

REPORT  
OF THE  
ROYAL COMMISSION  
ON THE  
GREAT SLAVE LAKE RAILWAY

VOLUME II

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ROYAL COMMISSION ON THE RAILWAY TO GREAT SLAVE LAKE

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VOLUME II  
FACTUAL AND STATISTICAL MATERIAL

Volume I published earlier, contains the reports of the Commissioners. Volume II contains factual and statistical material that is considered relevant to a choice of route for a railway.

JULY 1960

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CHAPTER VI  
AGRICULTURAL RESOURCES

The existing size of farm settlement and production along a proposed westerly route has already developed far beyond anything evident along an easterly route. This is not to say that no agricultural potential exists along the latter route - a matter which will be dealt with later. In terms of present development, however, no commercial agriculture exists along a proposed rail route north of Waterways. Tables II and III provide some sketchy evidence of the existing extent of farm settlement, production and grain shipments within the settled region north of Grimshaw and extending as far north and east as Fort Vermilion generally along the Mackenzie Highway and Peace River.

Total cereal grain shipments ex Grimshaw (wheat, oats, barley, flax and rye) over the past ten years have averaged some 1,733,000 bushels annually. This figure, when converted to a weighted average tonnage basis yields a figure of some 45,000 tons of grain annually. It is estimated that something less than 80% of this movement or some 36,000 tons originates in districts north of Grimshaw which would otherwise be served by any rail extension north of Grimshaw. At the present time, the great weight (about 90%) of productions and shipments originating north of Grimshaw is concentrated

TABLE II  
 ESTIMATED PRODUCTION OF CEREAL GRAINS NORTH OF TOWNSHIP 89 IN  
 ALBERTA (PANNING TO FORT VERMILION REGIONS); AND TOTAL RAIL  
 SHIPMENTS OF CEREAL GRAINS EX. GRIMSHAW, ALBERTA

Crop Year	Estimated Production '000 bushels				Shipments ex. Grimshaw '000 bushels				Shipments ex. Grimshaw approx. tonnages			
	Wheat	Oats	Barley	Flax Seed	Total	Wheat	Oats	Barley	Flax & Rye	Total	Total Ex. Grimshaw	Originating North of Twp. 89 @ 80%
1950	461	271	63	30	795	1297	772	117	0	2,786	72,070	57,656
1951	650	498	162	41	1,381	1011	249	76	12	1,348	36,474	29,179
1952	696	429	149	160	1,434	1001	415	174	60	1,650	42,526	34,021
1953	882	751	345	200	2,178	1015	594	305	154	2,068	51,586	41,269
1954	604	582	349	190	1,725	916	527	467	216	2,126	53,168	42,534
1955	365	448	234	195	1,242	980	244	622	187	2,033	53,468	42,774
1956	553	746	508	329	2,136	821	86	887	248	1,442	39,838	31,870
1957	562	608	560	315	2,265	961	90	234	186	1,471	41,094	32,875
1958	280	459	441	304	1,484	960	193	243	138	1,534	41,584	33,267
1959	505	856	819	528	2,708	372	86	330	88	876	22,920	18,336
											10 yr. av.	10 yr. av.
											45,473	36,380

Source: Government of Alberta  
 Department of Agriculture  
 Edmonton, Alberta

Source: Submission by  
 Northern Alberta  
 Railways  
 Edmonton, Alberta

TABLE III

Statistics of Agriculture North of Township 89  
(Census Division #17), Peace River Region, 1931 to 1956.

		1931	1936	1941	1946	1951
Occupied Farm Land	Ac.	72,053	122,293	144,374	155,848	156,982
Improved Land	"	14,734	33,902	60,283	79,098	93,965
Land Under Crop	"	10,742	24,477	39,657	57,307	63,391
Wheat	"	5,699	13,709	23,311	33,395	30,315
Oats	"	3,491	7,400	10,605	15,281	12,198
Barley	"	201	521	1,438	1,741	5,656
Flax Seed	"	N.A.	13	2,191	1,787	4,184
Hay & Seed Crop	"	150	569	778	3,026	9,900
Pasture	"	233	1,240	2,358	2,034	2,780
Summerfallow	"	2,281	6,453	15,478	18,573	25,391
Horses	No.	1,927	2,265	2,973	2,375	741
Cattle	"	1,917	4,146	4,199	4,510	1,976
Sheep	"	81	274	401	995	248
Hogs	"	1,723	2,838	6,501	2,786	1,675
Hens & Chickens	"	10,096	19,677	32,286	28,183	20,628

Note: Comparable figures for the Census year 1956 are not available due to a change in Census Division boundaries in that year.

Source: Alberta Government Department of Agriculture, Agricultural Extension Service.



in the region of Manning some 55 miles north. On the basis of the existing (statutory) freight rate applicable on grain movements beyond Grimshaw destined for export, such shipments can be expected to move to Grimshaw at about 1/2¢ per ton mile. On 36,000 tons of grain over a weighted average haul of 65 miles to Grimshaw, the rail carrier might expect to receive some \$12,000. of incremental revenue for the south-bound grain haul to Grimshaw. Livestock tonnages presently moving by rail out of Grimshaw are small, being less than 2,000 tons annually in recent years. This figure reflects the effectiveness of truck competition in the movement of livestock over a system of well developed trunk highways.

In terms of a further physical potential for agriculture in either the northwest or northeast of the Province of Alberta, authoritative information is more sketchy - and somewhat more so to the east than to the west. Along with climatic data, the general soil and topographic type of reconnaissance provides the only reliable source of preliminary information concerning the physical potential for agriculture along either an easterly or westerly rail route over lands not already occupied. Such studies are being carried out by the Alberta Research Council, and the results to date are more complete for the northwesterly portion of the Province than is the case for the northeast section. The results of this helicopter reconnaissance program as of this date have been made

available to the Commission and are reproduced in the accompanying map (See Map No: III).

In addition to the Research Council work, one other major soils and topographic reconnaissance of relevance here has been carried out over the Slave River lowlands north of the Alberta boundary from Fort Smith to the Slave River delta. The summary indications of this survey are also set out in the aforementioned tables and map.

The soil and topographical reconnaissance carried out in the Slave River lowland stretching from Fort Smith northward to the Slave River delta indicates some 400,000 acres to be arable without topographical or serious fertility limitation. In addition, about 1,300,000 acres are said to be arable "with some or moderate limitations." These limitations include such physical and fertility limitations as imperfect drainage, slowness to warming, low moisture holding capacity, influence of permafrost, raw organic matter, coarse texture and low organic matter and nitrogen. The remaining portion of the roughly 2,000,000 acres reconnoitered is said definitely to be rendered non-arable by reason of steep slopes, stoniness, flooding, inadequate drainage and ponding.

The northeast section of Alberta south from the 60th parallel (N.W.T. boundary) to an east-west line some 25 miles north of Waterways has not yet been reported on in terms of the helicopter program of soil and topographical surveys currently being carried on by the Research Council of Alberta

over all of north central Alberta. Results of this survey program covering much of the rest of northern Alberta north of the 55th parallel are at present available, however. The coarse land-classification resulting from these studies is reproduced on Map No. III.

It will be observed that the surveyed region of northeast Alberta generally falling between the 55th parallel just north of Lac la Biche and the 57th parallel north of Waterways is classified as being practically devoid of any arable potential for agriculture. In the presently unreported region north of the 57th parallel to the Alberta border, the arable potential is not likely to be greatly different from that generally indicated over the region surrounding and to the south of Waterways. This is so by reason of the increasingly poor drainage and lower elevations present throughout the whole region encompassing the lower reaches of the Athabasca and Peace Rivers and the upper reaches of the Slave River. Moreover, a type of agriculture based on a livestock grazing economy is not likely to prove possible on the meadowland stretches as long as these are inhabited in strength by the wood buffalo of the Park. Hence, the agricultural potential contiguous to an easterly route even in the long run is likely to be limited in extent to some half to one million acres along the lower reaches of the Slave River north of Fort Smith and suitable for a combined coarse grain - livestock feeding type of farm enterprise located in suitable

isolated patches of the river lowlands.

In contrast to the northeasterly sections of the Province, a wider coverage of the northwest portion of Alberta has been reported on as a result of the helicopter soil and land reconnaissance surveys already mentioned. Tables II and III and the associated map indicate the nature and extent of the land classification for each mapping block. The classification has been defined in terms of three groups, viz:

1. potentially arable (by reason of generally unlimiting soil, drainage, cover and topographical features.)
2. doubtful arable (by reason of indicated limitations imposed by one or several of the factors mentioned earlier.)
3. pasture and woodland (considered distinctly unsuitable for agriculture development.)

It is evident from these figures and from what is known of areas of existing settlement that some 5 million acres of "potentially arable" unoccupied land is available in the surveyed Peace River section of Alberta between latitudes 56° and 59° and west of the fifth meridian to the Alberta - B. C. boundary. These figures exclude the presently unreported strips some twelve townships deep just south of the Alberta - N. W. T. boundary. It is also to be noted, however, that

something over a third of this potential exists on the east and southeasterly side of the Peace River stretching from the vicinity of Falher and Peace River town on the south to Fort Vermilion and Vermilion Chutes on the north. This region is at present served hardly at all by transportation facilities of any kind, and this situation will not be greatly improved by the location of a railroad on the west side of the river. Nevertheless it is quite evident that the sheer arability potential of the whole region north of Grimshaw is considerably greater by a factor of at least 10 or more than anything indicated over the northeast portion of Alberta and north of the Slave River delta. Within the latter region, there is evidence of an arable potential with mild to moderate limitations in the middle reaches of the Slave River lowland of about 1-1/2 million acres, about a quarter of which is estimated to possess no general limitations on arability. On the basis of existing knowledge, therefore, it is clear that the north-west portion of the Province carries a vastly greater untapped agriculture resource than is the case to the northeast.

From the more immediate standpoint of railway routing and traffic development, it is now a question of how rapidly and in what way is this agriculture potential likely to be developed in the future. There is no doubt but that a continued expansion of improved acreage on presently occupied

lands will continue as in the past - with or without a railroad. The rate at which this trend can continue will depend in large measure on the future net income position of farmers and hence their ability to finance additional clearing and breaking of land - one form of farm capital accumulation. Cash incomes of present or potential grain shippers north of Grimshaw can be expected to increase to the extent of the savings provided on a grain haul to Grimshaw by rail rather than by truck as at present. This differential is estimated elsewhere in this report at around 7¢ per ton mile (1/2¢ per ton mile by rail for export as against 7-1/2¢ per ton mile by truck.) This could mean an annual cash saving to a typical farm shipping some 36 tons or about 1400 bushels in, say, the Manning district (55 miles) of about \$140. per year. This amount is then available to provide either a higher level of farm living, or an increased rate of farm capital accumulation in one form or another.

There is little evidence to suggest that present or future livestock shippers would find it economical to make extensive use of a new rail extension in preference to trucking over the Mackenzie Highway and south with the exception perhaps of carload shipments of hogs. Even here, the ton-mile rate differential between rail and truck is small compared to that applicable on grain movement.

It is therefore anticipated that some growth will

continue to take place in the farming communities of the north Peace River district even in the absence of a railroad. Such growth will continue not so much by reason of new settlement as by new acreage brought under cultivation on presently occupied farms. And some new settlement will proceed in any event quite regardless of economic incentives or disincentives. However, the financial obstacles facing existing and new settlers in breaking out new land should be noticeably reduced with the advent of a railroad and considerably cheaper transportation costs on cereal grains particularly. This effect will be particularly noticeable in the more sparsely settled farming districts well north of Manning because of the trucking distances now involved. These are the districts (Keg River, High Level, Paddle Prairie) where acreage improvements and new settlement are likely to receive the greatest stimulus from the economic effects of railroad proximity.

In addition, it is anticipated that the greater freight savings offered on grain than on other farm products by rail versus truck carriers will lead to some alteration in the pattern of farm production - and again particularly in the more northerly farm districts. There is little doubt but that the advent of a railroad would provide rather suddenly a stronger economic incentive than at present towards the production of cereal grains for cash cropping

purposes and away from the small seed, forage and livestock enterprises.

Taken together, continued growth in cultivated acreage north of Grimshaw, together with some reallocation of acreage to cereal grain cropping should lead to a steady increase in the amount of grain traffic which can be anticipated by the railroads in the future over present levels.

