COLUMBIA RIVER TREATY

AGREEMENT

on

DETERMINATION OF DOWNSTREAM POWER BENEFITS

RESULTING FROM CANADIAN STORAGE

FOR OPERATING YEARS 1969-70 THROUGH 1974-75

The Columbia River Treaty between Canada and the United States requires that the downstream power benefits resulting from operating plans agreed to by the Entities will be determined in advance by the Entities. The determination of downstream power benefits for the initial six operating years 1969-70 through 1974-75 are covered in the attached report and are agreed to by the United States Entity and the Canadian Entity.

R. G. Williston
Chairman
Canadian Entity

Sept 22, 1969
(Date signed)

H. R. Richmond
Chairman
United States Entity

9/26/69
(Date signed)

DETERMINATION OF DOWNSTREAM POWER BENEFITS RESULTING FROM CANADIAN STORAGE
FOR OPERATING YEARS 1969-70 THROUGH 1974-75
June 30, 1969

I. Introduction.

The Treaty between Canada and the United States of America and related documents relating to the cooperative development of the water resources of the Columbia River Basin requires that downstream power benefits from Canadian storage be determined in advance by the two entities. The purpose of this report is to set out the results of downstream power benefit computations for the years and for the storages for which the Assured Operating Plans were developed. The initial six operating years, 1969-70 through 1974-75, are covered in this report.

The procedures followed in the benefit studies are those provided in Annex B of the Treaty, in Articles VIII, IX, and X of the Protocol and in the document, "Procedures for the Determination of Downstream Power Benefits Resulting from Canadian Storage," dated September 9, 1968.

II. Results of Studies.

The Canadian Entitlement, which is one-half the total computed downstream power benefits for each of the six operating years, 1969-70 through 1974-75 are summarized below.

Operating Year	Canadian Computed Entitlement	
	Energy-mw	Capacity-mw
1969-70	573	950
1970-71	564	972
1971-72	558	981
1972-73	524	981
1973-74	768	1,484
1974-75	708	1,431

III. Computation of Entitlement.

The following Tables and Charts are attached and summarize the studies.

Table 1. Computation of Canadian Entitlement

The essential elements used in the computation of the Canadian Entitlement as provided in Paragraph 2 and 3 of Annex B are shown in this table.

Table 2. Summary of Power Regulations for the Computation of Canadian Entitlement to Downstream Benefits

This table summarizes the Step 1, 2 and 3 regulations by projects.

Table 3. Determination of Load Shape for Steps 2 and 3, Canadian Entitlement Computation

The load shape for Steps 2 and 3 carry the same ratio between each month and the annual average as does the Pacific Northwest area load. The Northwest area firm loads on this table were based on the current forecast data. The Grand Coulee pumping load is also included in this estimate.

The firm load for Steps 2 and 3 is computed as follows:

(1) Estimate the hydro nominal prime power for the critical period;

(2) Add the thermal from Step 1 less reserve;

(3) Multiply (2) by the ratio of the area annual average firm load to the area critical period firm load to obtain the annual average firm load for Steps 2 or 3.

The ratio used in the studies were as follows:

Operating Year	Step 2	Step 3
1969-70	0.98302	0.97099
1970-71	0.98172	0.96979
1971-72	0.98988	0.97901
1972-73	0.98387	0.97283
1973-74	0.99039	0.96914
1974-75	0.99116	0.97078

(4) Pro rate the average annual Step 2 or 3 load determined in (3) by months in the ratio that each monthly area load bears to the annual average area load; and

(5) Subtract the thermal in each month to obtain the monthly firm hydro load. The average annual hydro load for Steps 2 and 3 also becomes the firm energy considered usable according to Annex B, Paragraph 3(a).

Chart 1 & 2. Secondary Energy Duration Curve, Steps 2 and 3

These charts are duration curves of the secondary energy for Steps 2 and 3. The secondary energy is the capability each month which exceeds the firm hydro loads shown in Table 3. The usable secondary energy shown in average megawatts for each step is computed in accordance with Annex B, Paragraphs 3 (b) and 3 (c). The "other usable secondary" was computed on the basis of 40% of the remainder after thermal replacement. The thermal replacement was limited to the existing and scheduled thermal energy capability after allowance for reserve, except when an energy surplus condition occurs; then the thermal replacement must not exceed the total of the thermal energy capability and the estimated interruptible load. During operating years 1969-70 through 1971-72, NPR was assumed to be on dual purpose operation and not replaceable. Therefore, the NPR capability was also deducted to determine the thermal replacement.

Operating Year	Thermal Energy Capability-mw	Less 5% Reserves-mw	Less Dual Purpose NPR-mw	Thermal Replacement-mw
1969-70	856	43	511	302
1970-71	986	49	641	296
1971-72	1,560	78	661	821
1972-73	2,122	106	-	2,016
1973-74	2,096	105	-	1,991
1974-75	2,991	150	-	2,841

The following tabulation shows the ordinate values for usable secondary energy:

	1969-70		1970-71		1971-72	
	Step 2	Step 3	Step 2	Step 3	Step 2	Step 3
Thermal Replacement	302	302	296	296	821	821
Other	1,119	1,463	1,152	1,494	1,173	1,516
Total - mw	1,421	1,765	1,448	1,790	1,994	2,337

	1972-73		1973-74		1974-75	
	Step 2	Step 3	Step 2	Step 3	Step 2	Step 3
Thermal Replacement	2,016	2,016	1,991	1,991	2,841	2,841
Other	1,279	1,531	1,221	1,859	1,390	2,112
Total - mw	3,295	3,547	3,212	3,850	4,231	4,953

COMPUTATION OF CANADIAN ENTITLEMENT

Generation Figures are in Average Megawatts; Load Factors, in Percent

	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
Determination of Dependable Capacity Credited to Canadian Storage						
Critical Period Average Rate of Generation with Canadian Storage, Step 2	8,231	8,258	8,266	8,274	9,011	9,022
Critical Period Average Rate of Generation without Canadian Storage, Step 3	6,845	6,886	6,892	6,889	6,903	6,971
Gain Due to Canadian Storage	1,386	1,372	1,374	1,385	2,108	2,051
Estimated Average Critical Period Load Factor - Percent	72.941	70.573	70.022	70.590	71.014	71.695
Dependable Capacity Gain 1/	1,900	1,944	1,962	1,962	2,968	2,861
Canadian Share of Dependable Capacity	950	972	981	981	1,484	1,431
Determination of Increase in Average Annual Usable Energy						
Step 2 (with Canadian Storage)						
Annual Firm Hydro Energy	8,077	8,090	8,167	8,108	8,905	8,917
Thermal Replacement Energy	242	236	620	1,294	1,091	1,377
Other Usable Secondary Energy	756	775	655	429	435	421
System Annual Average Usable Energy	9,075	9,101	9,442	9,831	10,431	10,715
Step 3 (without Canadian Storage)						
Annual Firm Hydro Energy	6,623	6,650	6,716	6,647	6,629	6,684
Thermal Replacement Energy	259	255	668	1,452	1,441	1,851
Other Usable Secondary Energy	1,048	1,069	942	684	825	765
System Annual Average Usable Energy	7,930	7,974	8,326	8,783	8,895	9,300
Average Annual Usable Energy Gain	1,145	1,127	1,116	1,048	1,536	1,415
Canadian Share of Average Annual Energy Gain	573	564	558	524	768	708

1/ Dependable capacity gain credited to Canadian storage equals gain in critical period average rate of generation divided by the estimated average critical period load factor.

