML.	79.	680.	5.	180.	33.
MPN OF E. COLI/100ML	6.8	0.0	4.5	1.8	13.0
STD. PLATE COUNT/ML	800	81000	200-450000	150	

* DENOTES DATA NOT AVAILABLE

AR4 ATHABASCA RIVER ABOVE SMITH

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	11.02	13.40	7.60	11.70
BOD	MG/L	1.60	3.30	0.30	1.50
HYDROGEN ION CONC., PH		7.86	8.10	7.50	7.90
ALKALINITY	MG/L	161.60	178.00	131.00	173.00
TOTAL RESIDUE	MG/L	253.60	280.00	232.00	242.00
IGNITION LOSS MG/L		102.00	118.00	88.00	102.00
TURBIDITY AS SiO2 MG/L		8.60	18.00	2.00	9.00
CHLORIDES	MG/L	5.20	9.00	3.00	4.00
AMMONIA NITROGEN	MG/L	0.40	0.60	0.30	0.40
SULFATES AS SO4	MG/L	55.60	82.00	42.00	53.00
NITRATE NITROGEN	MG/L	0.32	0.80	0.10	0.20
TOTAL PHOS. AS PO4 MG/L		0.12	0.20	0.10	0.10
PHENOLS	PPB	3.20	6.00	0.00	4.00
TANNINS & LIGNINS	MG/L	0.72	0.80	0.60	0.70
COLIFORMS M.P.N./100ML		519.	1800.	5.	79.
M.P.N. CFU/COLI/100ML		5.	13.	0.	5.
STANDARD PLATE COUNT/ML		106700.	450000.	200.	1500.

AR5 ATHABASCA RIVER AT ATHABASCA

1969-70

DAY MONTH YEAR	14 OCT 1969	20 NOV 1969	10 DEC 1969	22 JAN 1970	11 FEB 1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1300	1400	1200	1430	1100
TEMPERATURE, DEG.CENT.	5.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	29.00	28.15	*0.00	27.90	28.40
DISSOLVED OXYGEN, MG/L	12.0	13.9	11.9	9.7	6.6
PERCENT SATURATION	97.	101.	800.	71.	48.
BICHEM. OX. DEMAND MG/L	1.7	3.4	1.5	1.5	2.5
HYDROGEN ION CONC., PH	8.1	8.0	7.9	7.3	7.8
ALKALINITY MG/L	128	169	171	190	158
THRESHOLD ODOR NO., TYPE	4 M	4 M	4 WR	16 M	32 WR
TOTAL RESIDUE MG/L	228	278	248	330	272
IGNITION LOSS MG/L	114	122	90	210	124
TURBIDITY AS SIC2 MG/L	6	8	21	2	2
CHLORIDES MG/L	3	4	6	5	7
AMMONIA NITROGEN MG/L	0.4	0.6	0.6	0.3	0.5
NITRATE NITROGEN MG/L	0.4	0.2	0.2	0.1	0.1
SULFATES AS SC4 MG/L	46	46	48	56	51
TOTAL PHOS-AS-PC4 MG/L	0.1	0.1	0.1	0.2	0.2
COLOR					
HAZEN UNITS MG/L	100	60	75	50	50
HUE	OR	GISEY	YISHO	YELL	GISHY
DOMINANT WAVELENGTH NM	592	567	582	576	565
LUMINANCE PERCENT	91.0	94.0	93.0	95.0	94.0
PURITY PERCENT	1.4	1.0	0.9	0.8	0.6
PHENOLS PPB	0	6	6	4	5
OILS & GREASES MG/L	0.5	2.5	0.9	1.1	1.4
TANNINS & LIGNINS MG/L	0.8	0.8	0.6	0.9	0.8
COLIFORM M.P.N./100ML	33.	0.	8.	180.	8.
MPN OF E. COLI/100ML	13.0	0.0	2.0	20.0	2.0
STD. PLATE COUNT/ML	200	70000	800	16000	750
RIVER DISCHARGE C.F.S.	14000.	5550.	4920.	2890.	2810.