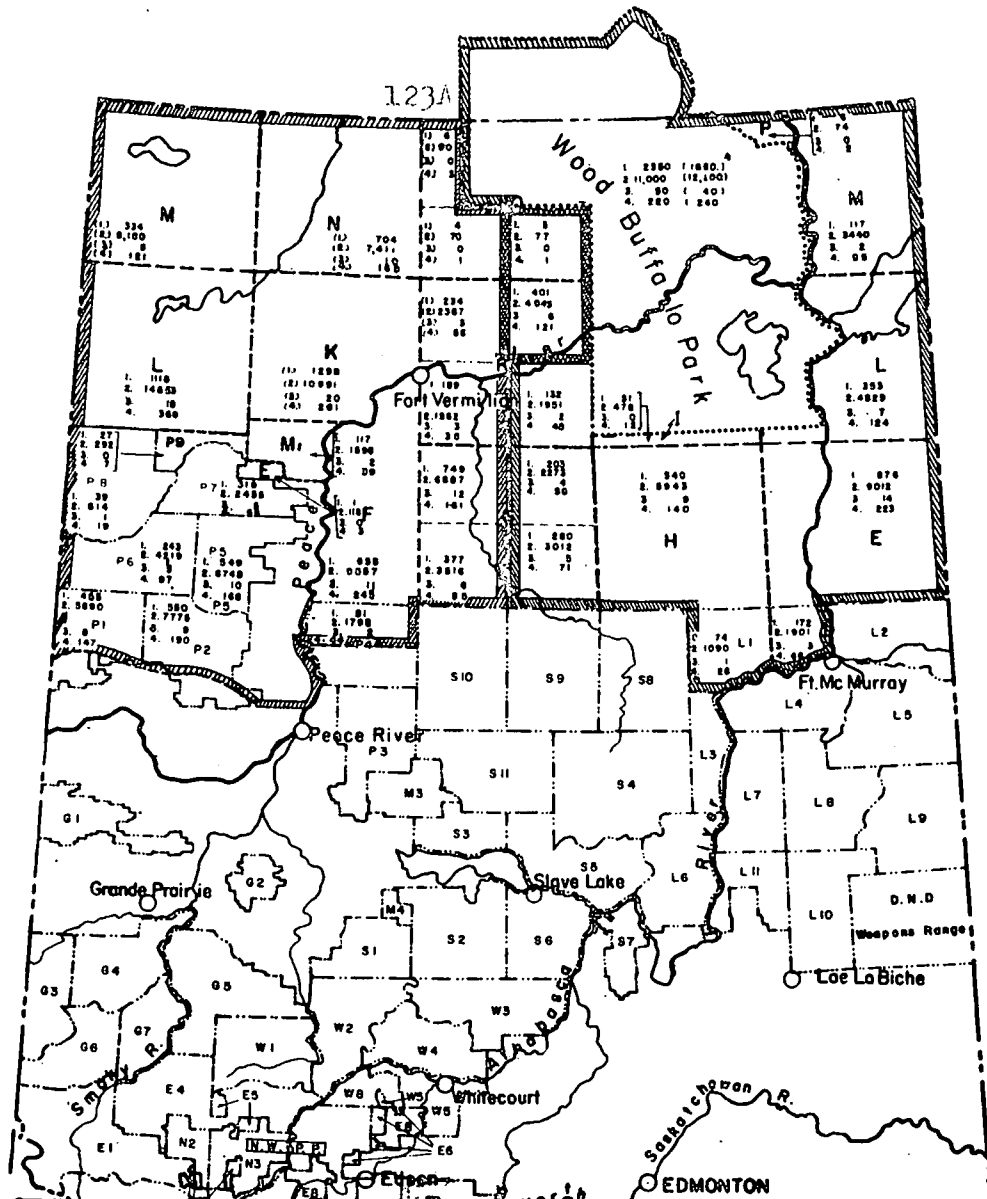
Within several years after commencement of railroad services, average annual grain shipments out of the whole region north of Grimshaw might well be expected to increase from the present estimate of 36,000 tons to nearly 50,000 tons annually. Thereafter, some increases in average tonnages due to a gradual growth in cultivated acreage can certainly be expected. It is estimated that grain shipments out of the region might well reach 100,000 tons within the next 20 years on the basis of both kinds of effects mentioned above. At such a time, the average length of haul over the new line will be closer to 100 miles rather than the present 65 miles due to the weight of settlement and production having moved north gradually. On the basis of a rail rate of 1/2¢ per ton mile on grain for export, the estimated 100,000 tons moving over an average haul of 100 miles would yield an additional \$50,000. of revenue to the rail company on the new extension, in contrast to an estimated \$12,000. - \$16,000. as of the first few years of operation.



CHAPTER VII  
FOREST RESOURCES

Some differences of opinion were evident during the hearings before the Commission with regard to the evidence concerning the extent of timber reserves contiguous to the proposed easterly and westerly rail routes to Great Slave Lake. It does not seem necessary to reproduce here all the details of the evidence submitted in this connection, since most of the apparent differences were found to hinge on matters of boundary, inventory, and rotation definitions. All parties submitting evidence produced figures which in any event were drawn from two basic sources, viz. inventory and annual allowable cut figures supplied by the Department of Lands and Forests, Government of Alberta, and comparable figures supplied for Wood Buffalo Park by the Forestry Division, Department of Northern Affairs, Government of Canada.

Using these same sources and tabulations prepared especially for the use of the Commission by the Alberta Government, Department of Lands and Forests, the Commission has attempted to summarize in Table IV two sets of data classified by inventory mapping blocks and where appropriate by smaller forestry management units. The comparable federal figures for the Wood Buffalo Park cannot be so classified by smaller geographic units, and are available only for the Park as a whole. The two sets of data considered to be most relevant for the purposes of evaluating future productive



West Route. Timber Resources.					TIMBER RESOURCES (EAST ROUTE)				
Area.	Potential.		Annual Allowable Out. xx		Area	Potential		Annual Allowable Cut	
	(1) Saw Logs Millions F.B.M.	(2) Pulp Thousands Cords	(3) Saw Logs Millions F.B.V.	(4) Pulp Thousands Cords		(1) Sawlogs Millions F/B/M	(2) Pulpwood Thousands Cords	(3) Sawlogs Millions F/B/M	(4) Pulpwood Thousands Cords
H	354	8180	8	181	L1	74	1090	1	26
N	704	7411	10	169	L2	172	1901	3	46
O nw	6	90	0	3	H	548	5943	9	140
O sw	4	76	0	1	E	676	9012	14	223
O se x	3	77	0	1	L	51	478	7	12
J nw	234	2387	3	56	L	373	4829	7	85
J se x	401	4945	6	121	M	117	3440	2	2
J sw	189	1562	3	58	P	6	74	0	0
K	1298	10991	80	281	J c-e	132	1951	2	48
L	1118	14653	18	369	C s-e	3	77	0	1
E ne	1	118	0	3	J n-e	401	4945	6	121
P8	39	214	0	19	C n-e	203	2273	5	56
P9	27	292	0	9	G s-e	280 x	3012 x	5 a	71 b
P7	319	2455	5	59	W.B.F.	2350 (1850)	11000 (12100)	50 (40)	220 (240)
M1	117	1595	2	39					
Y	688	9857	11	245					
G nw	749	6687	12	161					
G sw	377	3515	6	80					
M4	91	1798	2	44					
P5	349	6740	10	168					
P6	243	4219	8	97					
P1	455	5890	8	167					
P2	550	7778	9	189					
	8466	99158	158	2404					

x. Common to both routes.  
 xx. Average rotation for saw timber = 62 years  
 Average rotation for pulpwoods = 41 years

LEGEND AREA AVAILABLE TO WEST ROUTE [diagonal lines]  
 EAST ROUTE [dotted lines]  
 COMMON TO BOTH ROUTES [cross-hatched lines]

Total 5566 (5066) 50025 (51125) 103 (93) 1175 (1195)  
 x. Converting 500 million F/B/M of Hardwood Sawlogs to Pulpwood equivalent, to be consistent with the Province of Alberta's inventory classification.  
 a. Average rotation in wood buffalo Park for saw timber taken as 47 years.  
 b. For Pulpwoods as 50 years.  
 5.29 f/b/m = 1 cubic foot; 85 cu. feet = 1 cord  
 Green dressed lumber = 2100 lbs per M.F/B/M  
 Carload of Lumber = 30,000 F/B/M = 32.5 tons approx.

TABLE IV  
 TIMBER RESOURCES  
 OF NORTHERN ALBERTA

potential in forestry are those relating to the standing inventory of saw timber and pulpwood by geographic unit, and those relating to estimates of the net (after allowance for anticipated fire losses) annual allowable cut of saw timber and pulpwood by geographic unit based on the age, specie and density characteristics of the standing inventory. The method of conversion from an inventory to an annual cut basis in the case of the provincial figure is that which involves Von Mantel's formula. The combined provincial and federal (Wood Buffalo Park) data have been separated into two groups in Table IV according to whether the inventory and annual cut figures apply to areas thought to be exploitable at some stage as a result of a railway being constructed along either an easterly or westerly route traversing northern Alberta. The map which accompanies the data indicates the geographic allocations made as well as the inventory and annual cut figures applicable to each mapping region. The designation of exploitable forest reserves as potential development and traffic accruing to one route or another is of course somewhat arbitrary on the fringes. Commercial operations in some central areas may also be rendered more feasible regardless of which route is chosen just so long as rail service is somewhat extended to more northerly regions beyond present rail head. Hence some areas may be thought of as being common to both projected routes. All of these possibilities are indicated on the map.

It should also be noted that the provincial inventory of timber volumes makes no attempt to classify poplar stands by specie or by size of tree, and hence all poplar is classified as saw timber suitable for peeler (plywood) logs. Such a distinction is ordinarily of limited usefulness except with respect to limited and isolated stands of good quality large black poplar most commonly found along the river flats. The federal figures for the Wood Buffalo Park do set out volumes of hardwood species of a size suitable for peeler purposes along with volumes of softwood saw timber. In Table IV, this classification has been maintained for the Park in the main set of figures where the volume and annual allowable cut of saw timber are set out as 2,350 and 50 million f.b.m. respectively. These estimates include then both hardwood and softwood species of a size suitable for saw timber. In the interests of consistency with data for the rest of the Province, however, the hardwoods portion of the saw timber volume and cut for the Park have been removed, converted to a cord measure basis, and added to the pulpwood volume and cut for the Park.

It is also to be noted that the use of Von Mantel's formula for the estimation of an annual allowable cut from the inventory volume figure is based on the assumption of a "normal" age distribution in the inventory as well as the application in the formula of given rotational ages

for the various contained species. On this basis, the average implicit rotational ages (expected age to maturity divided by two) or ratios of volume to annual cut in the provincial data are approximately 62 years and 40 years for saw timber (excludes hardwoods) and pulpwood respectively. The comparable ratios for the Wood Buffalo Park are 47 years for saw timber (includes hardwoods) and 50 years for pulpwood. With regard to saw timber for instance, one implication of these apparent discrepancies is that a given standing volume of timber in the Wood Buffalo Park is capable of producing a proportionately higher annual allowable cut than is generally true elsewhere within the Province. Such a result is theoretically possible over a certain period of time where the standing volume contains an unusually or "abnormally" high proportion of mature and/or over mature timber. There is much evidence to support the contention that such is in fact the case over much of the most heavily forested stretches of the Wood Buffalo Park. Indeed, these are the grounds on which commercial lumbering operations have already been licensed within the Park by Park authorities. Although the exact extent of the age distortion applicable to the forest resources of the Wood Buffalo Park is difficult to verify, the Commission is nevertheless disposed to accept the reasonableness of a somewhat higher annual cut to volume ratio for the Wood

Buffalo Park than is generally applicable on the average over the other regions dealt with in the Province.

On the basis of the above remarks the totals indicated in Table IV for saw timber and pulpwood summarize the total and annual forestry potential available for development and roughly adjacent to the two proposed rail routes. It will be noted that the totals suggest an annual availability of saw timber of somewhere between 30% - 50% greater to a westerly route than to an easterly one. In the case of pulpwood, potential availability to the westerly route is nearly 100% greater than to the easterly route.

It is recognized that the overall results indicated by Table IV must be accepted as approximations only - and in particular with regard to the allocations of the potential of any one mapping region to one or the other of the proposed rail routes. It is also recognized that the proportion of softwoods - hardwoods is generally higher in regions adjacent to the easterly route than is true of the west, and that accordingly the suitability of timber stands for both lumber and pulping is likely to be superior to the east. On the basis of the data presented however, this factor is not sufficiently potent to compensate for the greater density of all species indicated for the more westerly regions. It is therefore concluded that the

developmental potential for the forestry industry in both saw timber and particularly pulping material is substantially greater in the central and north-westerly portions of the Province than is the case in the central and north-easterly regions.

CHAPTER VIII  
MINERAL RESOURCES

The Pine Point orebody, situated approximately 45 miles east of Hay River town, and 10 miles south of the south shore of Great Slave Lake, is the only mineral deposit presently known in the Canadian northwest which will provide an ore haul for the new railway. Since the ore from Pine Point is destined for the smelter at Trail, and not to a seaboard point, it can be transported equally well by either the eastern or western route. If, as predicted, this 215,000 tons or more of concentrates per annum can be transported the 400 miles to either Waterways or Grimshaw for 1.6 cents per ton mile, the revenue accruing to the new portion of the railway would be some \$1,321,000. per annum, which would increase as the production of concentrates from Pine Point increased.

The Pine Point lead-zinc ore deposits are in Devonian Limestones, and situated inland some sixteen miles from Dawson Landing, which was the temporary harbour giving access to the mine in the early proving-up stage. This ore occurrence has been known to prospectors since at least 1898 and claims have been staked and restaked several times since 1914. Some attempts were made to develop this discovery even before World War I.

Eventually exploration engineers of the Canadian Mining and Smelting Company carried on an extensive diamond



drilling program in 1948-49 and 1950, and succeeded in proving up an orebody some thirty miles long and said to contain at least 60,000,000 tons of lead-zinc ore of commercial grade.

Some work was done by other exploration companies to the west of the Pine Point orebody across the Buffalo River, but the results were not sufficiently encouraging. Due to the greater depth (the Pine Point ore plunges west) and the difficulties presented to the work by the very formidable swamps, no further investigation has been carried on. It has not been definitely established how much control has been exercised over the Pine Point deposit by the MacDonald Fault, but the existence of this very strong fault has guided the search for similar ore-bodies. The occurrence of lead-zinc at Sulphur Bay, and a geophysical survey outlining an anomaly lying between Boulogne Lake and Sulphur Bay, were responsible for the staking of approximately 1500 claims in that area. A limited amount of drilling was done, the results of which have not been made public.

The Slave River is the approximate contact between the older Precambrian rocks to the east and the younger Palaeozoic Sediments to the west. The Precambrian rocks on the east of the Slave River are part of the great Canadian Shield and it is in this Precambrian Shield that the great majority of our mineral resources have been found.