April 30, 1969

TABLE 1

SUMMARY OF POWER REGULATIONS FOR 1969-70
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

TABLE 2
Sheet 1 of 6

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Arrow			7,145			7,145							
Duncan			1,411			1,411							
Subtotal			8,556			8,556							
BASE FEDERAL SYSTEM													
Hungry Horse	4	328	3,161	266	197	3,008	278	187	102	3,008	278	213	102
Albeni Falls	3	49	1,155	24	23	1,155	23	22	23	1,155	23	24	23
Grand Coulee	18+2	2,294	5,232	2,255	1,741	5,072	2,269	1,702	1,948	5,072	2,114	1,249	1,734
Chief Joseph	16	1,280		1,280	889		1,280	865	1,051		1,280	655	962
Ice Harbor	3	310		310	167		310	167	232		310	171	232
McNary	14	1,127		1,127	538		1,127	507	736		1,127	424	709
John Day	8-14	1,708	536	1,708	794		1,708	797	1,180		1,708	669	1,133
The Dalles	14	1,283		1,283	649		1,283	623	900		1,283	512	861
Bonneville	10	574		574	498		574	484	510		574	422	510
Subtotal		8,953	10,084	8,827	5,496	9,235	8,852	5,354	6,702	9,235	8,697	4,339	5,266
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	185	1,219	178	138	1,219	179	134	123	1,219	179	151	123
Thompson Falls	6	40		39	38		39	35	33		39	38	33
Noxon Rapids	4	430	231	421	167		430	163	219		430	178	219
Cabinet Gorge	4	230		230	107		230	101	130		230	111	130
Box Canyon	4	70		70	50		70	47	50		70	52	50
Coeur D'Alene and Long Lakes			327			223				223			
Wells	10	820		820	380		820	371	495		820	283	463
Chelan	2	54	677	51	45	676	52	45	45	676	52	49	45
Rocky Reach	7	815		815	546		815	533	649		815	414	601
Rock Island	10	159		158	152		158	152	149		158	122	139
Wanapum	10	986		986	476		986	464	626		986	359	586
Priest Rapids	10	912		912	456		912	445	589		912	351	554
Brownlee	4	450	980	450	263	974	450	263	270	974	450	269	272
Oxbow	4	219		218	124		218	124	133		218	129	133
Subtotal		5,370	4,251	5,348	2,942	3,536	5,359	2,877	3,511	3,536	5,359	2,506	3,348
TOTAL BASE SYSTEM HYDRO		14,323	22,891	14,175	8,438	21,327	14,211	8,231	10,213	12,771	14,056	6,845	9,614
ADDITIONAL STEP 1 PROJECTS													
Boundary	4	638		638	383								
Spokane River Plants		153		148	83								
Hells Canyon	3	425		425	212								
Lewiston	2	10		10	6								
Little Goose	0-3	0		0	0								
Lower Monumental	1-3	466		466	163								
Pelton and Round Butte		436	274	426	151								
Subtotal		2,146	274	2,113	998								
Independent Resources		4,442	7,876	3,761	1,754								
TOTAL HYDRO RESOURCES		20,911	31,041	20,049	11,190								
THERMAL RESOURCES													
NPR 1/				601	511								
OTHERS 1/				466	345								
Additional Requirement 3/				111	100								
TOTAL THERMAL RESOURCES				1,178	956								
TOTAL IMPORTS				50	90								
TOTAL RESOURCES (HYDRO AND THERMAL)				21,277	12,236								
RESERVES 2/				-1,442	-48								
RESOURCES AVAILABLE FOR LOAD				19,835	12,188								
ESTIMATED LOAD													
Pacific Northwest Area				18,026	12,188								
SYSTEM LOAD				18,026	12,188								
SURPLUS OR DEFICIT				1,809	0								
CRITICAL PERIOD													
Starts :				August 16, 1936			August 16, 1936				September 16, 1936		
Ends :				April 15, 1937			April 15, 1937				April 15, 1937		
Length (Months):				8 Months			8 Months				7 Months		
STUDY IDENTIFICATION				70-1			70-2				70-3		

1/ Includes 601 mw peak and 511 mw energy from NPR under dual purpose operation, 407 mw peak and 325 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

3/ Assumed thermal resources are operated at 90% plant factor.

April 30, 1969

SUMMARY OF POWER REGULATIONS FOR 1970-71
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