* CENOTES DATA NOT AVAILABLE

	AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN MG/L	10.82	13.90	6.60	11.90
BOD MG/L	2.12	3.40	1.50	1.70
HYDROGEN ION CONC., PH	7.82	8.10	7.30	7.90
ALKALINITY MG/L	163.20	190.00	128.00	169.00
TOTAL RESIDUE MG/L	271.20	330.00	228.00	330.00
IGNITION LOSS MG/L	132.00	210.00	90.00	122.00
TURBIDITY AS SiO ₂ MG/L	7.80	21.00	2.00	6.00
CHLORIDES MG/L	5.00	7.00	3.00	5.00
AMMONIA NITROGEN MG/L	0.48	0.60	0.30	0.50
SULFATES AS SO ₄ MG/L	49.40	56.00	46.00	48.00
NITRATE NITROGEN MG/L	0.20	0.40	0.10	0.20
TOTAL PHOS. AS PO ₄ MG/L	0.14	0.20	0.10	0.10
PHENOLS PPB	4.20	6.00	0.00	5.00
CILS AND GREASES MG/L	1.28	2.50	0.50	1.10
TANNINS & LIGNINS MG/L	0.78	0.90	0.60	0.80
COLIFORMS M.P.N./100ML	370.	1800.	0.	8.
%P.N. CFU/COLI/100ML	7.	20.	0.	2.
STANDARD PLATE COUNT/ML	17550.	70000.	200.	800.

AR6 ATHABASCA RIVER AT TAR ISLAND

1969-70

DAY MONTH YEAR	16 OCT 1969	20 NOV 1969	18 DEC 1969	1 FEB 1970	11 FEB 1970
COMPOSITE CR GRAB SAMPLE	6	6	6	6	6
INITIAL SAMPLING TIME	1320	1300	1230	1330	1315
TEMPERATURE, DEG.CENT.	3.0	0.0	0.0	0.0	0.0
BAROMETRIC PRES. IN.HG	*0.00	*0.00	*0.00	28.80	29.50
DISSOLVED OXYGEN, MG/L	12.5	12.8	12.1	12.0	11.5
PERCENT SATURATION	*00.	*00.	*00.	85.	80.
BICHEM. OX. DEMAND MG/L	2.3	2.3	1.0	4.8	1.6
HYDROGEN ION CONC., PH	8.0	7.8	7.8	7.1	7.3
ALKALINITY MG/L	107	144	147	195	183
THRESHOLD ODOR NO., TYPE	1 M	4 M	4 M	64 CH	8 M
TOTAL RESIDUE MG/L	242	278	268	382	364
IGNITION LOSS MG/L	146	126	114	210	134
TURBIDITY AS SiO ₂ MG/L	9	8	7	7	7
TOTAL HARDNESS MG/L	100	140	132	200	192
CHLORIDES MG/L	13	27	12	37	44
AMMONIA NITROGEN MG/L	1.5	0.6	0.1	0.7	0.8
NITRATE NITROGEN MG/L	1.0	0.6	0.3	0.2	0.2
SULFATES AS SO ₄ MG/L	40	54	48	48	50
TOTAL PHOS.AS PO ₄ MG/L	0.1	0.1	0.2	0.0	0.3
COLOR					
HAZEN UNITS MG/L	150	125	75	175	125
HUE	OR	CR	YISHO	YISHO	OR
DOMINANT WAVELENGTH NM	588	595	582	584	595
LUMINANCE PERCENT	86.0	89.0	93.0	86.0	86.0
PURITY PERCENT	3.1	2.3	0.9	3.9	2.3
PHENOLS PPB	5	6	5	2	8
OILS & GREASES MG/L	1.8	2.1	2.4	1.0	0.7
FLUORIDES MG/L	0.40	0.11	0.15	0.21	0.12
TANNINS & LIGNINS MG/L	1.3	0.8	0.7	1.0	0.8
COLIFORM M.P.N./100ML	1600	45	350	45	540
MPN OF E.COLI/100ML	3.6	1.8	4.0	0.0	1.8
STD. PLATE COUNT/ML	26000	38000	200	10000	35000