The Precambrian Shield area that would be most directly affected by a railway would be that area lying between Great Slave Lake and Lake Athabasca and east of the Slave River. This area was first mapped by the Geological Survey in the 1890's but the first prospecting rush came in 1935 with the discovery of gold on the north shore of Lake Athabasca. During 1935 the Geological Survey mapped extensively as far north as the Northwest Territories boundary and prospectors, exploration engineers and geologists spread over this interlake region as far as the south shore of Great Slave Lake. At least three shafts were sunk in the Goldfields area but none was successful in proving up a mine.

Exploration interests subsequently moved north of Great Slave Lake with the discovery of gold in that area, and the interlake region was more or less abandoned until the discovery of uranium at Beaverlodge Lake, close to the earlier Goldfields. This second prospecting boom in the area was more intensive and widespread than the previous one. All the former area was covered but the interest centered more in the Black Lake area at the eastern end of Lake Athabasca. In this latter region, iron, nickel and uranium deposits were discovered and exploration work was carried on until 1955 when again interest lapsed due to lack of progress in proving up commercial ore bodies. A lead-zinc occurrence at O'Connor

Lake was given a very thorough examination. A shaft was sunk and a second level opened up, but the ore did not prove to be present in sufficient quantity to warrant a base metal operation. Base metal ores such as lead-zinc, copper, nickel or iron ore must be present and delimited in large bodies to provide economic exploitation such that the ore can be mined at very low cost, and so as to provide large tonnages to a railway. Precious metal ore can be mined economically in smaller bodies, and such an operation does not depend to the same extent on either roads or railroads to provide economic exploitation. To sum up, apart from some possibility of large orebodies in the Black Lake area and a like possibility at the east end of Great Slave Lake, nothing other than scattered mineral occurrences have so far been discovered in this interlake area.

The region north of Great Slave Lake has proved itself by and large to be a "gold country" and no significant amounts of base metals have been uncovered apart from several encouraging copper and nickel deposits in the area east and north of Great Bear Lake. These regions are at present too far removed from existing ground transportation services to consider any form of transportation other than air or under-ice submarine freighter. A deposit of lead-zinc ore at Joe Indian Mountain is known to contain approximately 800,000 tons of ore, but tonnages such as these

would scarcely return the cost of the installations necessary for their recovery apart from the cost of concentrating and smelting the ore.

In the evidence presented to the Commission, great stress was laid on the numerous mineral occurrences found in the several areas adjacent to one or other of the proposed railway routes. The concensus amongst the eminent geologists and mining men appearing before the Commission, however, was that while these occurrences were of interest, they were not yet to be thought of as decisive in terms of commercial prospects, and that any predictions of commercial operations based on such mineral occurrences must be conditioned by a careful distinction between mineral showings and the presence of mineral deposits in sufficient quantity and concentration to justify a mining operation. All were careful to stress the wide range of probabilities separating these two types of occurrence. Yet all would agree that surface showings or occurrences of restricted extent in terrain of generally favourable structure invariably provide added incentive to more intensive exploration for deposits of commercial extent.

Evidence was submitted to the Commission in some detail covering metallic and non-metallic mineral resources associated with the more southerly regions adjacent to the proposed railroad routes e.g. iron ore deposits in the vicinity of present railhead at Hines Creek; the oil sands

gypsum and salt in the vicinity of Waterways; the gypsum beds at Peace Point some 225 miles north of Waterways; the rapid developing gas and oil prospects in the north-westerly section of the Peace River district. There is little question that all of these mineral prospects will develop substantial commercial value at some time in the future. But the immediate import of any one of these potential resource developments to railroad traffic is uncertain in every case.

The development of the natural gas and crude petroleum industries which must proceed over a wide-spread area in any event, is not highly dependent on the type of service which a railroad can offer. An exception to this statement is likely to take place in the event of extraction of crude petroleum from the Athabasca oil sands if methods are used which essentially involve mining the sands followed by extractive processing at a central and fixed location. Such an operation is likely to generate a considerable amount of inbound rail traffic by way of operating equipment and supplies. Yet at the present moment, it cannot be said that the technical and market obstacles facing commercial production have been definitely overcome. Moreover, as is true of the iron ore deposits in the Peace River district, any future development based on utilization of the oil sands either directly in thermal power generation

or by extraction and shipment of the oil can proceed now with only a short extension of rail beyond present facilities. The same can be said of the other non-metallic mineral deposits mentioned in the vicinity of Waterways e.g. salt, gypsum, sulphur by-product.

In the case of the extensive and high quality gypsum beds located at Peace Point on the lower Peace River, the presence of a rail extension could ordinarily prove critical to commercial production. Moreover, south-bound shipments of the product would generate revenue over a considerable mileage on any northward extension of the railroad. There are, however, two serious reservations concerning early prospects for any development of the Peace Point gypsum deposits. In the first place, the deposits are located within the boundaries of the Wood Buffalo Park. Under present regulations relating to the administration of Canada's national parks, such a location is ruled out insofar as mining activity is concerned. The Commission was not and of course could not be given any definite assurance that such a restriction would be relaxed in the future. Secondly, from an analysis of the locations and freight rates applicable to existing sources of gypsum supply for the prairie market, and of a tentative freight rate quoted from Peace Point to Edmonton and to Calgary, it does not appear to this Commission that gypsum from Peace Point could be landed with

any significant competitive advantage anywhere but in Edmonton, where no plant exists at present.

With the advent of a railway, most if not all of these resources may be expected to call upon railway service at some time in the future, but immediate prospects are uncertain.

## CHAPTER IX

## HARBOURS

To complement the existing transportation network to the Canadian North to the best advantage, it is desirable that the railway should terminate at a harbour on Great Slave Lake, and preferably as close to the western end of this lake as possible. To clarify and justify this statement it may be that a short review of the past will enable us better to predict the future in this matter of water transportation and harbours.

The Canadian North is very fortunate in having several great water systems which have given access to a vast territory, and with the possible exception of the west side of the Mackenzie River valley, natives, traders, trappers, explorers and prospectors have been able to penetrate into almost every part of this region. Just how important good water routes are may be illustrated by the fact that Scotland was known to the Roman Legions at the beginning of the Christian Era, while the Hudson's Bay Company was incorporated only in 1670, yet more was known to the outside world of the present Northwest Territories than was known of the Highlands of Scotland in 1745.

In the early days of the fur trade the natives travelled the long and hazardous water route by the Churchill River to the trading factories on the Hudson's Bay. Later on the Hudson's Bay Company and more especially the North



West Company established trading posts inland as far as Lake Athabasca, and subsequently on Great Slave Lake and on down the Mackenzie. Trade goods to these posts still came from either Fort Churchill or Montreal and the boat brigades travelled from these points as far as the mouth of the Mackenzie River. The route was still the Churchill - Athabasca - Mackenzie River and the gateway to the North was Portage La Loche between the headwaters of the Churchill River system and the Athabasca - Mackenzie River system. Portage La Loche or Methye Portage was in itself a very considerable obstacle to navigation, the portage was long and the height of land had to be surmounted, every pound of goods had to be back-packed over the height of land, both the incoming trade goods and the outgoing fur. Once on the Clearwater however, northward bound, there were only two more obstacles between the boat brigades and the Arctic Ocean, the portage at the Rapids of the Drowned at Fort Smith on the Slave River, some sixteen miles, which again meant loading and unloading, and beyond that the very dangerous south shore of Great Slave Lake had to be navigated, not laborious as is a portage, but involving long delays waiting for wind and weather to allow of passage from the mouth of the Slave to the headwaters of the Mackenzie, with then almost a thousand miles of unobstructed river travel lying ahead to the Arctic Ocean.

The first modification in this long established water route came with the arrival of the railway to Edmonton. It was found that the obstacles to transportation presented by the Churchill River and Portage La Loche could be economically by-passed by shipping goods by rail to Edmonton and thence by wagon road to Athabasca Landing on the Athabasca River. Athabasca Landing now became the gateway to the north, but the Cascades of the Athabasca still had to be navigated. With careful management however, there was not too much loading and unloading, and the route had tremendous advantages over the original Churchill River route.

It was clear to be seen of course that the next move to improve the water transportation to the north would be to have a rail head at Waterways on the Clearwater, and so by-pass the Cascades on the Athabasca River. This having taken place, of course brings us to our present water transportation system. The canoes and York boats have gone, as have the paddle steamers, and the goods now measured in thousands of tons instead of hundreds of bales are handled by barges and diesel tugs.

#### BELL ROCK HARBOUR

The things that have not changed, however, and indeed can only be circumvented, are the same two obstacles

that faced the old boat brigades, the Portage at Fort Smith and the shallow south shore of Great Slave Lake. Now, as advocated by the proponents of the eastern route, a rail head at Fort Smith would eliminate the portage between Fort Fitzgerald and Fort Smith and the present harbour of the Northern Transportation Company at Bell Rock would then become the head of navigation for the Mackenzie River - Great Slave system. This argument is sound and would seem to follow the pattern as herein outlined; however, in this case it seems that two birds can be killed with one stone. True it is that the portage at Fort Smith is the last portage and should be by-passed, but there is still left the navigation of the south shore of Great Slave Lake which, not presenting the hazard to lake boats that it did to canoes can still be hazardous and delaying, especially in the spring because of ice, and in the fall because of storms.

The south shore of Great Slave Lake, from the mouth of the Slave River to the outlet at the Mackenzie is, from a navigational standpoint, a most favourable shore. A deposit of sand and silt forms a shelf, more or less parallel to the shoreline and extending out therefrom for a distance of two miles. The shallow water covering this shelf, together with the fact that there are no sheltering promontories, makes navigation difficult with on-shore winds, and

during the spring break-up the lake ice is held against this shore preventing the movement of shipping from the mouth of the Slave River. In the late fall also, which is often a period of heavy northern gales, tugs with their tows of barges are often in difficulties, and as a result terminate their schedules as early as possible.

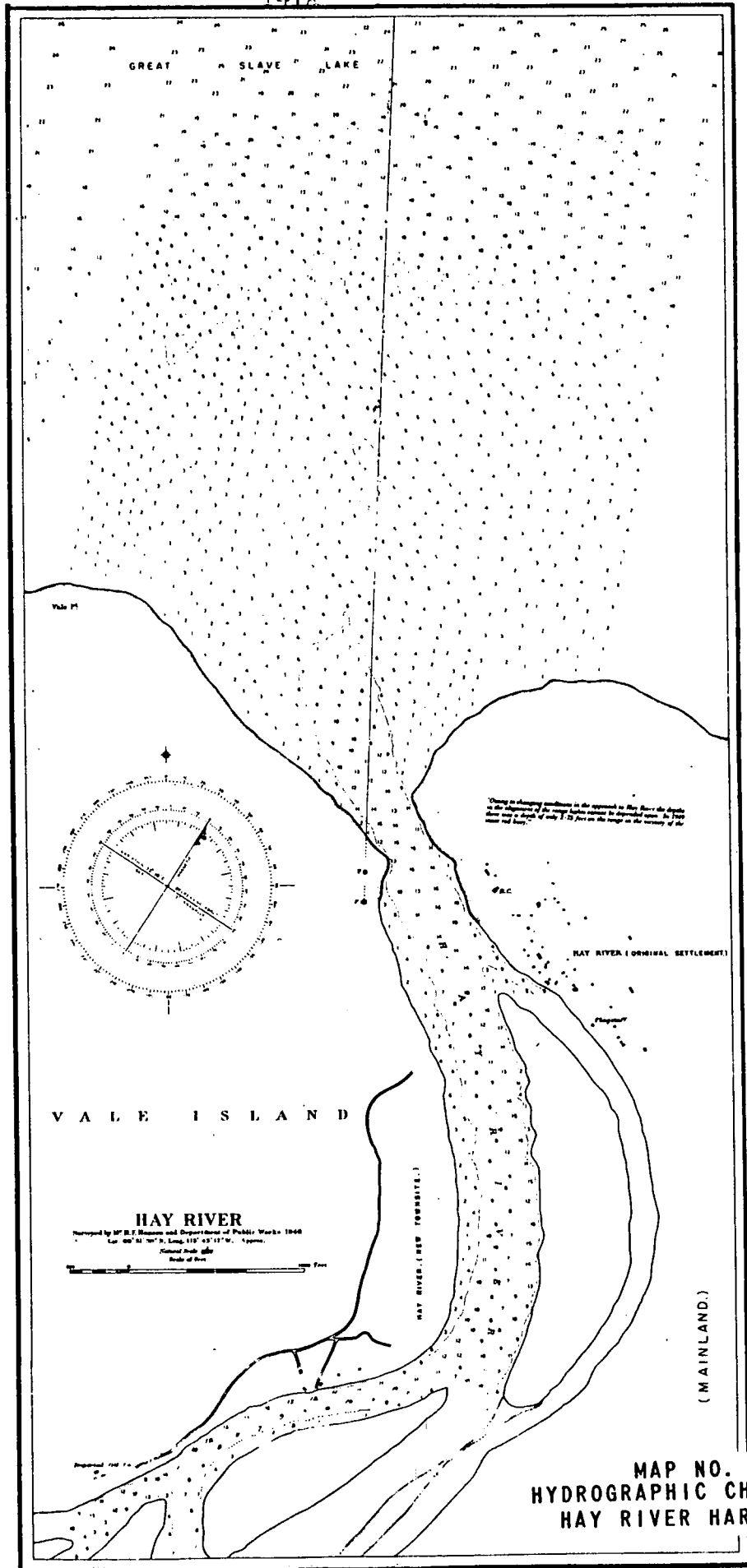
#### HAY RIVER HARBOUR \*

It would be a desirable situation if there was a good harbour at the extreme west end of Great Slave Lake which could be used as a railway terminus. However, there is only one natural harbour on the south shore of Great Slave Lake, the harbour at Hay River, which is 97.2 miles west of the Slave River and only 28 miles from the outlet to the Mackenzie. Because of its more westerly location it is possible for shipping proceeding down the Mackenzie to leave Hay River in the spring a week earlier than can be done from the mouth of the Slave, and using Hay River as home port in the fall could extend the shipping season almost three weeks longer than if based at Bell Rock on the Slave River.