TABLE 2
Sheet 2 of 6

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Arrow			7,145			7,145							
Duncan			1,411			1,411							
Subtotal			8,556			8,556							
BASE FEDERAL SYSTEM													
Hungry Horse	4	328	3,161	266	197	3,008	278	187	102	3,008	278	212	102
Albeni Falls	3	49	1,155	24	23	1,155	23	22	23	1,155	23	25	23
Grand Coulee	18+2	2,294	5,232	2,255	1,743	5,072	2,269	1,710	1,952	5,072	2,122	1,260	1,740
Chief Joseph	16	1,280		1,280	893		1,280	869	1,052		1,280	660	965
Ice Harbor	3	310		310	166		310	166	232		310	171	232
McNary	14	1,127		1,127	540		1,127	509	737		1,127	426	710
John Day	14	2,173	536	2,173	797		2,173	800	1,222		2,173	673	1,190
The Dalles	14	1,283		1,283	651		1,283	626	902		1,283	516	863
Bonneville	10	574		574	499		574	485	510		574	424	510
Subtotal		9,418	10,084	9,292	5,509	9,235	9,317	5,374	6,752	9,235	9,170	4,367	6,335
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	185	1,219	178	138	1,219	179	134	123	1,219	179	151	123
Thompson Falls	6	40		39	38		39	35	33		39	38	33
Noxon Rapids	4	430	231	421	167		430	163	219		430	179	219
Cabinet Gorge	4	230		230	107		230	101	130		230	111	130
Box Canyon	4	70		70	50		70	47	50		70	52	50
Coeur D'Alene and Long Lakes			327			223				223			
Wells	10	820		820	382		820	372	495		820	286	465
Chelan	2	54	677	51	45	676	52	45	45	676	52	49	45
Rocky Reach	7	815		815	548		815	536	649		815	417	602
Rock Island	10	159		158	152		158	152	148		158	123	140
Wanapum	10	986		986	478		986	466	627		986	362	588
Priest Rapids	10	912		912	458		912	447	590		912	353	555
Brownlee	4	450	980	450	263	974	450	262	269	974	450	269	271
Oxbow	4	219		218	124		218	124	132		218	129	132
Subtotal		5,370	4,251	5,348	2,950	3,536	5,359	2,884	3,510	3,536	5,359	2,519	3,353
TOTAL BASE SYSTEM HYDRO		14,788	22,891	14,640	8,459	21,327	14,676	8,258	10,262	12,771	14,529	6,886	9,688
ADDITIONAL STEP 1 PROJECTS													
Boundary	4	638		638	383								
Spokane River Plants		153		148	83								
Hells Canyon	3	425		425	212								
Lewiston	2	10		10	6								
Little Goose	3	466		466	158								
Lower Monumental	3	466		466	163								
Felton and Round Butte		454	274	426	151								
Subtotal		2,612	274	2,579	1,156								
Independent Resources		4,442	7,876	3,761	1,754								
TOTAL HYDRO RESOURCES		21,842	31,041	20,980	11,369								
THERMAL RESOURCES													
NPR 1/				789	641								
OTHERS 1/				466	345								
Additional Requirement 3/				396	356								
TOTAL THERMAL RESOURCES				1,651	1,342								
TOTAL IMPORTS				50	373								
TOTAL RESOURCES (HYDRO AND THERMAL)				22,681	13,084								
RESERVES 2/				-1,598	-67								
RESOURCES AVAILABLE FOR LOAD				21,083	13,017								
ESTIMATED LOAD													
Pacific Northwest Area				19,975	13,017								
SYSTEM LOAD				19,975	13,017								
SURPLUS OR DEFICIT				1,108	0								
CRITICAL PERIOD													
Starts :				August 16, 1936			August 16, 1936				September 16, 1936		
Ends :				April 15, 1937			April 15, 1937				April 15, 1937		
Length (Months):				8 Months			8 Months				7 Months		
STUDY IDENTIFICATION				71-1			71-2				71-3		

1/ Includes 789 mw peak and 641 mw energy from NPR under dual purpose operation, 407 mw peak and 325 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

3/ Assumed thermal resources are operated at 90% plant factor.

April 30, 1969

SUMMARY OF POWER REGULATIONS FOR 1971-72
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

TABLE 2
Sheet 3 of 6

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Arrow			7,145			7,145							
Duncan			1,411			1,411							
Subtotal			8,556			8,556							
BASE FEDERAL SYSTEM													
Hungry Horse	4	328	3,161	266	186	3,008	278	187	101	3,008	278	212	102
Albeni Falls	3	49	1,155	24	22	1,155	23	23	23	1,155	23	25	23
Grand Coulee	18+2	2,294	5,232	2,251	1,771	5,072	2,269	1,709	1,950	5,072	2,126	1,260	1,739
Chief Joseph	16	1,280		1,280	903		1,280	868	1,052		1,280	660	974
Ice Harbor	3	310		310	164		310	166	232		310	171	232
McNary	14	1,127		1,127	542		1,127	509	737		1,127	426	709
John Day	14-16	2,484	536	2,484	802		2,484	799	1,250		2,484	673	1,220
The Dalles	14-19	1,580		1,580	654		1,580	625	969		1,580	516	930
Bonneville	10	574		574	500		574	485	510		574	424	510
Subtotal		10,026	10,084	9,896	5,544	9,235	9,925	5,371	6,844	9,235	9,782	4,367	6,429
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	185	1,219	178	132	1,219	179	134	123	1,219	179	151	123
Thompson Falls	6	40		39	37		39	35	33		39	38	33
Noxon Rapids	4	430	231	421	161		430	163	218		430	179	218
Cabinet Gorge	4	230		230	103		230	101	130		230	111	130
Box Canyon	4	70		70	49		70	47	50		70	52	50
Coeur D'Alene and Long Lakes			327			223				223			
Wells	10	820		820	385		820	372	495		820	286	464
Chelan	2	54	677	51	44	676	52	45	45	676	52	49	45
Rocky Reach	7-11	1,291		1,291	567		1,291	548	723		1,291	423	672
Rock Island	10	159		158	152		158	152	149		158	123	140
Wanapum	10	986		986	482		986	465	627		986	362	587
Priest Rapids	10	912		912	462		912	447	590		912	353	554
Brownlee	4	450	980	450	259	974	450	262	268	974	450	269	270
Oxbow	4	219		218	121		218	124	132		218	129	132
Subtotal		5,846	4,251	5,824	2,954	3,536	5,835	2,895	3,583	3,536	5,835	2,525	3,418
TOTAL BASE SYSTEM HYDRO		15,872	22,891	15,720	8,498	21,327	15,760	8,266	10,427	12,771	15,617	6,892	9,847
ADDITIONAL STEP 1 PROJECTS													
Libby	0	0	0	0	0								
Boundary	4	639		638	369								
Spokane River Plants		153		148	81								
Hells Canyon	3	425		425	208								
Dworshak	0-3	0	0	0	0								
Lewiston	2	10		10	6								
Little Goose	3	466		466	156								
Lower Monumental	3	466		466	161								
Pelton and Round Butte		454	274	426	130								
Subtotal		2,612	274	2,579	1,131								
Independent Resources		4,442	7,876	3,761	1,735								
TOTAL HYDRO RESOURCES		22,926	31,041	22,060	11,364								
THERMAL RESOURCES													
NPR 1/				789	661								
OTHERS 1/				466	345								
Centralia #1				700	554								
TOTAL THERMAL RESOURCES				1,955	1,560								
TOTAL IMPORTS				50	438								
TOTAL RESOURCES (HYDRO AND THERMAL)				24,065	13,362								
RESERVES 2/				-1,640	-78								
RESOURCES AVAILABLE FOR LOAD				22,425	13,284								
ESTIMATED LOAD													
Pacific Northwest Area				20,496	13,233								
SYSTEM LOAD				20,496	13,233								
SURPLUS OR DEFICIT				1,929	51								
CRITICAL PERIOD													
Starts :			August 1936			August 16, 1936				September 16, 1936			
Ends :			April 15, 1937			April 15, 1937				April 15, 1937			
Length (Months):			8-1/2 Months			8 Months				7 Months			
STUDY IDENTIFICATION			72-1			72-2				72-3			

1/ Includes 789 mw peak and 661 mw energy from NPR under dual purpose operation, 407 mw peak and 325 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

April 30, 1969

SUMMARY OF POWER REGULATIONS FOR 1972-73
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