* DENOTES DATA NOT AVAILABLE

AR6 ATHABASCA RIVER AT TAR ISLAND

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	12.38	13.10	11.50	12.50
BOD	MG/L	2.40	4.80	1.00	2.30
HYDROGEN ION CONC., PH		7.60	8.00	7.10	7.80
ALKALINITY	MG/L	155.20	195.00	107.00	147.00
TOTAL RESIDUE	MG/L	306.80	382.00	242.00	382.00
IGNITION LOSS MG/L		146.00	210.00	114.00	134.00
TURBIDITY AS SiO2 MG/L		7.60	9.00	7.00	7.00
TOTAL HARDNESS	MG/L	152.80	200.00	100.00	140.00
CHLORIDES	MG/L	26.60	44.00	12.00	27.00
AMMONIA NITROGEN	MG/L	0.74	1.50	0.10	0.70
SULFATES AS SO4	MG/L	48.00	54.00	40.00	48.00
NITRATE NITROGEN	MG/L	0.46	1.00	0.20	0.30
TOTAL PHOS. AS PO4 MG/L		0.14	0.30	0.00	0.10
PHENOLS	PPB	5.20	8.00	2.00	5.00
CILS AND GREASES	MG/L	1.60	2.40	0.70	1.80
FLUORIDES	MG/L	0.20	0.40	0.11	0.15
TANNINS & LIGNINS MG/L		0.92	1.30	0.70	0.80
CCLIFORMS M.P.N./100ML		516.	1600.	45.	350.
M.P.N. CF E COLI/100ML		2.	4.	0.	2.
STANDARD PLATE COUNT/ML		21840.	38000.	200.	26000.

ML3 MCLEOD RIVER AT WHITECOURT

1969-70

DAY MONTH YEAR	14 NOV 1969	18 NOV 1969	9 DEC 1969	13 JAN 1970	11 FEB 1970
COMPOSITE OR GRAB SAMPLE	G	G	G	G	G
INITIAL SAMPLING TIME	1625	1115	1215	1600	1450
TEMPERATURE, DEG.CENT.	5.0	1.0	0.0	0.0	0.0
SALINOMETRIC PRES. IN.HG	27.69	*0.00	27.10	27.20	27.70
DISSOLVED OXYGEN, MG/L	11.3	12.6	13.1	6.4	5.7
PERCENT SATURATION	95.	*00.	99.	48.	42.
BIOCHEM. OX. DEMAND MG/L	0.1	0.6	0.1	2.4	0.5
HYDROGEN ION CONC., PH	8.2	8.3	7.9	7.7	7.5
ALKALINITY MG/L	143	214	216	240	252
THRESHOLD ODOR NO., TYPE	1 M	2 M	1 M	4 M	4 M
TOTAL RESIDUE MG/L	244	260	232	380	318
IGNITION LOSS MG/L	74	114	100	103	130
TURBIDITY AS SiO2 MG/L	3	9	3	2	2
CHLORIDES MG/L	0	1	2	0	0
AMMONIA NITROGEN MG/L	0.4	0.4	0.2	0.4	0.2
NITRATE NITROGEN MG/L	0.1	0.1	0.1	0.4	0.1
SULFATES AS SO4 MG/L	22	26	14	28	24
TOTAL PHOS. AS PO4 MG/L	0.0	0.0	0.1	0.5	0.1
COLOR					
HAZEN UNITS MG/L	*00000	30	30	25	*00000
HUE	*00.0	8-P	8-P	8-G	*00.0
Dominant Wavelength MU	*000	500C	500C	486	*000
Luminance Percent	*0.0	98.0	98.0	96.0	*0.0
Purity Percent	*00.0	0.5	0.5	0.6	*00.0
PHENOLS PPB	1	1	1	3	4
TANNINS & LIGNINS MG/L	*.0	0.7	0.6	1.4	*.0
COLIFORM M.P.N./100ML	4.	2.	*000.	11.	33.
MPN OF E COLI/100ML	1.8	0.0	*00.0	0.0	1.8
STO. PLATE COUNT/ML	500	3400	*00000	100	100