The already mentioned sand shelf along the south shore extends past the mouth of the Hay River and

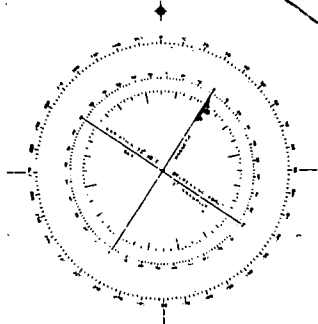
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\* See Map No. 1 - Hydrographic Chart of Hay River Harbour.



G R E A T S L A V E L A K E

Vale Pt.



*Depth in changing positions in the approach to this River the depth is the same as in the approach to the river below unless otherwise shown. In 1904 the depth of only 1-12 feet on the length of the bar of the river and bay.*

HAY RIVER (ORIGINAL SETTLEMENT)

V A L E I S L A N D

HAY RIVER

Surveyed by H. F. Hanson and Department of Public Works 1946  
 Lat. 66° 51' 30" N. Long. 118° 43' 15" W. Approx.  
 Natural Scale 1:50,000  
 Scale of Feet



HAY RIVER (NEW FOREBAY)

( MAINLAND )

MAP NO. 1  
 HYDROGRAPHIC CHART OF  
 HAY RIVER HARBOUR

calls for fairly continuous dredging for approximately one and one-half miles out from the river mouth. The cost of this dredging amounts to about \$25,000.00 per annum. The harbour at Hay River does not silt up, because it is lying in a river channel which has been dammed off, so that there is no current. The water is deep and there is approximately four miles at present available for wharfage and by moving the Mackenzie Highway crossing further up the channel, much more wharfage could be made available.

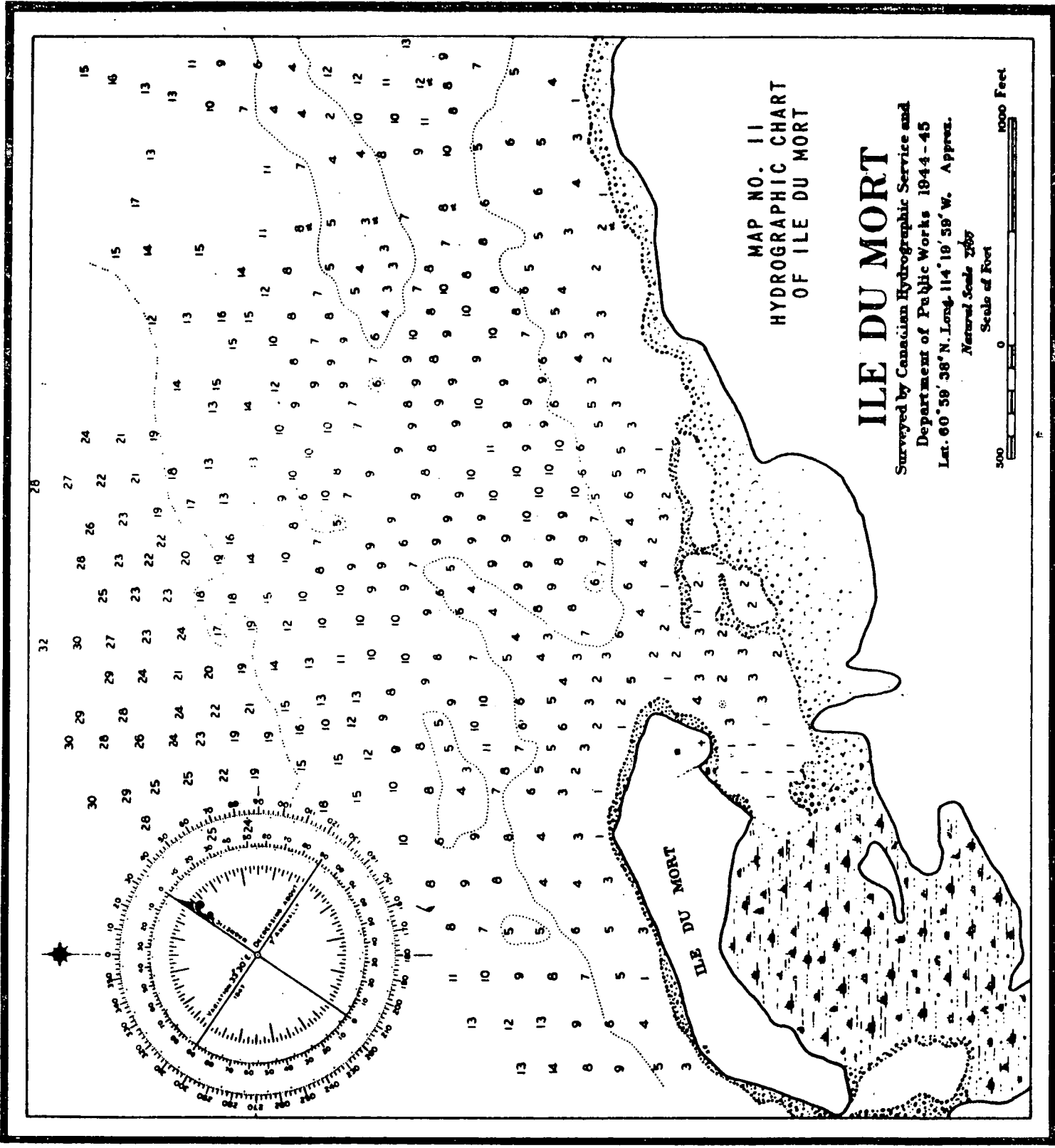
#### ILE DU MORT \*

Considerable discussion arose as to the merits of a railway terminus and harbour at Ile du Mort, which is forty miles west of the mouth of the Slave River. The only apparent merit of Ile du Mort is that it is close to the lead-zinc ore deposits at Pine Point, should Pine Point require a harbour which is unlikely. There is no natural harbour at Ile du Mort and the cost of dredging and building break-waters would be very considerable.

Its location is even less favourable than the mouth of the Slave River; it would in no manner complement the existing transportation network; and its location makes

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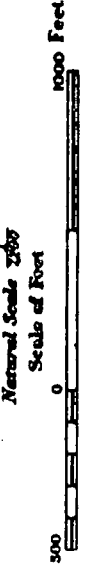
\* See Map No. II - Hydrographic Chart of Ile Du Mort.



MAP NO. 11  
HYDROGRAPHIC CHART  
OF ILE DU MORT

# ILE DU MORT

Surveyed by Canadian Hydrographic Service and  
Department of Public Works 1944-45  
Lat. 60° 59' 38" N. Long. 114° 19' 59" W. Approx.  
Natural Scale 2800



it an undesirable cul-de-sac for present or future transportation to points north of Great Slave Lake or points down the Mackenzie Valley.

#### FORT PROVIDENCE OR MILLS LAKE

A harbour with a railway terminus at Fort Providence or at Mills Lake would be well located for future traffic down the Mackenzie River Valley, but such a harbour would be at a disadvantage for traffic south-bound by barge to Great Slave Lake because of the swift current (10.7 m.p.h.) and the tortuous channel of the Providence Rapids. The added cost, too, of the 100 miles of extra construction and the cost of harbour installation would hardly be justified at this time and should wait until such time as the traffic on the Mackenzie is of such volume as to warrant this extra expenditure.

It would appear, therefore, that a railway terminus at Hay River is the logical location. There is already a well established community with harbour installations; the harbour itself is adequate and requires no maintenance. It is the focal point for truck, barge and air transportation, and the rates will be sufficiently competitive that shippers will be ensured of reasonable rates. It is also in a strategic position to serve the



area tributary to Great Slave Lake or the Mackenzie Valley and future contemplated extension of the railway, either west or north may be achieved with a minimum of cost consuming detours.

## CHAPTER X

## POPULATION

Population statistics were presented to the Commission by the protagonists of both routes as an argument in favour of the one route as against the other. Though 1956 Census figures have been used it is realized that the population in the areas served by both the eastern and western routes have been augmented since then, the western area possibly having a normal increase, while in the eastern area the population of Fort Smith may possibly have doubled since 1956 due to the establishment of much of the Northwest Territories administrative staff and to the building of a large federal school in that town.

Considering the population on that area served by a railway north from Waterways, (the eastern route) we have, along the Athabasca River to Fort Fitzgerald and centered mainly near the delta of the Athabasca and in the vicinity of Fort Chipewyan, a population of 663, (1956 Census) while Fort Smith had a population of 1,100. In the area served by a railway north from Grimshaw and excluding any of the area north of the Territorial boundary, we have a population of approximately 8,000, roughly four to one in favour of the western route, if mere numbers are an argument in favour of any particular route.

An analysis of the occupational pursuits of the

people making up this population could be a determining factor. A population of 300 people at a base metal mine would create more traffic both inbound and outbound for a railway than would the same number engaged in a gold mining operation. The 663 people listed as residents of the eastern area along the Athabasca and Slave Rivers are occupationally engaged in work connected with river transport, fur-trading, trapping, fishing and lumbering, the last two only being traffic producing. The residents of Fort Smith are in the main engaged in administrative and clerical work, and apart from their household needs of heating and food supplies are non-traffic producers. In fact, in presenting their brief in favour of the eastern route, the Northern Alberta Railways advanced the argument in favour of this route that their branch line from Waterways to Edmonton had no back-haul from Waterways. The inference, therefore, would be that the 2,000 people along this route and also the people at Waterways and McMurray, are not primary producers, and nothing is processed or manufactured which would provide back-haul tonnage for a railway. The same brief also stated, and not without some basis for doing so, that if a railway went on the eastern route the water transportation on the Athabasca River would be discontinued. This was also the quoted opinion of the

Commissioner for the Northwest Territories. Now, if there is some basis for these statements that the water transportation would be discontinued, the net effect would be that the towns of Waterways and McMurray would virtually cease to exist and the population north along the Athabasca River would also decrease.

Turning again to the western route population, the 8,000 people resident in this area are largely engaged in agricultural pursuits with some lumbering and the private enterprises, (listed as 72 in number) that are necessary and ancillary to these. Now, while the rate structures are such that agricultural products and forestry products are not very profitable traffic to a railway, nevertheless very many branch lines were built with no traffic, or anticipated traffic in view other than agricultural and forestry traffic. These people are, however, primary producers and, as such, create some traffic both inbound and outbound for a railway and since the potential is considerable, an increase in population will result in a proportional increase in this traffic.

In the long term view, the greatest population increase can be looked for along this western route and down the Mackenzie Valley and this population will have a more direct service, either from or to the east via Edmonton or

from or to the west coast or world markets via the Northern Alberta and Pacific Great Eastern railways.

## CHAPTER XI

## ENGINEERING COST FACTORS

Costs of construction and operation applicable to the alternative rail routes will have some bearing - along with revenue considerations - on the profit or loss position arising from any new rail extension. This, in turn, will ultimately affect the rate burden to existing shippers or to the tax paying public at large. At the same time, evidence submitted to the Commission in connection with construction and operating costs was necessarily less complete than that covering most other aspects of the subject. This was so due to the high costs of conducting detailed locational ground surveys over a number of alternative routes, and the Commission therefore recognizes the tentative nature of any cost estimates submitted to it. At the same time, a number of general presumptions seem warranted with regard to some items influencing both capital and operating costs over the two proposed routes.

The engineering factors governing the cost of construction are as follows:

1. Route Mileage
2. Topography and Soil Conditions
3. Accessibility of route
4. Ballast
5. Bridges
6. Grades

## 1. ROUTE MILEAGE

The most useful and desirable northern terminus of the proposed rail line should be the harbour at Hay River for purposes of providing access to and developing the region tributary to Great Slave Lake. Such is the unanimous opinion of this Commission for reasons outlined elsewhere, and it is a view which is held quite regardless of whether the rail extension were to proceed from Waterways or from Grimshaw. On the basis of either route moving as far as Hay River with spur line connections to the Pine Point property estimated route mileages appear as follows:

Grimshaw to Alexandra Falls	362 Miles
Alexandra Falls to Hay River	<u>36 Miles</u>
Total - Grimshaw to Hay River	398 Miles
Alexandra Falls to Pine Point	75 Miles
Total - Grimshaw to Pine Point	437 Miles
Waterways to Fort Smith Jctn	290 Miles
Fort Smith Jctn to Pine Point Jctn	96 Miles
Pine Point Jctn to Hay River	<u>40 Miles</u>
Total - Waterways to Hay River	426 Miles
Pine Point Jctn to Pine Point	32 Miles
Total - Waterways to Pine Point	418 Miles
Fort Smith Jctn to Fort Smith	25 Miles

On the basis of these estimates where both Hay River and the eastern extremity of the Pine Point property are served by either an easterly or westerly route, there is no great difference with regard to sheer mileage of new constructions (437 miles via the West and 458 miles via the East, or 483 miles on the East including a spur to the Fort Smith area).

Mileages to Edmonton would appear as follows on the basis of the above estimates plus 327 miles from Grimshaw to Edmonton and 305 miles from Waterways to Edmonton.

