



3 3298 00413 1018

*File at Power...*

W A T E R P O W E R S

British Columbia

Canada

ANNUAL REVIEW

May 1962

WATER RESOURCES SERVICE  
Department of Lands, Forests, and Water Resources

A. F. PAGET  
Deputy Minister of Water Resources

**DO NOT CIRCULATE  
LIBRARY USE ONLY**

DOC  
BC  
W328  
D:W3  
1962

MAY 1962

WATER POWER AND HYDRO ELECTRIC DEVELOPMENT

Generation and New Developments

The total amount of electrical energy generated at hydro-electric plants during 1961 was 12,371,000,000 kilowatt-hours; a decrease of 2.1% on the corresponding figure for 1960. This drop in production is entirely due to the two-months shut-down of the Aluminum Company of Canada's power plant at Kemano. If ALCAN had maintained their output of the previous year the overall total for the Province would have shown an increase of around 5%.

Over the last ten years the total amount of power generated by hydro-plants in the Province has risen at a rate of 10.1% compound. The total generation both hydro and thermal for the same period has risen at a rate of 9.8% compound, from 5,143,000,000 Kwh. in 1951 to 13,158,000,000 in 1961. It is interesting to note that the average rate for the last forty-one years, the longest period for which records are available, is 8.2% compound.

The only new installation made during 1961 was by the B. C. Power Commission, which constructed a new 700 kilowatt plant at Clayton Falls near Bella Coola. Table I which lists the principal operating electric plants in British Columbia, shows a slightly different total from that of the previous year owing to the fact that plants with capacities less than 1,000 kilowatts have been included. The non-hydro list is as complete as possible though it is known that there are a number of diesel and steam plants used by various industrial concerns of which details are not available.

The installation of the first 158,000 kilowatt unit at the Burrard (Ioco) plant is now complete. Testing of the equipment is under way at the time of writing and it is expected to be in use very shortly. A second unit is under construction and a third on order. Provision has been made for the addition of a fourth unit when required and tentative plans envision up to six.

Planning - Columbia River

In last year's review it was reported that a Treaty had just been signed by Canada and the United States of America with respect to joint development of the Columbia River for hydro-electric power and flood control. Soon after this, in June, applications were made by the B. C. Power Commission for water licences covering the three projects to be built by Canada. A considerable number of objections to these were received by the Comptroller of Water Rights, most of which were directed against the Arrow Lakes project, and it was therefore decided that public hearings should be held. These took place during September and October and were held at the following places: at Revelstoke for the Mica application; at Kaslo for the Duncan application; and at Revelstoke, Nakusp and Castlegar for the Arrow Lakes application. An additional session was held in Victoria during November at which further presentations were made concerning the Arrow and Duncan projects.

A considerable volume of evidence was presented at these hearings, covering some 1,400 pages in the official transcripts. Subsequent review of these, and additional studies by the Water Rights Branch and other Government departments took several months. A decision was reached at length in favour of the applicant, and water licences were issued on the 16th of April, 1962. Some 450 legal objectors were also informed of the decision by registered mail, the largest such number in the Branch's history.

At the present time ratification of the Columbia Treaty is still pending ; but in spite of this the first stage of construction of the Duncan project is expected to be under way in a few weeks' time.

#### Planning - Peace River

It was reported in last year's review that the Peace River development was under examination by the B. C. Energy Board and it was expected that application would soon be made to the Public Utilities Commission for a Certificate of Convenience and Public Necessity. As a result of the legislation enacted last August and subsequent acquisition of the Peace River Power Development Co. by the Crown such a certificate is no longer required. The B. C. Electric Co. therefore made application for water licences covering power and storage at Portage Mountain site on the Peace River near Hudson Hope, on the 14th of February, 1962. A large number of objections have since been received by the Comptroller from persons whose lands or other rights would be affected by flooding due to the reservoir.

The proposed installation is twelve units of 212,000 kilowatts each, making a total of 2,544,000 Kw. The gross storage in the reservoir will be around 88,000,000 acre-feet of which 32,000,000 will be used for power production. The flooded area at the maximum pool elevation will be around 560,000 acres. In addition to this development at the Portage Mountain site a further 140 feet of head can be utilized at a point 12 miles downstream, which may raise the ultimate Peace River installation to 3,200,000 Kw.

#### Planning - Fraser River

The Fraser River Board is continuing a comprehensive study of a plan for the development of the head waters of the Fraser system for hydro-electric power and flood control. Field exploration is being carried out at a number of potential dam sites and the regulatory effect of the resulting storage reservoirs is being evaluated in terms of flood levels in the built-up areas along both the Fraser and Thompson Valley, as well as an economic evaluation of the developed areas of the river valley, are being carried out in support of the site investigations. These, together with numerous associated engineering studies, will form the basis of a plan for the development of upstream reservoirs capable of producing both hydro-electric power and suitable regulation of the

spring flood waters, sufficient to provide a degree of flood protection to the downstream flood plain. This work is expected to be completed in late 1963.