TABLE 2
Sheet 4 of 6

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Mica			0										
Arrow			7,143			7,143							
Duncan			1,411			1,411							
Subtotal			8,556			8,556							
BASE SYSTEM FEDERAL													
Hungry Horse	4	328	3,161	165	115	3,008	278	187	102	3,008	278	213	102
Albeni Falls	3	49	1,155	24	22	1,155	23	23	23	1,155	23	25	23
Grand Coulee	18+2	2,294	7,469	2,134	1,684	5,072	2,269	1,710	1,950	5,072	2,117	1,258	1,740
Chief Joseph	16	1,280		1,280	930		1,280	869	1,052		1,280	659	965
Ice Harbor	3	310		310	221		310	166	252		310	171	232
McNary	14	1,127		1,127	625		1,127	509	736		1,127	426	709
John Day	16	2,484	536	2,484	897		2,484	800	1,252		2,484	673	1,225
The Dalles	19-22	1,950		1,950	747		1,950	626	997		1,950	516	970
Bonneville	10	574		574	539		574	486	530		574	424	511
Subtotal		10,396	12,321	10,048	5,780	9,235	10,295	5,376	6,874	9,235	10,143	4,365	6,477
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	185	1,219	175	104	1,219	179	134	123	1,219	179	151	123
Thompson Falls	6	40		40	37		39	35	33		39	38	33
Noxon Rapids	4	430	231	420	155		430	163	218		430	179	218
Cabinet Gorge	4	230		230	101		230	101	130		230	111	130
Box Canyon	4	70		70	47		70	47	50		70	52	50
Coeur d'Alene & Long Lake			327			223				223			
Wells	10	820		820	406		820	373	495		820	286	465
Chelan	2	54	677	51	37	676	52	45	45	676	52	49	45
Rocky Reach	11	1,291		1,291	599		1,291	549	743		1,291	423	704
Rock Island	10	159		158	154		158	152	149		158	123	140
Wanapum	10	986		986	519		986	466	627		986	362	588
Priest Rapids	10	912		912	491		912	447	590		912	353	555
Brownlee	4	450	980	450	260	974	450	262	267	974	450	265	270
Oxbow	4	219		218	125		218	124	132		218	126	132
Subtotal		5,846	4,251	5,821	3,035	3,536	5,835	2,898	3,602	3,536	5,835	2,524	3,453
TOTAL BASE SYSTEM HYDRO		16,242	25,128	15,869	8,815	21,327	16,130	8,274	10,476	12,771	15,978	6,889	9,930
ADDITIONAL STEP 1 PROJECTS													
Libby	0	0	4,965	0	0								
Boundary	4	638		638	350								
Spokane River Plants		153		146	94								
Hells Canyon	3	425		425	214								
Dworshak	3	460	2,000	394	185								
Lewiston	2	10		10	10								
Lower Granite	0-3	0		0	22								
Little Goose	3	466		466	233								
Lower Monumental	3	466		466	236								
Pelton and Round Butte		454	274	425	144								
Subtotal		3,072	7,239	2,970	1,488								
Independent Resources		4,569	7,876	3,939	1,792								
TOTAL HYDRO RESOURCES		23,883	40,243	22,778	12,095								
THERMAL RESOURCES													
NPR 1/				839	631								
OTHERS 1/				466	292								
Centralia #1 & #2				1,400	1,199								
TOTAL THERMAL RESOURCES				2,705	2,122								
TOTAL IMPORTS				50	303								
TOTAL RESOURCES (HYDRO AND THERMAL)				25,533	14,520								
RESERVES 2/				-1,766	-106								
RESOURCES AVAILABLE FOR LOAD				23,767	14,414								
ESTIMATED LOAD													
Pacific Northwest Area				22,072	14,275								
SYSTEM LOAD				22,072	14,275								
SURPLUS OR DEFICIT				1,695	139								
CRITICAL PERIOD													
Starts :			August 16, 1943			August 16, 1936				September 16, 1936			
Ends :			April 30, 1945			April 15, 1937				April 15, 1937			
Length (Months):			20-1/2 Months			8 Months				7 Months			
STUDY IDENTIFICATION			73-1			73-2				73-3			

1/ Includes 839 mw peak and 631 mw energy from NPR under single purpose operation, 407 mw peak and 272 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

April 30, 1969

SUMMARY OF POWER REGULATIONS FOR 1973-74
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Mica			7,036			7,008							
Arrow			7,145			7,145							
Duncan			1,411			1,347							
Subtotal			15,592			15,500							
BASE SYSTEM FEDERAL													
Hungry Horse	4	328	3,161	160	102	3,008	200	113	103	3,008	278	213	102
Albeni Falls	3	49	1,155	26	25	1,155	20	23	24	1,155	23	25	23
Grand Coulee	18-20+2	2,800	5,232	2,625	1,895	5,072	2,750	1,780	2,179	5,072	2,997	1,224	1,866
Chief Joseph	16-18	1,280		1,280	1,078		1,280	1,002	1,156		1,280	701	1,038
Ice Harbor	4-6	693		693	220		693	227	306		693	771	306
McNary	14	1,127		1,127	647		1,127	595	764		1,127	427	714
John Day	16	2,484	536	2,484	925		2,484	928	1,276		2,484	675	1,231
The Dalles	22	2,015		2,015	770		2,015	740	1,020		2,015	517	978
Bonneville	10	574		574	546		574	535	537		574	421	511
Subtotal		11,350	10,084	10,984	6,208	9,235	11,143	5,943	7,365	9,235	11,071	4,378	6,769
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	18	1,219	168	114	1,219	175	104	123	1,219	179	151	123
Thompson Falls	6	40		40	34		38	36	34		39	38	33
Noxon Rapids	4	430	231	430	174		430	160	218		430	179	218
Cabinet Gorge	4	230		230	112		230	99	130		230	111	130
Box Canyon	4	70		70	47		70	45	50		70	52	50
Coeur d'Alene & Long Lake			327			223				223			
Wells	10	820		820	439		820	411	516		820	286	470
Chelan	2	54	677	50	38	676	51	38	45	676	52	49	45
Rocky Reach	11	1,291		1,291	645		1,291	608	769		1,291	423	710
Rock Island	10	159		155	155		157	157	150		158	123	140
Wanapum	10	986		986	560		986	525	660		986	363	596
Priest Rapids	10	912		912	528		912	496	620		912	354	563
Brownlee	4	450	980	325	216	974	450	263	268	974	450	268	269
Oxbow	4	219		218	106		218	126	131		218	128	132
Subtotal		5,846	4,251	5,693	3,168	3,536	5,828	3,068	3,714	3,536	5,835	2,525	3,479
TOTAL BASE SYSTEM HYDRO		17,196	29,927	16,679	9,376	28,271	16,971	9,011	11,079	12,771	16,906	6,903	10,248
ADDITIONAL STEP 1 PROJECTS													
Libby	0-4	483	4,965	149	186								
Boundary	4	638		638	364								
Spokane River Plants		153		147	91								
Hells Canyon	3	425		425	182								
Dworshak	3	460	2,000	442	172								
Lewiston	2	6		6	6								
Lower Granite	3	466		466	220								
Little Goose	3	466		466	216								
Lower Monumental	3	466		466	219								
Pelton and Round Butte		454	274	455	136								
Subtotal		4,017	7,239	3,630	1,792								
Independent Resources		4,591	8,054	3,774	1,699								
TOTAL HYDRO RESOURCES		25,804	45,220	24,083	12,867								
THERMAL RESOURCES													
NPH 1/				839	633								
OTHERS 1/				466	292								
Centralia #1 & #2				1,400	1,171								
Additional Requirement 3/				117	105								
TOTAL THERMAL RESOURCES				2,822	2,201								
TOTAL IMPORTS				50	283								
TOTAL RESOURCES (HYDRO AND THERMAL)				26,955	15,351								
RESERVES 2/				-1,887	-110								
RESOURCES AVAILABLE FOR LOAD				25,068	15,241								
ESTIMATED LOAD													
Pacific Northwest Area				23,584	15,241								
SYSTEM LOAD				23,584	15,241								
SURPLUS OR DEFICIT				1,484	0								
CRITICAL PERIOD													
Starts :				August 16, 1928			September 1943				September 16, 1936		
Ends :				February 29, 1932			April 1945				April 15, 1937		
Length (Months):				42-1/2 Months			20 Months				7 Months		
STUDY IDENTIFICATION				74-1			74-2				74-3		