Hay River to Edmonton, via Grimshaw	725 Miles
Pine Point to Edmonton, via Grimshaw	764 Miles
Hay River to Edmonton, via Waterways	731 Miles
Pine Point to Edmonton, via Waterways	723 Miles

Mileages applicable to northern freight moving through Hay River from or to Vancouver via the Northern Alberta - Canadian National or the Northern Alberta - Pacific Great Eastern railways would now stand as follows:

Hay River - Grimshaw - McLennan - Edmonton - Vancouver (N.A.R. - C.N.R.)	1490 Miles
Hay River - Grimshaw - McLennan - Dawson Creek - Vancouver (N.A.R. - P.G.E.)	1410 Miles
Hay River - Waterways - Edmonton - Vancouver (N.A.R. - C.N.R.)	1496 Miles



## 2. TOPOGRAPHY AND SOIL CONDITIONS

The Department of Highways, Province of Alberta, has actual data on file indicating the type of terrain to be traversed by a rail extension between Grimshaw and Hay River. This information has been accumulated as a result of surveys and later construction on the Mackenzie Highway. In general, the countryside is of low relief, in fact quite flat, but not to the point of presenting a serious drainage problem. Extensive cutting and filling can be expected to be at a minimum. Over the Alberta section of the Mackenzie Highway, the soil type is generally similar to that found to the south throughout most of the Peace River country - a type suitable for embankment and sub-grade purposes. North of the Alberta boundary from Alexandra Falls to Hay River, the route of the Mackenzie Highway follows ridges of coarse gravel for the most part. Less is known of the terrain which would be crossed by a branch from the vicinity of Alexandra Falls to Pine Point. There are indications that a route branching east near the existing winter road to Pine Point could travel reasonably well drained terrain on the escarpment and on gravel ridges beyond the escarpment.

In the case of an easterly route from Waterways to Hay River, not as much is known of the details of the terrain to be traversed. This is so owing to the lack of adequate ground surveys and of roads over most of the region.

Evidence obtained from a perusal of the note books of the Dominion Land Surveyors who ran the base lines and meridians over the region tributary to the Athabasca River indicates that most of this area is a sand hill country. The whole of the region is drained by streams flowing easterly towards the Athabasca River. Since the stream beds are in a youthful stage of erosion, the valleys are deep and V-shaped such as could require much bridging in their lower reaches.

The terrain west of Lac Clair is poorly drained with extensive swamps reaching west almost to Jackfish River Post. A railroad grade here would find it necessary to make a wide detour to the west to avoid these swamps. From Peace Point to the vicinity of Fort Smith, the country is flat with only minor marshy patches.

From the Fort Smith vicinity in a more or less direct line to the Pine Point headframe, as proposed by the railway companies, is to be found a most formidable expanse of swamp and muskeg - and one that has served extensively as a major resting ground for waterfowl. From such information as this Commission has been able to make available to itself, a preferred route would seem to run from the vicinity of Fort Smith northwesterly as far as possible along the top of the escarpment which eventually reaches the Hay River at Alexandra Falls. By dropping off the escarpment farther west than was proposed in the submission of the railway

companies, the worst of the marshy territory southeast of Pine Point can be avoided. The mining property can then be served by a short spur running off the line which continues north-westerly to Hay River. There seems little doubt but that the latter route would lead to lower construction and maintenance costs, although it is not such a direct route for the Pine Point property itself. On the other hand, such a spur would run almost the full length of the Pine Point property and so provide surface transportation to the mine.

With regard to soil types over an easterly route, these would seem to include a larger proportion of sands, tar sands and high organic content meadow soils than is the case to the west. None of these materials is very suitable for embankment and grading purposes and they are frequently costly to excavate and to maintain.

### 3. ACCESSIBILITY OF ROUTE

Accessibility for purposes of surveying and transporting men, materials and supplies for construction are important factors influencing the initial costs of construction of a railway. On the westerly route, the Mackenzie Highway would make any portion of a proposed railway line easy of access through the use of short access roads into the right of way. The grade can then be

constructed in sections simultaneously along its whole length. Delays developing in any one section need not be reflected in the progress of others.

Year-round accessibility by road to much of an easterly rail route is more difficult, especially along the west side of the Athabasca to Peace Point. This region is readily accessible by river barge during the summer months; however, accessibility at any time is difficult in the case of the marshy sections northwest of Fort Smith unless the route moved westward first along the top of the escarpment in the vicinity of the present winter road to Hay River. As matters stand at the present time and without further road construction, accessibility to an easterly right of way is at present confined to the summer months by barge or to the winter months by winter road. In general, ease of access for construction purposes is not nearly so convenient nor reliable along an easterly route as can be expected along a route north of Grimshaw.

#### 4. BALLAST

Proximate supplies of gravel are understood to have been adequate for the construction of the Mackenzie Highway. Since railways will often prefer to train-haul their gravel for ballast, it may be necessary to have access to several large sources of gravel. The railway gravel pit in the valley at Peace River town still holds large reserves,

but due to the grade out of the valley, this may not always be a desirable source. However, the Commission is informed that there is a large gravel deposit just east of North Star, and an additional larger deposit on the west side of the Peace River, near Carcajou. North of Alexandra Falls to Hay River, the sub-soil itself consists mainly of a coarse gravel.

In the case of the eastern route, sufficient reconnaissance has not been made to establish the location or availability of suitable gravel reserves. Once over the encarpment south of Great Slave Lake on the northern end of the route, the terrain is again interspersed with old raised beaches and gravel ridges west and southwest of Pine Point.

#### 5. BRIDGES

No major bridges are required over the western route with the exception of a crossing over the Hay River at some point. The only other valley of any consequence is that of the Third Battle or Meikle River, the Meikle River being a small stream with a youthful valley some 150 feet deep. The Notikewin, Keg, Boyer, Hay and Steen Rivers run in shallow valleys and are relatively narrow streams.

A railway following an easterly route must cross at some point two major rivers, the Athabasca and the Peace. If the Athabasca crossing is made at Fort McMurray in the valley, then the bridge span need traverse only the river

and not the full width of the river valley. While some have stated that no foundation problems are anticipated for a bridge site at McMurray, others have questioned this view. The same can be said of the bridge site at Peace Point on the Peace River. Little concrete information will be available on these points until some drilling has been undertaken on the sites to indicate the nature and depth of strata suitable for carrying foundations. In any event, both of these bridges must be long if not high, and will add materially to initial costs of construction.

If the proposed railway is routed along or close to the west bank of the Athabasca downstream from McMurray, a number of minor bridges will be required to span the narrow but deep ravines cut by the relatively small streams emptying into the Athabasca from the west. Beyond the Peace River little difficulty is likely to be encountered with bridging due to the lower gradients and hence river valleys of the streams in the area. Bridging of the Hay River will also be necessary at the terminus in order to connect with existing wharfage at Hay River town.

## 6. GRADES

On a westerly route, the present N.A.R. line from Edmonton Junction to Grimshaw (327 miles) is constructed to a ruling grade of 0.5% over its entire length

with the exception of an eight mile section of pusher grade ascending the west side of the Peace River valley between Peace River town and Grimshaw. This grade consists of a mixture of 1.9%, 2% and 2.2% grades against north-bound traffic. On the other side of the river valley, a similar pusher grade operating against south-bound traffic exists out of Peace River town. This is a grade of 2.4% for seven miles out of Peace River.

Such pusher grades in excess of the ruling grade for the line unquestionably give rise to operational disadvantages and costs. Either a pusher locomotive must be held in location to service trains on the adverse grade, or the train must be broken and relayed over the grade in sections. Either method of handling such isolated grades in excess of the ruling grade for the line is costly, but is only one element affecting the operating costs on the line as a whole. Even more important as a cost detriment is the degree of the ruling grade for the line, since this determines directly the weight of the train that can be hauled over the line as a whole by a driving unit of given power.

In 1917, a survey was carried out by the Central Canada Railway Company from the present locale of Grimshaw some seventy miles north to a point near the Meikle River.

This survey established that a ruling grade of 0.5% was entirely feasible to that point. Profiles of the Mackenzie Highway route filed with the Alberta Government Department of Highways indicate that a ruling grade of 0.5% could be obtained over the entire route from Grimshaw to Hay River in both directions. This would suggest the possibility therefore of obtaining a 0.5% ruling grade in both directions over the entire route from Edmonton to Hay River.

In the case of an easterly route, the existing line from Edmonton to Waterways is built to a ruling grade of 1% operating against both northbound and southbound traffic. It is axiomatic in railway construction that "when a ruling grade has been determined, all grades in either direction are cut down to that limit", and furthermore that "no added expense should be incurred to reduce grades below that pre-determined ruling grade". In the event of a railway extension beyond Waterways then, it is unlikely that such an extension would be constructed to anything less than a 1% ruling grade since this is the grade standard already present on the line between Edmonton and Waterways. In addition, there is a 2% pusher grade against southbound traffic south out of Waterways between Draper and Lynton.

Some idea of the influence of ruling grade on



costs of railroad operation can be had from the following statement. A railway having a ruling grade of 0.5% will permit hauling from 60% to 70% more tonnage per train with a given driving unit than is the case over a 1% ruling grade.\* Stated differently, for a given tonnage and using the same class of locomotive, the railway with the 0.5% ruling grade would require, say, five trains to move the tonnage, whereas the railway with the 1% ruling grade would require eight trains to move the same tonnage.

#### SUMMARY OF ENGINEERING COST FACTORS

The evidence of Major J. L. Charles, Consulting Engineer and witness for the railway companies, indicated an initial cost of construction per mile of grade at about the same figure for either route when allowance is made for the initial cost of the two major bridges on an easterly route. It was emphasized that such estimates are based only on a preliminary reconnaissance of the two proposed routes, much of it from the air, and that such a reconnaissance certainly would not include any significant amount of ground survey work.

At the same time, it seems reasonable to this Commission that preliminary estimates of construction costs

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\* Webb, Economics of Railroad Construction.

over an easterly route can hardly be accepted with the same degree of firmness as would apply to estimates over a westerly route. This is so in view of the large amount of information already available concerning ground conditions applicable to the construction of the Mackenzie Highway. The proposed routing of a westerly rail extension parallels closely the route of the existing highway. No such experience or information is available over much of an easterly route as proposed by the railroad companies. From what has already been said concerning soil, topographical and accessibility factors over the two routes, it is the view of this Commission that any upward revision of cost estimates based on final ground location surveys for either route is likely to be greater on the east than on the west. It is impossible to go beyond this general statement in the absence of more specific cost data.

CHAPTER XII  
TRAFFIC FACTORS

Evidence was submitted to the Commission from several sources dealing with estimates of traffic likely to accrue to a rail extension following either a route north of Grimshaw or alternatively north of Waterways to a port on the south shore of Great Slave Lake. While some differences of opinion exist on small points pertaining to mileages and revenue generation per ton mile of traffic for a given freight mix, the broad outlines of an anticipated traffic pattern for either route can be developed with sufficient accuracy to serve the present purposes. These estimates are presented in Table V.

The figures reproduced in Table V are only suggestive of the rough order of magnitude likely to apply immediately to rail tonnages and revenues if and as a railroad comes into being along either route. Such a cautionary statement must be applied against the revenue estimates particularly, since each group of tonnages listed itself includes a mixture of products classified differently for railway rate-making purposes. Hence the implicit freight rates implied by the tonnage and revenue figures are really only a weighted average of the appropriate class and commodity rates thought likely to apply

## SUMMARY ESTIMATES OF TRAFFIC AND REVENUE INITIALLY AVAILABLE TO A RAIL CARRIER

TRAFFIC ITEM	VIA GRIMSHAW			VIA WATERWAYS		
	Tonnage	Revenue/ton-mile	Total Revenue	Tonnage	Revenue/ton-mile	Total Revenue
1 - AVAILABLE TO EITHER ROUTE	215,000	\$1.62	\$1,502,000.	215,000	\$1.62	\$1,502,000.
1. Lead and Zinc Concentrates						
Pine Point to Grimshaw or Waterways (assume 430 miles either way)						
2. Mine Supplies	25,000	4.43	476,000.	25,000	4.43	476,000.
Grimshaw or Waterways to Pine Point (assume 430 miles either way)						
3. General Traffic	70,000	3.56	1,024,372.	70,000	3.56	1,024,372.
Northbound to Great Slave Lake and Mackenzie River Points						
4. WEST ROUTE ONLY						
4. Grain	36,000	.50	12,000.			
Southbound to Grimshaw (weighted average haul of 65 miles)						
5. Lumber	12,000	.65	9,750.			
Southbound to Grimshaw (weighted average haul of 125 miles)						
6. General Traffic	32,000	3.00	86,000.			
Northbound from Grimshaw (average haul of 90 miles)						
7. General Traffic				8,000	<del>2.50</del>	\$ 72,000.
Northbound, Waterways to Fort Smith Area (300 miles)						
8. Lumber				12,000	.65	19,500.
Southbound to Waterways (weighted average haul of 250 miles)						
9. General Traffic				100,000	2.50	562,500.
Northbound for Lake Athabasca (Waterways to Peace Point - 225 miles)						

to the particular freight mix included in each broad category. These unit revenues or rates have been calculated on the basis only of mileages, rates and revenues applicable on through movements beyond either Grimshaw or Waterways as the case may be. While the figures presented are necessarily coarse estimates then, they are nevertheless useful as a starting point from which prognostications of future resource and development and therefore freight tonnages can be made. They are also indicative of the wide variations present as between groups of traffic with respect to the capacity of a given tonnage of each category to generate freight revenue to a rail carrier under the existing rate structure. The incremental revenue figures on traffic which is likely to move over the whole of the new line are based on the same total mileage between Grimshaw and Hay River as between Waterways and a terminal at Hay River.