* DENOTES DATA NOT AVAILABLE

ML1 MCLEOD RIVER AT WHITECOURT

1969-70

		AVERAGE	MAXIMUM	MINIMUM	MEDIAN
DISSOLVED OXYGEN	MG/L	9.82	13.10	5.70	11.30
BOD	MG/L	0.74	2.40	0.10	0.50
HYDROGEN ION CONC., PH		7.92	8.30	7.50	7.90
ALKALINITY	MG/L	213.20	253.00	143.00	216.00
TOTAL RESIDUE	MG/L	286.80	380.00	232.00	380.00
IGNITION LOSS	MG/L	105.20	130.00	74.00	108.00
TURBIDITY AS SiO ₂	MG/L	3.80	9.00	2.00	3.00
CHLORIDES	MG/L	0.60	2.00	0.00	0.00
AMMONIA NITROGEN	MG/L	0.32	0.40	0.20	0.40
SULFATES AS SO ₄	MG/L	22.80	28.00	14.00	24.00
NITRATE NITROGEN	MG/L	0.16	0.40	0.10	0.10
TOTAL PHOS. AS PO ₄	MG/L	0.14	0.50	0.00	0.10
PHENOLS	PPB	2.00	4.00	1.00	1.00
COLIFORMS M.P.N./100ML		13.	33.	2.	4.
M.P.N. OF E. COLI/100ML		1.	2.	0.	0.
STANDARD PLATE COUNT/ML		1475.	3400.	500.	1000.

DAY	14	20	10
MONTH	OCT	NOV	DEC
YEAR	1969	1969	1969
COMPOSITE CR GRAB SAMPLE	6	6	6
INITIAL SAMPLING TIME	1130	1215	900
TEMPERATURE, DEG.CENT.	5.0	0.0	0.0
BAROMETRIC PRESS., IN.HG	28.80	28.00	+0.00
DISSOLVED OXYGEN, MG/L	11.2	11.8	11.5
PERCENT SATURATION	91.	86.	*00%
BIOCHEM. OX. DEMAND MG/L	0.1	2.8	0.3
HYDROGEN ION CONC., PH	7.6	7.5	7.6
ALKALINITY MG/L	69	95	77
THRESHOLD ODOR NO., TYPE	4 N	8 N	4 N
TOTAL RESIDUE MG/L	160	202	232
IGNITION LOSS MG/L	318	122	106
TURBIDITY AS SiO ₂ MG/L	5	8	20
CHLORIDES MG/L	1	1	3
TOTAL PHOS.AS PO ₄ MG/L	0.0	*.0	*.0
COLOR			
HAZEN UNITS MG/L	*00000	*00000	400
HUE	*00.0	*00.0	GISHY
DOMINANT WAVELENGTH NM	\$000	\$000	575
LUMINANCE PERCENT	*0.0	*0.0	9.5
PURITY PERCENT	*00.0	*00.0	11.8
FLUORIDES MG/L	0.34	0.08	0.14
COLIFORM M.P.N./100ML	17.	*000.	8.
MPN OF E. COLI/100ML	4.5	0.0	4.5
STD. PLATE COUNT/ML	2400	120000	400
RIVER DISCHARGE C.F.S.	940.	705.	*0000.

* DENOTES DATA NOT AVAILABLE

COLOUR CODES

<u>CODE</u>	<u>HUE</u>
V	Violet
B	Blue
B-G	Blue-Green
GREEN	Green
GISHY	Greenish-Yellow
YELL	Yellow
YISHO	Yellowish-Orange
OR	Orange
R	Red
B-P	Blue-Purple
R-P	Red-Purple

MERCURY ANALYSIS*

ATHABASCA RIVER

<u>LOCATION</u>	<u>DATE SAMPLED</u>	<u>CONCENTRATION</u>
Hinton	January 20, 1970	0.10 p.p.b.
Tar Island	January 21, 1970	0.10 p.p.b.

*Total Mercury

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