1/ Includes 839 mw peak and 633 mw energy from NPH under single purpose operation, 407 mw peak and 272 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

3/ Assumed thermal resources are operated at 90% plant factor.

April 30, 1969

SUMMARY OF POWER REGULATIONS FOR 1974-75
FOR THE
COMPUTATION OF CANADIAN ENTITLEMENT
TO DOWNSTREAM BENEFITS

TABLE 2
Sheet 6 of 6

PROJECTS	BASIC DATA		STEP 1			STEP 2				STEP 3			
	Number of Units	Nominal Installed Peaking Capacity mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw	Usable Storage 1000 AF	January Peaking Capability mw	Critical Period Average Generation mw	Average Annual Generation mw
CANADIAN													
Mica			7,036			7,008							
Arrow			7,145			7,145							
Duncan			1,411			1,347							
Subtotal			15,592			15,500							
BASE FEDERAL SYSTEM													
Hungry Horse	4	328	3,161	160	102	3,008	164	112	101	3,008	278	213	102
Albeni Falls	3	49	1,155	25	25	1,155	22	23	24	1,155	23	25	23
Grand Coulee	20-21-2	3,960	5,232	3,695	1,949	5,072	3,962	1,781	2,310	5,072	3,684	1,225	2,053
Chief Joseph	18-24	1,826		1,826	1,090		1,826	1,002	1,288		1,826	702	1,164
Ice Harbor	6	693		693	220		693	226	306		693	171	306
McNary	14	1,127		1,127	647		1,127	594	767		1,127	427	714
John Day	16	2,484	536	2,484	925		2,484	927	1,276		2,484	675	1,232
The Dalles	22	1,943		1,943	733		1,943	709	961		1,943	529	932
Bonneville	10-12	474		574	583		574	483	492		574	477	573
Subtotal		12,984	10,084	12,527	6,274	9,235	12,775	5,957	7,626	9,235	12,432	4,444	7,099
BASE SYSTEM NON-FEDERAL													
Kootenay Lake (Canadian)			817			444				444			
Kerr	3	185	1,219	169	114	1,219	173	104	123	1,219	179	151	123
Thompson Falls	6	40		40	34		39	36	34		39	38	33
Noxon Rapids	4	430	231	430	174		430	160	219		430	179	218
Cabinet Gorge	4	230		230	112		230	99	131		230	111	130
Box Canyon	4	70		70	47		70	45	51		70	52	50
Coeur D'Alene and Long Lakes			327			223				223			
Wells	10	820		820	438		820	411	515		820	286	471
Chelan	2	54	677	50	38	676	51	37	46	676	52	49	45
Rocky Reach	11	1,291		1,291	644		1,291	607	769		1,291	424	711
Rock Island	10	159		156	153		157	157	150		158	124	140
Wanapum	10	986		986	559		986	525	660		986	363	598
Priest Rapids	10	912		912	527		912	496	620		912	354	564
Brownlee	4	450	980	401	220	974	450	262	267	974	450	268	268
Oxbow	4	219		218	106		218	126	131		218	128	131
Subtotal		5,846	4,251	5,773	3,166	3,536	5,827	3,065	3,716	3,536	5,835	2,527	3,482
TOTAL BASE SYSTEM HYDRO		18,830	29,927	18,300	9,440	28,271	18,602	9,022	11,342	12,771	18,467	6,971	10,581
ADDITIONAL STEP 1 PROJECTS													
Libby	4	483	4,965	218	203								
Boundary	4	638		638	364								
Spokane River Plants		153		147	91								
Hells Canyon	3	425		425	181								
Dworshak	3	460	2,000	443	172								
Lewiston	2	6		6	6								
Lower Granite	3	466		466	220								
Little Goose	3	466		466	216								
Lower Monumental	3	466		466	218								
Felton and Round Butte		424	274	425	136								
Subtotal		4,017	7,239	3,700	1,807								
Independent Resources		4,647	8,369	3,808	1,716								
TOTAL HYDRO RESOURCES		27,494	45,535	25,808	12,963								
THERMAL RESOURCES													
NPR 1/				839	633								
OTHERS 1/				466	292								
Centralia #1 & #2				1,400	1,171								
Trojan				1,105	768								
PP&L #2				0	127								
Additional Requirement 3/				49	44								
TOTAL THERMAL RESOURCES				3,859	3,035								
TOTAL IMPORTS				50	231								
TOTAL RESOURCES (HYDRO AND THERMAL)				29,717	16,229								
RESERVES 2/				-1,973	-152								
RESOURCES AVAILABLE FOR LOAD				27,744	16,077								
ESTIMATED LOAD													
Pacific Northwest Area				24,657	16,077								
SYSTEM LOAD				24,657	16,077								
SURPLUS OR DEFICIT				3,087	0								
CRITICAL PERIOD													
Starts :				August 16, 1928			September 1943				September 16, 1936		
Ends :				February 1932			April 1945				April 15, 1937		
Length (Months):				42-1/2 Months			20 Months				7 Months		
STUDY IDENTIFICATION				75-1			75-2				75-3		

1/ Includes 839 mw peak and 633 mw energy from NPR under single purpose operation, 407 mw peak and 272 mw energy from existing thermal plants, and 59 mw peak and 20 mw energy from miscellaneous contracts.

2/ Peak reserves are 8% of peak load; energy reserves are 5% of thermal plant energy capability.