Temporary shutdown of the Kemano Plant

For some years it had been noticed that there was an unusual loss of hydraulic head at ALCAN's Kemano power plant. The conclusion reached by the Company's staff was that a section of the tunnel had caved in, causing a sudden constriction of flow. Various remedial measures were attempted with a certain degree of success, but the available head was still well below the amount it should have been. It was therefore decided that full repairs should be made for which purpose a complete shutdown of the plant would be required.

Preliminary observations of the nature of the head losses made it possible to determine the approximate size and location of the blockage. On dewatering the tunnel the estimates were found to be reasonably correct as a portion of the unlined section of the tunnel had collapsed at a point some four miles upstream from the power plant. In addition there were other falls of a minor nature all in unlined tunnel. It was observed that none of the falls were of recent occurrence and that the probability of further trouble was distinctly unlikely.

Very detailed planning was undertaken before commencement of the repair operations and the minimum dislocation to the company's operations was a primary consideration. Although the time required, twelve weeks, was longer than anticipated it was considered to be well worth while and subsequent tests have shown that the efficiency is now above the calculated figure.

TABLE I

Principal Electric Generating Plants in British Columbia

(in operation during 1961)

<u>Hydro Plant Code No.</u>	<u>Name of Plant</u>	<u>Locality</u>	<u>Type (Note 1)</u>	<u>Nameplate Capacity in Kw.</u>
PUBLIC AGENCIES				
<u>British Columbia Hydro and Power Authority</u>				
1870	Clayton Falls	Bella Coola	H	700
7100	Alouette	Mission	H	8,000
7150	Ash River	Alberni	H	25,200
7360	Bridge River No.1	Lillooet	H	180,000
7410	Bridge River No.2	Lillooet	H	248,000
7570	Cheakamus	Squamish	H	140,000
7720	Clowhom	Squamish	H	30,000
7770	Coquitlam-Buntzen	Port Moody	H	76,700
8330	John Hart	Campbell River	H	120,000
8380	Jordan River	Victoria	H	25,000
8600	La Joie	Bralorne	H	22,000
8650	Ladore Falls	Campbell River	H	54,000
8980	Puntledge	Courtenay	H	27,000
9040	Ruskin	Mission	H	105,600
9100	Seton	Lillooet	H	42,000
9200	Shuswap Falls	Vernon	H	5,200
9300	Spillimacheen	Golden	H	4,000
9350	Stave Falls	Mission	H	52,500
9570	Strathcona	Campbell River	H	33,750
9630	Wahleach	Chilliwack	H	60,000
9730	Whatshan	Arrow Lakes	H	33,750
-	-	Alert Bay	D	1,050
-	-	Bella Coola	D	750
-	-	Blue River	D	500
-	-	Boston Bar	D	1,300
-	-	Burns Lake	D	2,936
-	-	Chetwynd	G	1,200
-	-	Dawson Creek	G	17,000
-	-	Fort Nelson	G	2,350
-	-	Hazelton	D	850
-	-	Houston	D	950
-	-	Kamloops	D	4,500
-	-	Lytton	D	880
-	-	McBride	D	1,350
-	-	Port Hardy	D	1,100
-	-	Prince George	G	21,000
-	-	Queen Charlotte	D	460
-	-	Quesnel	G	18,000

TABLE I (continued)

<u>Hydro Plant Code No.</u>	<u>Name of Plant</u>	<u>Locality</u>	<u>Type (Note 1)</u>	<u>Nameplate Capacity in Kw.</u>
<u>British Columbia Hydro and Power Authority</u>				
--	-	Smithers	D	3,880
--	-	Spences Bridge	D	200
--	-	Terrace	D	4,200
--	-	Tofino	D	1,675
--	-	Valemount	D	330
--	-	Vanderhoof	D	1,600
--	-	Williams Lake	G	1,800
	Mobile Unit No.80 (road)	-	D	500
	Mobile Unit No.81 (road)	-	D	500
	Mobile Unit No.82 (road)	-	D	500
	Mobile Unit No.83 (road)	-	D	500
	Mobile Unit No.84 (rail)	-	D	1,000
	Burrard (Ioco)	Port Moody	S	Note (2)
	Georgia	Chemainus	T	75,500
	Port Mann (standby)	Port Mann	T	100,000
<u>The Corporation of the City of Nelson</u>				
7620	City of Nelson	Nelson	H	9,200
<u>The Corporation of the City of Revelstoke</u>				
7900	Walter Hardman (Cranberry Creek)	Revelstoke	H	4,000
8270	Illecillewaet River	Revelstoke	H	900
			D	1,900
<u>The Village of Kaslo</u>				
3520	Kaslo River	Kaslo	H	212
<u>PRIVATE UTILITIES</u>				
<u>East Kootenay Power Co. Ltd.</u>				
7050	Aberfeldie	Fernie	H	4,000
7930	Elko	Fernie	H	9,600
<u>Northern British Columbia Power Co. Ltd.</u>				
1220	Barneys Gulch	Prince Rupert	H	60
7310	Big Falls	Prince Rupert	H	7,100
9150	Shawatlans	Prince Rupert	H	1,400
	-	Prince Rupert	D	6,200