Pine Point production southbound and Pine Point mining, general and petroleum supplies northbound are anticipated to yield over the beginning years of operation some 240,000 tons of traffic annually. The 25,000 tons of high rated general freight included in the above figure is expected to yield nearly \$18. per ton as against nearly \$7. per ton on the southbound bulk movement of

concentrates from the mine. The total of this traffic is expected to yield close to \$2,000,000. annually to a rail extension, moving over either an easterly or westerly route, providing that the railroad can effectively compete for all the traffic against truck operations on the west which can move right into Pine Point, and barge operations on the east which cannot fully complete the movement to Pine Point even in the summer time.

In addition, it is estimated that some 70,000 tons of northbound freight annually can be anticipated for the general Great Slave Lake region and beyond (excluding Fort Smith) yielding an estimated annual rail revenue of just over \$1,000,000. or about \$15. per ton. This traffic is also potentially available to a rail carrier operating over either an easterly or westerly route.

Taken together then at some \$3,000,000. annually, the two large Pine Point and Slave Lake traffic items constitute the major and potentially common core of traffic available to meet some portion or all of the out-of-pocket costs of operating and maintaining a northerly rail extension. In addition to these two large agglomerates of traffic, the assured prospects for other traffic assume relatively inconsequential proportions in terms of their immediate ability to generate revenue to meet the

costs of a new rail extension. The one exception to this statement, which has led to much controversy, involves an annual freight movement of some 100,000 tons of mining supplies and general freight moving into the Uranium City area on Lake Athabasca from Waterways by means of common (barge) carrier. Shipper's outlay for this movement is estimated to run in the neighborhood of \$1,300,000. annually. More will be said of this item at a little later stage.

Some immediate prospects for a lumber movement accruing to a new rail extension are evident for both proposed routes. It appears that some 12,000 tons of sawn lumber could accrue immediately to a rail extension over roughly the first 200 miles north of Grimshaw. On the basis of the existing very favourable "Spokane" competitive rates plus arbitraries (rate increments beyond certain base points of origin) applying on lumber moving to eastern U. S. and Canadian markets, gross revenue accruing to the new line is likely to be in the neighborhood of \$9,750.00 annually (assuming an average haul of 125 miles and a rate "arbitrary" beyond Grimshaw of .65¢ per ton mile). Thus lumber for eastern movement is a relatively low-rated commodity insofar as the new rail extension is concerned. On the route north of Waterways, immediate tonnage of sawn lumber

from existing licensed berths on mature and over-mature timber in the Wood Buffalo Park could also be said to be in the neighborhood of 12,000 tons annually, although mill capacity in the region is already twice this great. (Proponents of a westerly route argue that capacity north of Grimshaw could and would be doubled quickly with the advent of a rail extension). A given tonnage on an easterly route will tend to yield more freight revenue in the immediate future since the length of haul over the new line will be longer (225 miles from the vicinity of Peace Point and 300 miles from Fitzgerald to Waterways). The initial 12,000 tons of lumber on an easterly rail route could be expected to yield about \$19,500. annually to the new line based on an average haul of 250 miles over the proposed extension (assuming a rate arbitrary of .65¢ per ton mile beyond Waterways). In any event, immediate revenue prospects of the above order are small on either route by comparison to the major groups of traffic already mentioned.

The same can be said of several other groups of traffic likely to be available only to a westerly or to an easterly route. It is estimated that grain loadings on a new rail extension north of Grimshaw might initially amount to some 36,000 tons annually. The bulk of this



production (about 85%) will be concentrated for some time in the Manning region some 55 miles north of Grimshaw, with most of the remainder coming to rail some 200 miles north of Grimshaw from the Fort Vermilion district. Assuming a weighted average haul of 65 miles for all grain shipments moving over a new line, and at the statutory (export) rate converted to a ton-mile basis for the area (.5¢ per ton mile), the 36,000 ton grain haul might be expected to yield just over \$12,000. annually to a rail carrier. This amount also is comparatively insignificant from the point of view of revenue generated to sustain the operation of a rail extension. This is so not only because of the relatively low incremental rates applicable to grain shipments (as with lumber, but for different reasons) when compared to most other categories of traffic, but also because of the relatively short distance over which the bulk of the grain movement will take place on any new extension. Relatively little livestock can be expected to move over any new extension north of Grimshaw because of the already proven effectiveness of truck competition on the Mackenzie highway and south which can offer greater convenience and service to scattered shippers at nearly the same rates on all but carload rail shipments.

In the summary estimates of Table V one other item of northbound general traffic has been included for each of the two routes. This item is to include the general freight and supplies moving north from existing railhead at Grimshaw and Waterways and destined for intermediate points along the proposed new routes.

In the case of an easterly route, the extent of this traffic is easier to estimate since the bulk of it at present is destined for the Fort-Smith - Fort Fitzgerald region. Based on past barge shipments into the region over a number of years, a reasonable estimate for the Fort Smith traffic in the immediate future has been placed at 8,000 tons (of which nearly 5,000 tons consists of petroleum products). At a water competitive rate in the neighborhood of 3¢ per ton mile, this freight if carried by rail over some 300 miles from Waterways to Fort Smith would yield about \$72,000. annually to a rail carrier.

In the case of a westerly route, the likely size of northbound general traffic for intermediate points is more difficult to estimate. According to 1956 Census information however, some 8,000 people are known to reside on farms and in settlements generally adjacent to the

Mackenzie Highway from Grimshaw north to High Level (approximately 180 miles) and east of this point into the Fort Vermilion region. It is assumed that the per capita requirement of inbound freight for family living and business use is about the same for the population resident along the west as for the population of the Fort Smith region (reported at about 2,000 in 1956). On this basis, the tonnage of northbound freight required to meet the needs of the population along a westerly route would be in the neighborhood of 32,000 tons annually. At the present time, all of this is moved by private or public truck carrier. If moved by rail however, this freight would move over an average haul of about 90 miles. At the relatively low (for general freight) average rate of 3¢ per ton mile, the 32,000 tons of freight would yield a revenue to the new line of about \$2.70 per ton or \$86,000. annually. This aggregate amount of revenue is not much greater than that estimated for the Fort Smith area traffic to the east even though the tonnage may be four times as great on the west. This is so due to the longer haul over any new rail extension to the east from Waterways to Fort Smith (300 miles) than from Grimshaw to intermediate points as far north as 180 miles. Once again, whether or not northbound general traffic between Grimshaw and Keg River

will ever become available to a rail carrier in significant amounts must remain an open question at this time. Suffice it to say that a railroad paralleling the Mackenzie highway, rebuilt to new standards, must compete with potential trucking operations capable of being offered under first class conditions.

On an easterly route, any new rail operation must also compete with the established barge service. As a water carrier however, such barge operations between Waterways and Fort Smith - Bell Rock have not been and can never be carried on under first class conditions such as to make available the usual low cost advantages of a water carrier. These matters will be dealt with later. Suffice it to say here that on most types of general traffic any proposed railway extension will find it more difficult to pick up traffic from present all weather truck carriers than from present seasonal barge carriers.

There remains now to consider some 100,000 tons of annual traffic presently moving by public barge carrier (Northern Transportation Company) from existing railhead at Waterways down the Athabasca River and across Lake Athabasca to Bushell, Sask., the port for the Uranium City area. The same water route is used by private barge carrier (Gunnar Mines) primarily for the movement of large

tonnages of bulk freight such as sulphur and petroleum products. Of the roughly 100,000 tons of freight moved by public carrier into the Uranium City area, it is estimated that about 40,000 tons consists of petroleum products, 25,000 consists of sulphur for process use in the uranium mills, the remaining 35,000 odd tons consisting mainly of mining supplies plus general freight. This total Lake Athabasca movement by public carrier beyond Waterways will yield at present barge rates some \$1.3 million annually. It has been the subject of some controversy during the hearings before this Commission as to whether or not an extension of rail service beyond Waterways can expect to contribute in some way to the Lake Athabasca carriage.

In the traffic estimates of the joint submission of the Canadian National and Canadian Pacific Railway companies, the assumption was made that all of the public carrier barge freight at present moving into Lake Athabasca would instead move beyond Waterways by rail at least as far as Peace Point at the projected crossing of the Peace River, and some 225 miles north of Waterways. It was also assumed that some 35,000 tons annually of freight presently being barged and portaged from Waterways to Fitzgerald-Bell Rock

and beyond for Slave Lake points would also be carried by rail to a Slave Lake port such as Ile du Mort or Hay River. The same assumption was made for a Grimshaw route with regard to truck carriers operating over the Mackenzie highway.

It does not seem unreasonable to assume that traffic from Waterways destined to points north of Bell Rock harbor (at the foot of the Slave River portage) would continue to move competitively beyond Waterways by rail in preference to barge at least as far as Bell Rock harbor beyond the portage. This is so due to the influence of barging costs of a relatively short season of operation, or sporadic low water conditions, and of the necessity for railway-to-water trans-shipment at Waterways and again at Fort Fitzgerald for the portage (the latter estimated by Northern Transportation to cost in the neighborhood of \$8.00 per ton). The combined influence of all of these items obviously provides a rail carrier considerable scope on which to compete with a northern river carrier. On the basis of existing water carrier rates from Waterways to Bell Rock and of railway company estimates of projected incremental rail rates beyond Waterways, it appears likely that a rail carrier could offer lower freight charges on traffic moving either way between Waterways and Slave Lake.

This would only happen in practice, however, as long as competing carriers are available to offer effective alternatives. At the same time it is to be noted that the present published barge rates of the Northern Transportation Company - a Crown Company - are high by usual water transport standards. This fact no doubt reflects in part certain of the unique operating conditions of the Mackenzie River system mentioned earlier, as well as a comfortable profit position. Faced with competition, there is little doubt but that the current barge rates applying on the Athabasca River system might well be reduced on the basis of the present volume of traffic.

Aside from traffic moving down the Athabasca River for points beyond the portage, and considering only the relatively large tonnage moving into Lake Athabasca, it is by no means clear that a rail carrier operating beyond Waterways to Peace Point will find it easy to interest shippers in any extended rail haul unless the rail rates quoted are unusually attractive for the type of freight involved. This is so since the extended rail haul must require trans-shipment to barge at Peace Point in any event, and will therefore not be able to offer year-round or otherwise improved service to the Uranium City area. Moreover, the barging distance from Peace

Point down the Peace and across Lake Athabasca to Bushell (Uranium City area) is only some 60 miles shorter than the existing water route from Waterways down the Athabasca and across Lake Athabasca to Bushell. This being so, it is unlikely that a water carrier will be able in the future to provide service to Lake Athabasca points from Peace Point at a cost plus profit per ton which is much lower than that now in existence on operations out of Waterways. On the other hand, if profits on the Peace Point barge operation are reduced so as to offer lower combined rates to shippers on operations out of Peace Point, then there is no reason why such mileage rate reductions cannot be made available on existing operations out of Waterways to nearly the same extent. It is true that draught conditions on the Peace River below Peace Point to the west end of Lake Athabasca are likely to be more favourable throughout most of the summer season. But there is also evidence to suggest that channel conditions over this stretch are so tortuous in at least one place as to require the relaying of barges - a slow and consequently costly operation. The annual capital charges arising from new harbour and trans-shipment facilities at Peace Point must also be considered in gauging the future cost structure of a water carrier operating out of Peace Point rather than Waterways.



All in all, there is little to indicate that water transport charges from Peace Point to Lake Athabasca points could be greatly reduced below those existing on operations out of Waterways, - and assuming a comparable profit or loss margin per ton on both operations. If this is so, then it would appear that a rail carrier operating north of Waterways to Peace Point would have little interest to shippers in the Lake Athabasca region unless the combined rail-barge charges via Peace Point were competitive with the straight barge charges on the alternative existing water route from Waterways via the Athabasca River. In view of the small difference in the length of the water haul on the alternative routes, this would imply that the incremental freight charges by the rail carrier on the combined rail-water route would have to be exceedingly low - perhaps in the neighborhood of 1-1/2¢/ton mile on general freight. This figure is considerably lower than anything projected in the revenue estimates contained in the joint C.N.R. - C. P. R. submission.

The estimate given above is arrived at in the following fashion. The Northern Transportation water-rate at present from Waterways to Bushell, Sask. is \$20. per ton on general freight, which amounts to some 7.3¢ per ton mile over a distance of about 273 miles. Assuming for the moment

the same costs per mile on a water haul out of Peace Point, and a saving in water mileage of some 60 miles, then the total water charge on general merchandise out of Peace Point to Bushell might be reduced to the extent of some \$4.40 per ton. For a rail carrier now to haul from Waterways to Peace Point, a rail distance of approximately 225 miles, at an incremental rate of \$4.40 per ton beyond Waterways would imply a charge of \$4.40 or 1.9¢ per ton mile on the freight mix destined for Lake Athabasca points. Railway company estimates were in the neighbourhood of 3-1/2¢ per ton mile. Conversely, if rail charges are assumed at 3-1/2¢ per ton mile or \$7.85 per ton from Waterways to Peace Point, and the alternative straight water rate from Waterways to Bushell is \$20. per ton, then a water carrier out of Peace Point would be left a margin of \$20. - \$7.85 or \$12.15 per ton on which to carry freight from Peace Point to Bushell, a distance which is only some 60 miles or 23% less than the Waterways-Bushell water route on which the rate would be \$20. per ton. Hence rail-water trans-shipment point at Peace Point rather than at Waterways to serve Lake Athabasca shows little prospect of adding revenue to a rail extension north of Waterways except either at the expense of the shipper, or at the expense of substantial revenue on the part of the water

carrier - which revenue would not have to be sacrificed if operations were to continue out of Waterways. If such revenue and profit reductions are justified on operations out of Peace Point, they will also be justified on operations out of Waterways.