3/ Assumed thermal resources are operated at 90% plant factor.

April 30, 1969

Determination of Load Shape for Steps 2 and 3
1969-70 Canadian Entitlement Computations

	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load
July	14,748*	11,134	75.49	8,261	813	7,448	6,910	813	6,097
Aug. 1-15	15,022*	11,195	74.52	8,307	813	7,494	6,948	813	6,135
Aug. 16-31	15,022*	11,196	74.53	8,308	813	7,495	6,949	813	6,136
Sept. 1-15	15,293*	11,112	72.66	8,245	813	7,432	6,897	813	6,084
Sept. 16-30	15,292*	11,239	73.50	8,340	813	7,527	6,976	813	6,163
October	15,848*	11,507	72.62	8,538	813	7,725	7,142	813	6,329
November	16,988*	12,212	71.89	9,062	813	8,249	7,580	813	6,767
December	17,714*	12,873	72.67	9,551	813	8,738	7,989	813	7,176
January	18,026*	13,131	72.84	9,743	813	8,930	8,150	813	7,337
February	17,288*	12,744	73.72	9,456	813	8,643	7,910	813	7,097
March	16,633*	12,318	74.06	9,140	813	8,327	7,645	813	6,832
Apr. 1-15	16,904*	11,959	70.75	8,874	813	8,061	7,423	813	6,610
Apr. 16-30	16,897*	11,959	70.78	8,874	813	8,061	7,423	813	6,610
May	16,830*	11,746	69.79	8,716	813	7,903	7,290	813	6,477
June	16,423*	11,827	72.01	8,775	813	7,962	7,340	813	6,527
Crit. Period Avg.		12,188	72.941	9,044	813	8,231	7,658	813	6,845
Annual Average		11,981		8,890	813	8,077	7,436	813	6,623
January Peak	18,026*								
Step 1 Critical Period Aug. 16, 1936 - Apr. 15, 1937 8 Months				Critical Period Aug. 16, 1936- Apr. 15, 1937 8 Months			Critical Period Sept. 16, 1936- Apr. 15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

4/30/69

Determination of Load Shape for Steps 2 and 3
1970-71 Canadian Entitlement Computations

	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total[1/] Firm Load	Thermal Firm Load	Hydro Firm Load	Total[1/] Firm Load	Thermal Firm Load	Hydro Firm Load
July	16,277*	11,812	72.57	8,344	937	7,407	7,013	937	6,076
Aug. 1-15	16,637*	11,956	71.86	8,446	937	7,509	7,098	937	6,161
Aug. 16-31	16,636*	11,955	71.86	8,445	937	7,508	7,098	937	6,161
Sept. 1-15	17,012*	11,887	69.87	8,397	937	7,460	7,057	937	6,120
Sept. 16-30	16,874*	11,822	70.06	8,351	937	7,414	7,019	937	6,082
October	17,471*	12,284	70.31	8,678	937	7,741	7,293	937	6,356
November	18,692*	12,964	69.36	9,158	937	8,221	7,697	937	6,760
December	19,463*	13,678	70.28	9,662	937	8,725	8,120	937	7,183
January	19,975*	14,122	70.70	9,976	937	9,039	8,384	937	7,447
February	19,222*	13,708	71.31	9,683	937	8,746	8,139	937	7,202
March	18,530*	13,236	71.43	9,349	937	8,412	7,858	937	6,921
Apr. 1-15	18,000*	12,706	70.59	8,976	937	8,039	7,544	937	6,607
Apr. 16-30	17,995*	12,706	70.61	8,976	937	8,039	7,544	937	6,607
May	17,021*	12,496	73.42	8,827	937	7,890	7,419	937	6,482
June	17,479*	12,592	72.04	8,895	937	7,958	7,476	937	6,539
Crit. Period Avg.		13,017	70.573	9,195	937	8,258	7,823	937	6,886
Annual Average		12,779		9,027	937	8,090	7,587	937	6,650
January Peak	19,975*								
Step 1 Critical Period Aug. 16, 1936 - Apr. 15, 1937 8 Months				Critical Period Aug.16, 1936- Apr.15, 1937 8 Months			Critical Period Sept.16, 1936- Apr. 15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

4/30/69

Determination of Load Shape for Steps 2 and 3
1971-72 Canadian Entitlement Computations

	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load
July	17,333*	12,554	72.43	9,207	1,482	7,725	7,823	1,482	6,341
Aug. 1-15	17,268*	12,282	71.13	9,007	1,482	7,525	7,653	1,482	6,171
Aug. 16-31	17,267*	12,280	71.12	9,005	1,482	7,522	7,651	1,482	6,169
Sept. 1-15	17,608*	12,283	69.76	9,008	1,482	7,526	7,654	1,482	6,172
Sept. 16-30	17,470*	12,221	69.95	8,962	1,482	7,480	7,614	1,482	6,132
October	17,943*	12,461	69.45	9,139	1,482	7,657	7,764	1,482	6,282
November	19,243*	13,213	68.66	9,690	1,482	8,208	8,232	1,482	6,750
December	20,046*	13,905	69.37	10,197	1,482	8,715	8,664	1,482	7,182
January	20,496*	14,371	70.12	10,540	1,482	9,058	8,955	1,482	7,473
February	19,669*	13,923	70.79	10,211	1,482	8,729	8,675	1,482	7,193
March	19,056*	13,419	70.42	9,841	1,482	8,359	8,361	1,482	6,879
Apr. 1-15	18,883*	13,382	70.87	9,814	1,482	8,332	8,338	1,482	6,856
Apr. 16-30	18,878*	13,383	70.89	9,815	1,482	8,333	8,339	1,482	6,857
May	18,687*	13,064	69.91	9,580	1,482	8,098	8,140	1,482	6,658
June	18,223*	13,112	71.95	9,616	1,482	8,134	8,170	1,482	6,688
Crit. Period Avg.		13,233	70.022	9,748	1,482	8,266	8,374	1,482	6,892
Annual Average		13,157		9,649	1,482	8,167	8,198	1,482	6,716
January Peak	20,496*								
Step 1 Critical Period Aug. 1936 - Apr. 15, 1937 8-1/2 Months				Critical Period Aug.16,1936- Apr.15, 1937 8 Months			Critical Period Sept.16, 1936- Apr.15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

4/30/69

Determination of Load Shape for Steps 2 and 3
1972-73 Canadian Entitlement Computations