TABLE I (continued)

<u>Hydro Plant Code No.</u>	<u>Name of Plant</u>	<u>Locality</u>	<u>Type (Note 1)</u>	<u>Nameplate Capacity in KW.</u>
<u>West Kootenay Power and Light Co. Ltd.</u>				
8700	Lower Bonnington	Nelson	H	41,000
<u>Mirror Lake Power Ltd.</u>				
1420	Bjerkness-Mirror	Kaslo		150
PRIVATELY OWNED - INDUSTRIAL				
<u>Raynonier Canada Ltd.</u>				
8880	Port Alice	Port Alice	H	2,000
9780	Woodfibre	Squamish	H	2,250
<u>Aluminum Co. of Canada Ltd.</u>				
1090	Kemano	Kitimat	H	707,200
<u>Howe Sound Co. Ltd.</u>				
7260	Beach Powerhouse	Brittania Beach (Note 3)	H	6,150
<u>Carnegie Mining Corporation</u>				
5640	Slocan Star	New Denver	H	200
<u>Consolidated Mining and Smelting Co. of Canada Ltd.</u>				
7460	Brilliant	Nelson	H	81,600
7820	Corra Linn	Nelson	H	40,500
9250	South Slocan	Nelson	H	47,250
9520	Upper Bonnington	Nelson	H	55,125
9680	Waneta	Trail (Note 3)	H	144,000
<u>Crown Zellerbach Ltd.</u>				
8820	Ocean Falls (Note 3)	Ocean Falls	H	13,320
		Ocean Falls	S	15,000
		Fraser Mills	S	12,500
<u>Evans Coleman Evans</u>				
4220	Munro Creek	Port Moody	H	375

TABLE I (continued)

<u>Hydro Plant Code No.</u>	<u>Name of Plant</u>	<u>Locality</u>	<u>Type (Note 1)</u>	<u>Nameplate Capacity in KW.</u>
<u>Bralorne Pioneer Mines</u>				
1680	Cadwallader-Pioneer	Bralorne	H	240
7520	Cadwallader-Bralorne	Bralorne	H	800
8210	Hurley River No.2	Bralorne	H	675
<u>MacMillan Bloedel and Powell River Ltd.</u>				
8930	Powell River	Powell River	H	21,350
9400	Stillwater	Powell River	H	32,400
		Powell River (Note 3)	S	14,700
<u>Steelhead Haven Ltd.</u>				
5520	Silverhope-Steelhead	Hope	H	100
<u>Canadian Fishing Co. Ltd.</u>				
1660	Butedale Creek	Princess Royal Island (Note 3)	H	430

Notes: (1) Type of plant: H - Hydro,  
D - Diesel,  
G - Gas diesel,  
T - Gas turbine,  
S - Steam.

(2) The first unit of 158,000 kilowatts is at present being tested and will quite probably be in operation by the date of publication. Present planning is for two more such units making a total of three, in the near future.

(3) Also hydro-mechanical power development, see Table II.



TABLE I (continued)

Summary - Totals by Owners

	<u>Kilowatts</u>
B. C. Hydro and Power Authority - Hydro plants .....	1,293,400
B. C. Hydro and Power Authority - Thermal plants .....	268,361
The Corporation of the City of Nelson .....	9,200
The Corporation of the City of Revelstoke .....	6,800
The Village of Kaslo .....	212
East Kootenay Power Co. Ltd. ....	13,600
Northern B. C. Power Co. Ltd. ....	14,760
West Kootenay Power and Light Co. Ltd. ....	41,000
Mirror Lake Power Ltd. ....	150
Rayonier Canada Ltd. ....	4,250
Aluminum Co. of Canada Ltd. ....	707,200
Howe Sound Co. Ltd. ....	6,150
Carnegie Mining Corporation .....	200
Consolidated Mining and Smelting Co. of Canada Ltd. ....	368,475
Crown Zellerbach Ltd. ....	40,820
Evans Coleman Evans .....	375
Bralorne Pioneer Mines .....	1,715
MacMillan Bloedel and Powell River Ltd. ....	68,450
Steelhead Haven Ltd. ....	100
Canadian Fishing Co. Ltd. ....	430
	<hr/>
Total for British Columbia .....	2,845,648
	<hr/> <hr/>

TABLE II

Operating Hydro-mechanical power plants in British Columbia

<u>Hydro Plant Code No.</u>	<u>Name of Plant</u>	<u>Locality</u>	<u>Installation in Hp.</u>
	<u>Howe Sound Co.</u>		
9460	Tunnel Powerhouse	Brittania Beach	1,100
	<u>Consolidated Mining and Smelting Co.</u>		
5940	Sullivan		360
	<u>Crown Zellerbach Ltd.</u>		
8820	Ocean Falls		12,600
	<u>James J. Donaldson</u>		
2720	Georgetown Creek		230
	<u>MacMillan Bloedel &amp; Powell River</u>		
8930	Powell River		26,760
	<u>Canadian Fishing Co. Ltd.</u>		
4160	Mercantile Creek		100
	<u>Total for British Columbia</u>		<u>41,150</u>