In addition to the cost and revenue considerations bearing on the assumed rail-water haul into Lake Athabasca out of Peace Point, it is also to be noted that such an alternative operation will not necessarily provide shippers with more frequent or with year-round service. To do so would require the initiation of a winter truck or tractor haul from the vicinity of Peace Point or the Fort Fitzgerald region to the Uranium City area - an overland distance of between 150 to 200 miles. While such a service could easily develop at some time in the future, it is not necessarily assured by the advent of a railway in the general region. Nor is it assured that shippers would find it economical to use a winter rail-truck haul in preference to a summer water haul for anything but a limited amount of freight which is otherwise excessively inconvenient or costly to store.

On the basis of all the evidence therefore, it does not appear sound economically to assume that a projected rail carrier operating north of Waterways can

expect to obtain for some time to come more than a nominal amount of the Lake Athabasca freight haul although this nominal portion will ordinarily be high rated freight. Nor is it sound economics to manoeuvre or force the existing public water carrier into a changed and uneconomic operation so as to improve the revenue position of the new rail haul unless this is explicitly viewed as an operating subsidy to the rail carrier. Thus it would seem appropriate to subtract the Lake Athabasca freight of some 100,000 tons annually from traffic estimates submitted by proponents of the eastern route, and this adjustment will then be carried over to revenue estimates as well.

Viewing the traffic and revenue potential along each of the alternative rail route in general now, the immediate prospects can be summarized as follows. If all the traffic to Lake Athabasca points is excluded, the immediate volume of freight reasonably assured to either an easterly or westerly route is not very different. Somewhat higher tonnages are associated with the westerly route, but this is more than offset by somewhat higher revenues available to an easterly rail extension. This is so chiefly as a result of two factors, viz:

1. the smaller tonnage of traffic destined for the Fort Smith region consisting mainly of

general freight and petroleum products is consistently higher rated freight per ton mile than is applicable to a larger grain tonnage available to the west (about 1/2¢ per ton mile on grain moving for export as against probably 4-1/2¢ per ton mile or much higher on general freight depending on inter-carrier competition, but at least 3-1/2¢ per ton mile which is the barge rate currently in effect between Waterways and Fort Smith.)

2. both the lumber and Fort Smith traffic available to an easterly route will utilize a considerably longer section of any new rail extension north of Waterways than is true of the grain and lumber traffic available to any new extension north of Grimshaw. In other words, the smaller tonnage of traffic generated by intermediate points on an easterly route on the average is higher-rated and is hauled over longer distances on the new line than is the case of intermediate traffic generated on a westerly route.

But because these revenue differences are comparatively small in any event when judged against the totals, it is particularly important to realize that all estimates of traffic discussed so far are based on present or immediate tonnage availability and hence take little account of likely future growth trends with respect to different types of resource or industrial development. Nor do the summary remarks just recorded make any allowance for some part of the lucrative Lake Athabasca carriage that might accrue to a railroad particularly during the winter months if and when a winter road connection to Uranium City is built. These are all matters which are discussed elsewhere in this report.

A P P E N D I C E S

APPENDIX A.

C O M M I S S I O N

under Part I of the Inquiries Act

appointing Marshall E. Manning, Esquire, et al,  
Commissioners to inquire into the respective  
merits of alternative routes for a railway line  
from Northern Alberta to southern portion of  
the District of Mackenzie, N. W. T.

Dated . . . . .22nd June, 1959

RECORDED. . . . .22nd June, 1959

Film 84      Document 66

(Sgd. R. W. Doyle)

FOR REGISTRAR GENERAL OF CANADA



## C A N A D A

ELIZABETH THE SECOND, by the Grace  
of God of the United Kingdom, Canada and Her  
other Realms and Territories QUEEN, Head of  
the Commonwealth, Defender of the Faith.

(Sgd. W. R. Jackett)

Deputy Attorney General,

CANADA.

(S E A L)

TO ALL TO WHOM these presents shall come or whom the same may in any wise concern,

GREETING:

WHEREAS pursuant to the provisions of Part I of the Inquiries Act, chapter 154 of the Revised Statutes of Canada, 1952, His Excellency the Governor in Council, by Order P. C. 1959-705 of the fourth day of June, in the year of Our Lord one thousand nine hundred and fifty-nine, a copy of which is hereto annexed, has authorized the appointment of Our Commissioners therein and hereinafter named to inquire into and report upon the respective merits of the alternative routes that might be followed by a railway line to be built from northern Alberta into the southern portion of the District of Mackenzie, Northwest Territories, for the purpose of providing access to and contributing to the development of that portion of the Territories tributary to Great Slave Lake, and has conferred certain rights, powers and privileges upon Our said Commissioners as will by reference to the said Order more fully appear.

NOW KNOW YE that, by and with the advice of Our Privy Council for Canada, We do by these Presents nominate, constitute and appoint Marshall E. Manning, Esquire, of the City of Edmonton, in the Province of Alberta; W. D. Gainer, Esquire, of the City of Edmonton, in the Province of Alberta; and John Anderson-Thompson, Esquire, of Yellowknife, in the

Northwest Territories, to be Our Commissioners to conduct such inquiry.

TO HAVE, hold, exercise and enjoy the said office, place and trust unto the said Marshall E. Manning, W. D. Gainer and John Anderson-Thompson, together with the rights, powers, privileges and emoluments unto the said office, place and trust of right and by law appertaining during Our Pleasure.

AND WE DO hereby authorize Our said Commissioners to exercise all the powers conferred upon them by section 11 of the Inquiries Act.

AND WE DO hereby authorize Our said Commissioners to adopt such procedure and methods as they may from time to time deem expedient for the proper conduct of the inquiry and sit at such times and at such places in Canada as they may decide from time to time.

AND WE DO hereby authorize Our said Commissioners to engage the services of such counsel, staff and technical advisers as they may require at rates of remuneration and reimbursement to be approved by the Treasury Board.

AND WE DO hereby require and direct Our said Commissioners to report their findings to Our Governor in Council.

AND WE FURTHER appoint the said Marshall E. Manning to be Chairman of Our said Commissioners.

GIVEN under the Great Seal of Canada.

WITNESS: Our Right Trusty and Well-beloved Counsellor, Vincent Massey, Member of Our Order of the Companions of Honour, Governor General and Commander in Chief of Canada.

AT OUR GOVERNMENT HOUSE, in Our City of Ottawa, this twenty-second day of June in the year of Our Lord one thousand nine hundred and fifty-nine and in the eighth year of Our Reign.

BY COMMAND

(Sgd. C. STEIN)

UNDER SECRETARY OF STATE

P. C. 1959-705

Certified to be a true copy of a Minute of a Meeting of  
the Privy Council, approved by His Excellency  
the Governor General on the 4th June, 1959.

The Committee of the Privy Council, on the  
recommendation of the Right Honourable John George Diefenbaker  
the Prime Minister, advise that

Marshall E. Manning, Edmonton, Alberta

W. D. Gainer, Edmonton, Alberta

John Anderson-Thompson, Yellowknife,  
Northwest Territories

be appointed Commissioners under Part I of the Inquiries Act  
to inquire into and report upon the respective merits of the  
alternative routes which might be followed by a railway line  
to be built from northern Alberta into the southern portion  
of the District of Mackenzie, Northwest Territories, for the  
purpose of providing access to and contributing to the  
development of that portion of the Territories tributary to  
Great Slave Lake.

The Committee further advise:

1. That the Commissioners be authorized to exercise  
all the powers conferred upon them by section 11  
of the Inquiries Act;

2. That the Commissioners adopt such procedure and methods as they may from time to time deem expedient for the proper conduct of the inquiry and sit at such times and at such places as they may decide from time to time;
3. That the Commissioners be authorized to engage the services of such counsel, staff and technical advisers as they may require at rates of remuneration and reimbursement approved by the Treasury Board;
4. That the Commissioners report to the Governor in Council with all reasonable despatch; and
5. That Marshall E. Manning be Chairman of the Commission.

"R. B. BRYCE",

Clerk of the Privy Council

## APPENDIX B.

## HEARINGS OF THE ROYAL COMMISSION

<u>PLACE</u>	<u>DATES</u>
Yellowknife, N. W. T.	September 2nd, 1959
Fort McMurray, Alberta.	September 4th, 1959
Peace River, Alberta.	September 8th and 9th, 1959
Edmonton, Alberta.	September 10th and 11th, 1959
	September 15th to 18th, 1959
	September 28th to 30th, 1959
	October 1st, 1959
	October 6th to 8th, 1959
	October 14th to 16th, 1959
	October 19th to 21st, 1959
	October 28th to 30th, 1959
	November 4th, 1959
	February 18th, 1960

## APPENDIX C.

## LIST OF SUBMISSIONS AND WITNESSES

<u>SUBMISSION</u>	<u>WITNESS</u>
Alberta & Northwest Chamber of Mines & Resources. . . . .	Cawker, E. A. Finland, G. H.
Alberta - Province of. . . . .	Taylor, Hon. Gordon E.
Anderson, C. H.. . . . .	Baldwin, G. W., Q.C., M.P.
Brintnell, W. L. . . . .	Brintnell, W. L.
British Columbia, - Province of. . . . .	Bonner, Hon, R. W., Q.C. Foulks, Arthur Guest, J. I. Roethel, H. L. Southworth, J. J. Baldi, Mr. McNab, G. Collins, Mr.
British Columbia & Yukon Chamber of Mines . . . . .	Riley, Dr. C.
Canadian Kodiak Refineries Ltd.. . . . .	Moar, J. Gordon, A.
Dawson Creek, City of. . . . .	Forsyth, Mayor R.
Denney Logging Company Ltd.. . . . .	Denney, R. B. Jr.



## APPENDIX C.

Edmonton, City of, and Edmonton and Calgary Chambers of Commerce (Joint Brief). . . . .	Clement, C. W., Q.C. Bishop, E. E., Q. C. Grimble, L. G. Gordon, A. Edgar, N. MacDonald, B. Rueger, M. R.
Farmers' Union of Alberta. . . . .	Nelson, E. C. Harper, W. J.
Farmers' Union of Alberta, District #1. . . . .	McIntosh, J. K. Powell, U.
Farmers' Union of Alberta, District #2. . . . .	Iddins, E. F. Hibbard, H.
Farmers' Union of Alberta - Golden Meadow Local #215. . . . .	No Witness
Farmers' Union of Alberta - Local North Star #249, and affiliates Deadwood No. 206 and Notikewin-Hotchkiss #227 . . . . .	Jason, J. Lorenez, N. Fazikas, W.
Fort Smith Chamber of Commerce. . . . .	No Witness
Fort St. John & District Board of Trade. . . . .	Murray, Mrs. M. L.

## APPENDIX C.

Grande Prairie Chamber of Commerce. . .	Baldwin, G.W., Q.C.,M.P. Rottacher, M.
Hay River Chamber of Commerce.. . . .	Porritt, R.
Horton, E. R. . . . .	Horton, Mayor, E.R.
Hotchkiss Ladies Club . . . . .	No Witness
Jones, J. R.. . . . .	Jones, J. R.
Lac La Biche Chamber of Commerce. . . .	Maccagno, M.
LeMouel, Jean M. . . . .	No Witness
McClarty, W. R. . . . .	McClarty, W. R.
McMurray Chamber of Commerce . . . . .	Duncan, R. A. McDougall, M. Peden, Mr. Hill, W.
Northern Alberta Railways . . . . .	Boyd, W. G. Levesque, D. J. Charles, Major J.L. Cooper, J. F. Rotstein, M.
North Vancouver Board of Trade . . . . .	Frazer, M.M.
Northwest Territories, Commissioner of,	Brown, W. G., Deputy Commissioner Jenness, Dr. J. L.
Notikewin-Hotchkiss F.W.U.A. Local #209.. . . .	No Witness

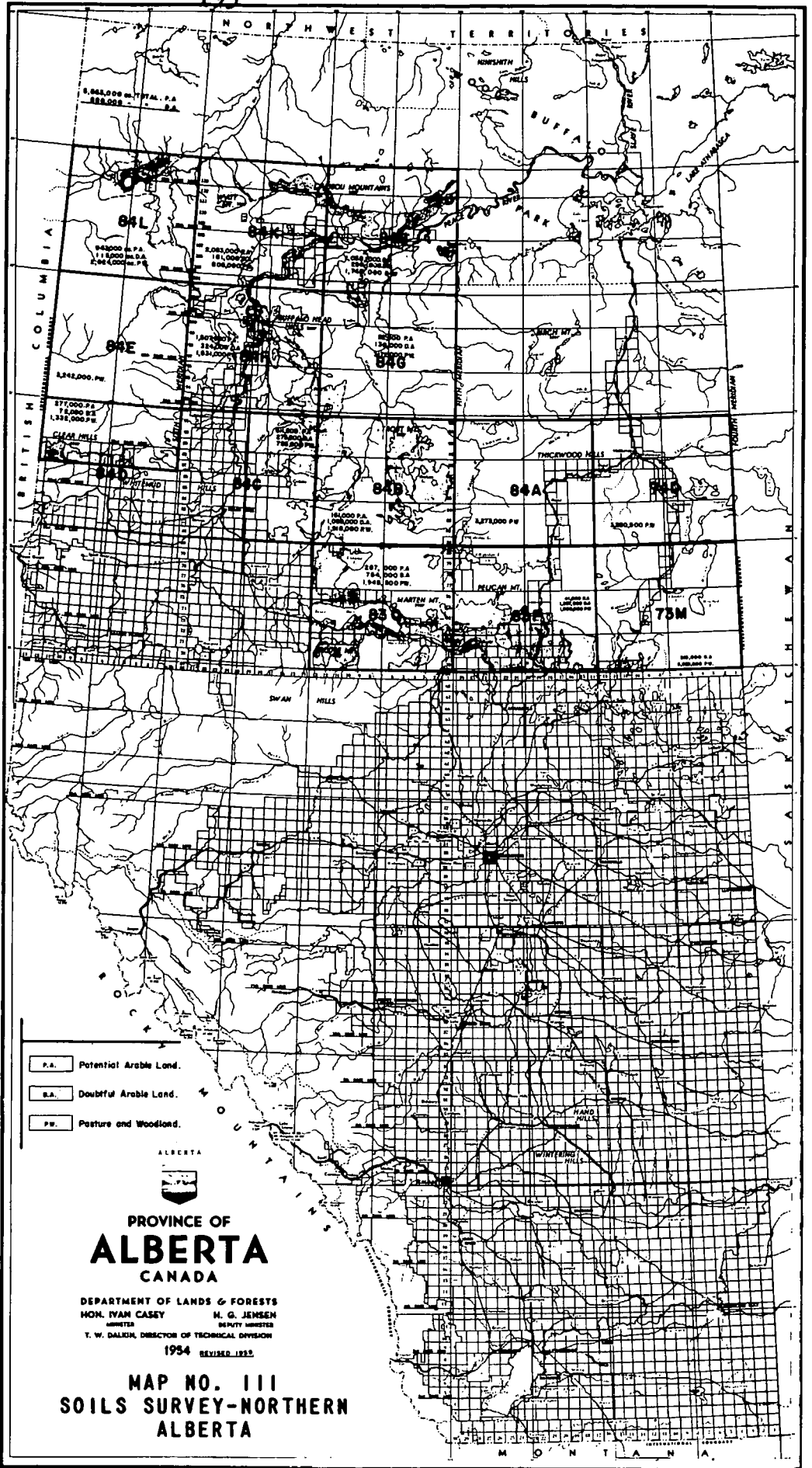
## APPENDIX C.