	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load
July	18,205*	13,297	73.04	9,492	2,016	7,476	8,122	2,016	6,108
Aug. 1-15	18,442*	13,293	72.08	9,489	2,016	7,473	8,120	2,016	6,106
Aug. 16-31	18,442*	13,295	72.09	9,490	2,016	7,474	8,121	2,016	6,107
Sept. 1-15	18,830*	13,297	70.62	9,492	2,016	7,476	8,122	2,016	6,108
Sept. 16-30	18,828*	13,271	70.49	9,473	2,016	7,457	8,106	2,016	6,092
October	19,514*	13,623	69.81	9,724	2,016	7,708	8,321	2,016	6,307
November	20,915*	14,430	68.99	10,300	2,016	8,284	8,814	2,016	6,800
December	21,748*	15,125	69.55	10,797	2,016	8,781	9,239	2,016	7,225
January	22,072*	15,552	70.46	11,102	2,016	9,086	9,500	2,016	7,486
February	21,166*	15,060	71.15	10,751	2,016	8,735	9,199	2,016	7,185
March	20,392*	14,531	71.26	10,373	2,016	8,357	8,876	2,016	6,862
Apr. 1-15	20,203*	14,217	70.37	10,148	2,016	8,132	8,684	2,016	6,670
Apr. 16-30	20,204*	14,218	70.37	10,149	2,016	8,133	8,685	2,016	6,671
May	19,740*	13,824	70.03	9,868	2,016	7,852	8,444	2,016	6,430
June	19,573*	14,011	71.58	10,001	2,016	7,985	8,558	2,016	6,544
Crit. Period Avg.		14,275	70.590	10,290	2,016	8,274	8,905	2,016	6,889
Annual Average		14,182		10,124	2,016	8,108	8,663	2,016	6,647
January Peak	22,072*								
Step 1 Critical Period Aug. 16, 1943 - Apr. 30, 1945 20-1/2 Months				Critical Period Aug.16, 1936- Apr.15, 1937 8 Months			Critical Period Sept.16, 1936- Apr.15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

4/30/69

Determination of Load Shape for Steps 2 and 3
1973-74 Canadian Entitlement Computations

	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load
July	19,416*	14,073	72.48	10,093	1,991	8,102	7,985	1,991	5,992
Aug. 1-15	19,740*	14,158	71.72	10,154	1,991	8,163	8,033	1,991	6,040
Aug. 16-31	19,741*	14,160	71.73	10,155	1,991	8,164	8,034	1,991	6,041
Sept. 1-15	20,282*	14,375	70.88	10,309	1,991	8,318	8,155	1,991	6,162
Sept. 16-30	20,235*	14,327	70.80	10,275	1,991	8,284	8,129	1,991	6,135
October	20,969*	14,683	70.02	10,530	1,991	8,539	8,330	1,991	6,337
November	22,459*	15,531	69.15	11,138	1,991	9,147	8,811	1,991	6,818
December	23,308*	16,278	69.84	11,674	1,991	9,683	9,235	1,991	7,242
January	23,584*	16,725	70.92	11,994	1,991	10,003	9,489	1,991	7,496
February	22,623*	16,185	71.54	11,608	1,991	9,617	9,183	1,991	7,190
March	21,826*	15,646	71.69	11,221	1,991	9,230	8,877	1,991	6,884
Apr. 1-15	21,085*	15,081	71.52	10,815	1,991	8,824	8,556	1,991	6,563
Apr. 16-30	21,086*	15,083	71.53	10,816	1,991	8,825	8,557	1,991	6,564
May	20,889	14,832	71.00	10,637	1,991	8,646	8,415	1,991	6,422
June	20,436*	14,838	72.61	10,641	1,991	8,650	8,418	1,991	6,425
Crit. Period Avg.		15,241	71.014	11,002	1,991	9,011	8,894	1,991	6,903
Annual Average		15,193		10,896	1,991	8,905	8,620	1,991	6,629
January Peak	23,584*								
Step 1 Critical Period Aug. 16, 1928 - Feb. 29, 1932 42-1/2 Months				Critical Period Sept. 1943 - Apr. 1945 20 Months			Critical Period Sept. 16, 1936- Apr. 15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

4/30/69

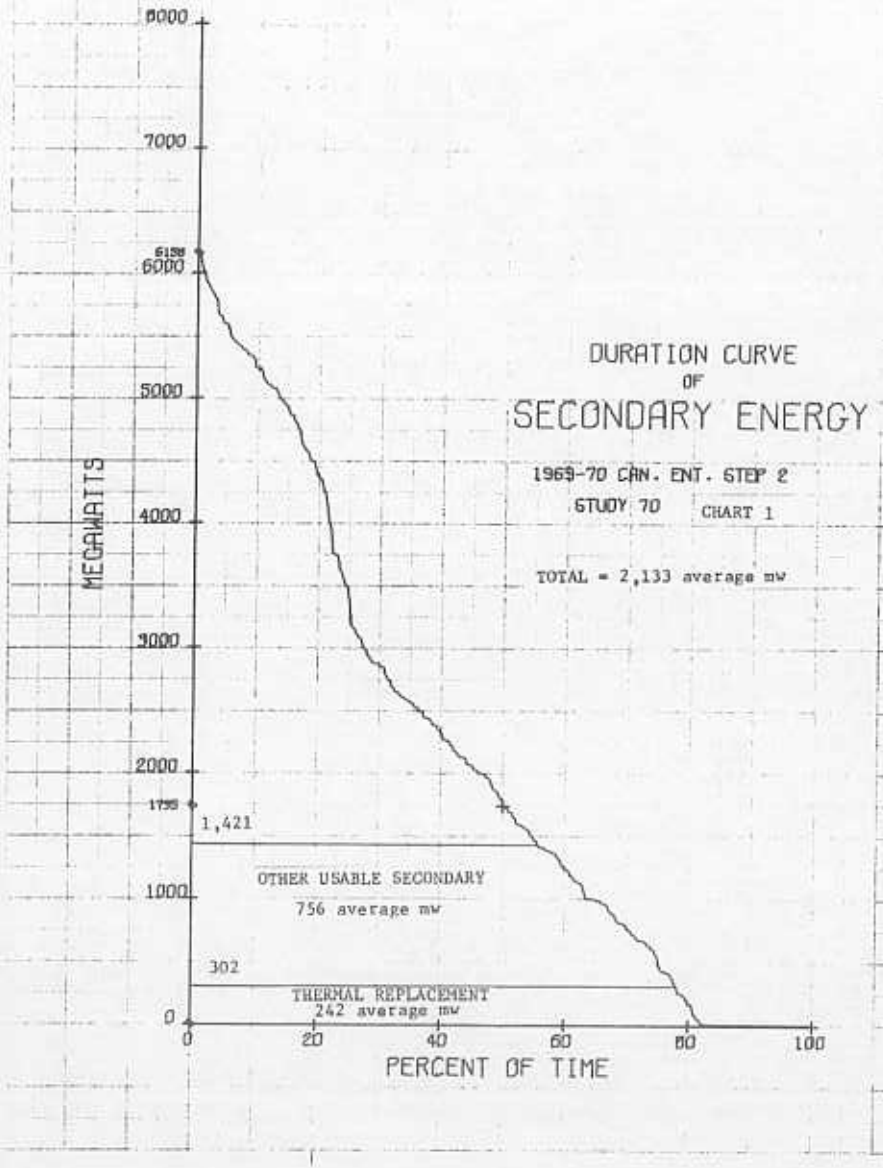
Determination of Load Shape for Steps 2 and 3
1974-75 Canadian Entitlement Computations