## Peace River Associated Chambers of

Commerce . . . . .	Baldwin, G. W. Q.C., M.P. Thomson, H. Bickell, J. Rottacher, M. Fischer, K.
Peace River Power Development Co. Ltd. .	Shakespeare, J. S.
Pickard, M. . . . .	Pickard, M.
Pine Point Mines Limited . . . . .	Frere, C.H.B., Q.C. Jewitt, W. G.
Porritt, Robert . . . . .	Porritt, R.
Premier Steer Mills Limited. . . . .	Heffernan, G.R.
Prest, B. J. . . . .	No Witness
Research Council of Alberta. . . . .	Odynsky, W.
Royalite Oil Company Limited . . . . .	Connell, G. A. Hay, C.
Sherritt Gordon Mines Limited. . . . .	Pearce, R. Walford, R.
Sproule, Dr. J. C. . . . .	Sproule, Dr. J. C.
Swanson Lumber Company Limited . . . . .	Hamilton, A. J. Matty, J. R.
United Grain Growers Limited . . . . .	Edworthy, G.

## APPENDIX C.

Uranium City Chamber of Commerce . . . .	Campbell, D. L. McMeekan, J. M.
Vancouver Board of Trade . . . . .	Elmer, R. T.
Westcoast Transmission Company Limited .	Hume, Dr. E. S.
Yellowknife Board of Trade. . . . .	Bromley, G.
Rebuttal Brief - City of Edmonton and Edmonton & Calgary Chambers of Commerce . . . . .	Bishop, E.E. Q. C.
Rebuttal Brief - Province of British Columbia . . . .	Foulks, Arthur.



- P.A. Potential Arable Land.
- D.A. Doubtful Arable Land.
- P.W. Pasture and Woodland.

ALBERTA

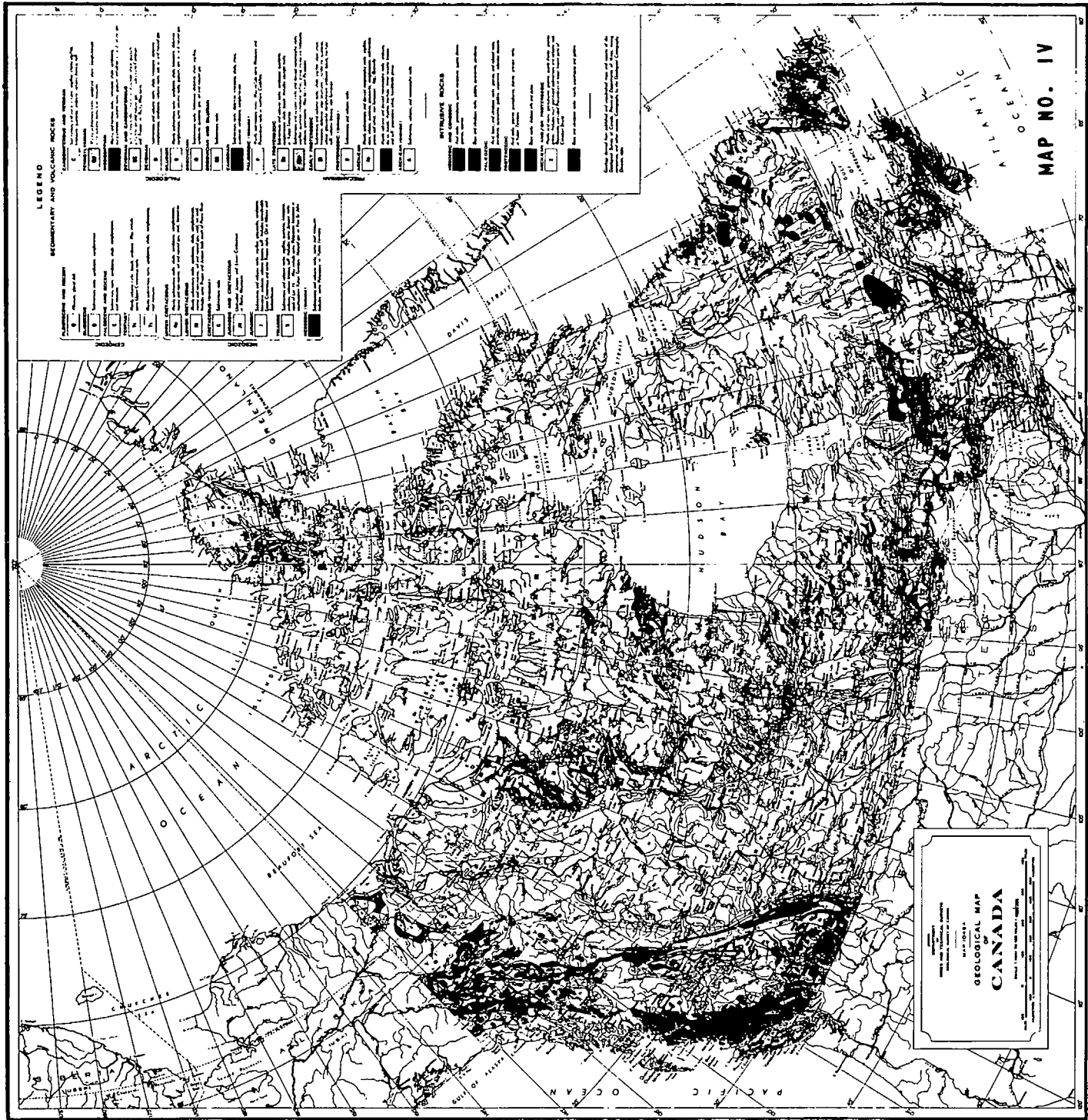


PROVINCE OF  
**ALBERTA**  
 CANADA

DEPARTMENT OF LANDS & FORESTS  
 HON. IVAN CASEY      M. G. JENSEN  
 MINISTER              DEPUTY MINISTER  
 T. W. DALGIN, DIRECTOR OF TECHNICAL DIVISION  
 1954    REVISED 1952

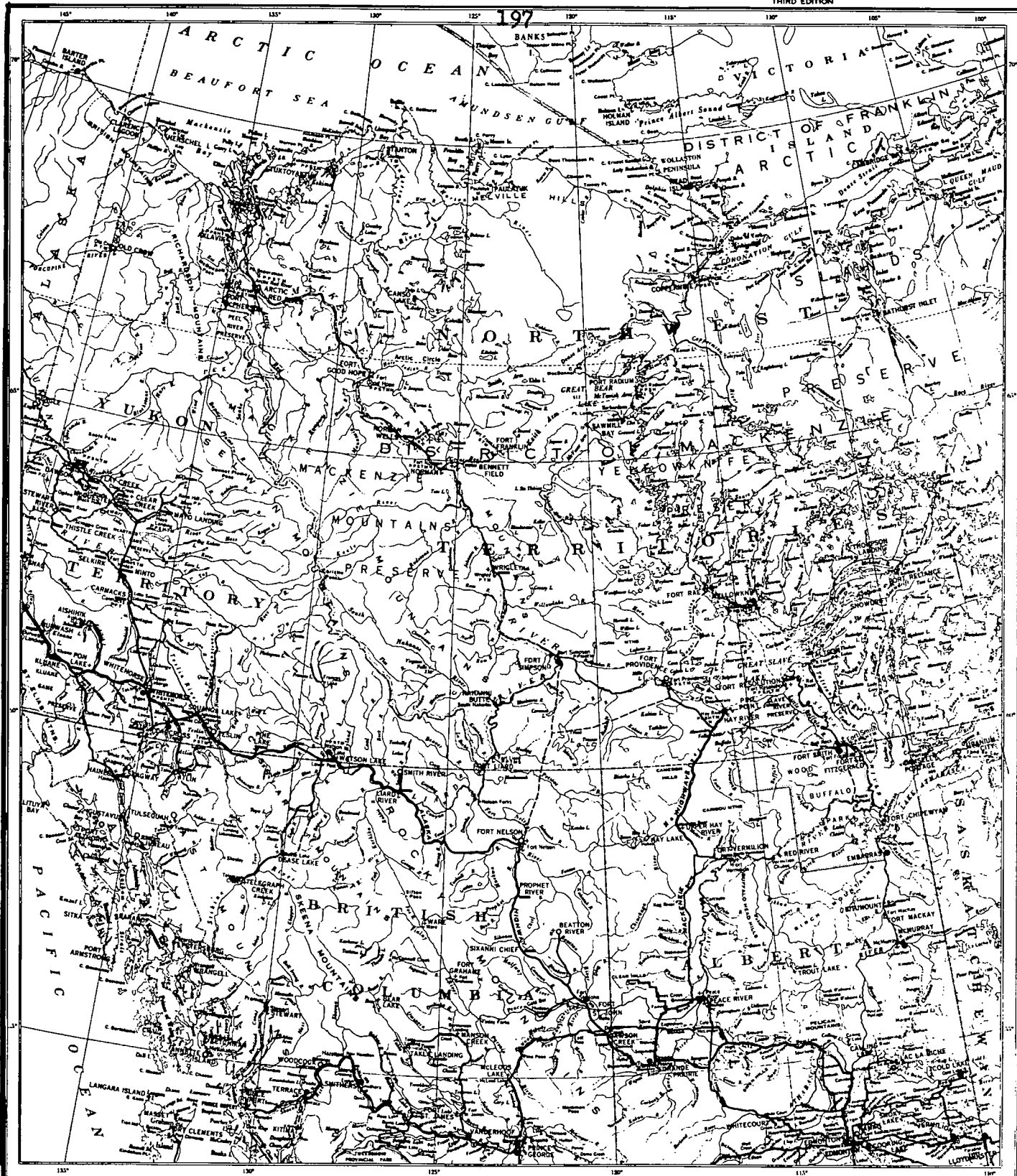
MAP NO. 111  
**SOILS SURVEY-NORTHERN**  
**ALBERTA**

M O N T A N A



GEOLOGICAL MAP  
OF  
CANADA  
MAP NO. IV

MAP NO. IV



TRANSPORTATION FACILITIES - 1958

**NORTHWESTERN CANADA**

Scale: 50 miles to 1 inch



Drawn to same scale

**MAP NO. V**

**REFERENCE**

- APPLYING TO NORTHWEST TERRITORIES
- Road Caravan (marked with asterisk) . . . . .
  - Post office . . . . .
  - School . . . . .
  - Hotel . . . . .
  - Nursing station . . . . .
  - Trading post . . . . .
  - Mission . . . . .

**REFERENCE**

- AIRFIELD . . . . .
- LANDING STRIP (unimproved) . . . . .
- SEAPLANE ANCHORAGE (improved) . . . . .
- SEAPLANE ANCHORAGE (unimproved) . . . . .
- RADIO STATION . . . . .
- RADIO RANGE . . . . .
- MOTOR ROAD . . . . .
- WINTER TRACTOR ROAD . . . . .
- STAMPA MONY . . . . .

DISTANCES IN MILES BY AIR BETWEEN MAIN CENTRES ALONG PRINCIPAL FLYING ROUTES

Edmonton to Inuvik	227	Grande Prairie to Fort St. John	307
Edmonton to Fort Smith	278	Fort St. John to Fort Nelson	193
Fort Smith to Inuvik	80	Fort Nelson to Wood Lake	276
Wood Lake to Fort Simpson	123	Wood Lake to Inuvik	150
Fort Simpson to Inuvik	126	Trout Lake to Whitecourt	60
Whitecourt to Inuvik	126	Whitecourt to Grande Prairie	102
Whitecourt to Edmonton	302	Whitecourt to Inuvik	266
Fort Smith to Yellowknife	180	Whitecourt to Inuvik (Alaska)	164
Yellowknife to Fort Resolution	211	Whitecourt to Fort McMurray	174
Fort Resolution to Yellowknife	143	Whitecourt to Fort McMurray	278
Fort Resolution to Yellowknife	174	Princess George to Inuvik	182
Edmonton to Grande Prairie	244	Sheridan to Inuvik (Alaska)	175