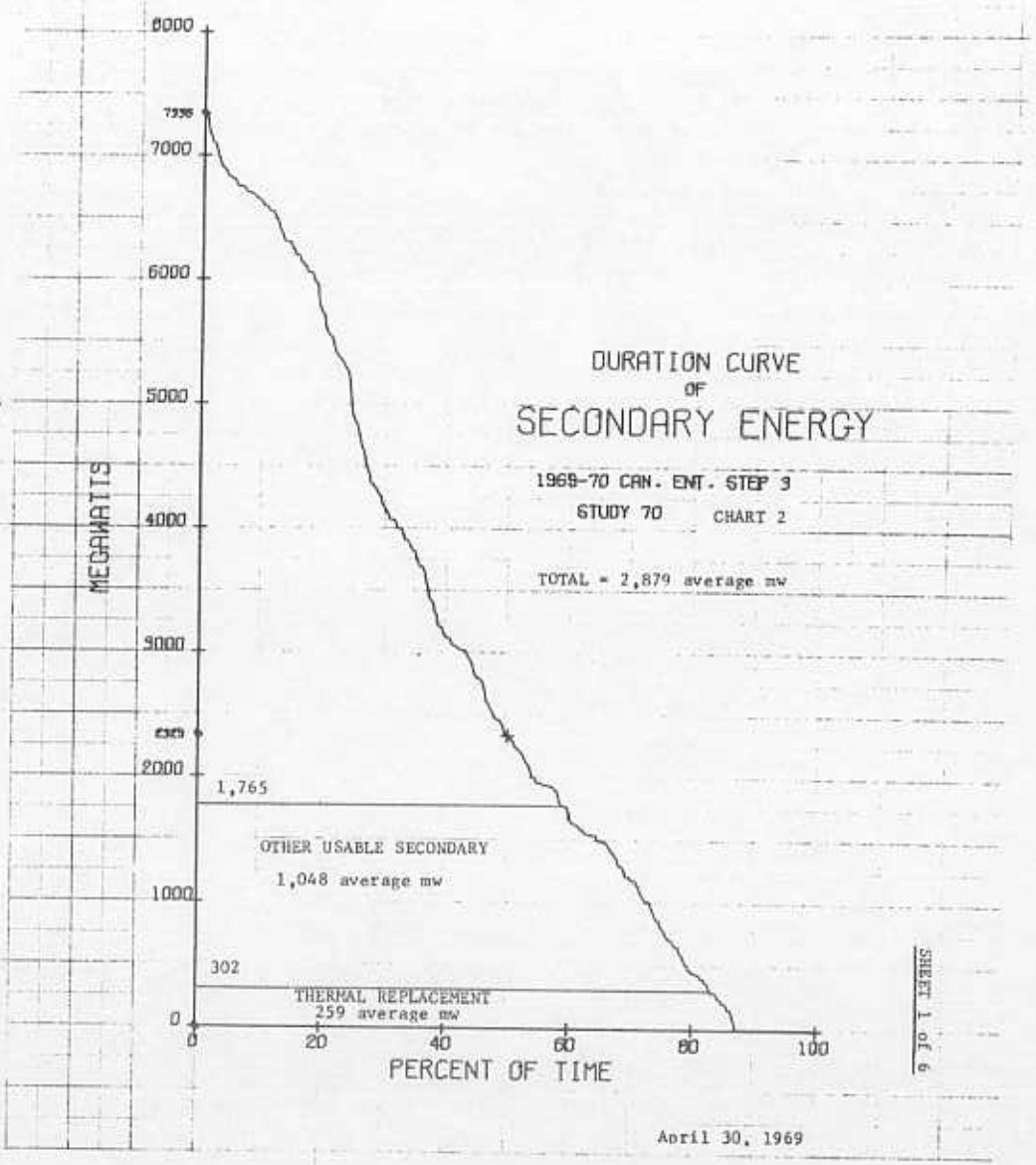
	Pacific Northwest Area Load			Step 2			Step 3		
	Peak	Avg.	Load Factor Percent	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load	Total 1/ Firm Load	Thermal Firm Load	Hydro Firm Load
July	20,410*	15,090	73.93	11,069	2,841	8,228	8,967	2,841	6,126
Aug. 1-15	20,651*	15,079	73.02	11,062	2,841	8,221	8,961	2,841	6,120
Aug. 16-31	20,651*	15,081	73.03	11,063	2,841	8,222	8,962	2,841	6,121
Sept. 1-15	21,023*	15,106	71.85	11,081	2,841	8,240	8,976	2,841	6,135
Sept. 16-30	20,976*	15,058	71.79	11,045	2,841	8,204	8,948	2,841	6,107
October	21,805*	15,440	70.81	11,326	2,841	8,485	9,175	2,841	6,334
November	23,375*	16,347	69.93	11,992	2,841	9,151	9,715	2,841	6,874
December	24,296*	17,174	70.69	12,599	2,841	9,758	10,206	2,841	7,365
January	24,657*	17,638	71.53	12,939	2,841	10,098	10,481	2,841	7,640
February	23,626*	17,061	72.21	12,515	2,841	9,674	10,138	2,841	7,297
March	22,767*	16,474	72.36	12,085	2,841	9,244	9,790	2,841	6,949
Apr. 1-15	22,244*	15,855	71.28	11,631	2,841	8,790	9,422	2,841	6,581
Apr. 16-30	22,243*	15,857	71.29	11,632	2,841	8,791	9,423	2,841	6,582
May	21,961*	15,587	70.98	11,433	2,841	8,592	9,262	2,841	6,421
June	21,451*	15,573	72.60	11,424	2,841	8,583	9,254	2,841	6,413
Crit. Period Avg.		16,077	71.695	11,863	2,841	9,022	9,812	2,841	6,971
Annual Average		16,029		11,758	2,841	8,917	9,525	2,841	6,684
January Peak	24,657*								
Step 1 Critical Period Aug. 16, 1928 - Feb. 29, 1932 42-1/2 Months				Critical Period Sept. 1943 - Apr. 1945 20 Months			Critical Period Sept. 16, 1936 - Apr. 15, 1937 7 Months		

1/ Total firm load of Step 2 and Step 3 systems, computed for each system to have an average energy load equivalent to the average energy capability within the critical period and to bear a constant ratio, month by month, to the Pacific Northwest Area Load.

* Figures so marked are peak megawatts. All other figures are monthly or semi-monthly energy in average megawatts.

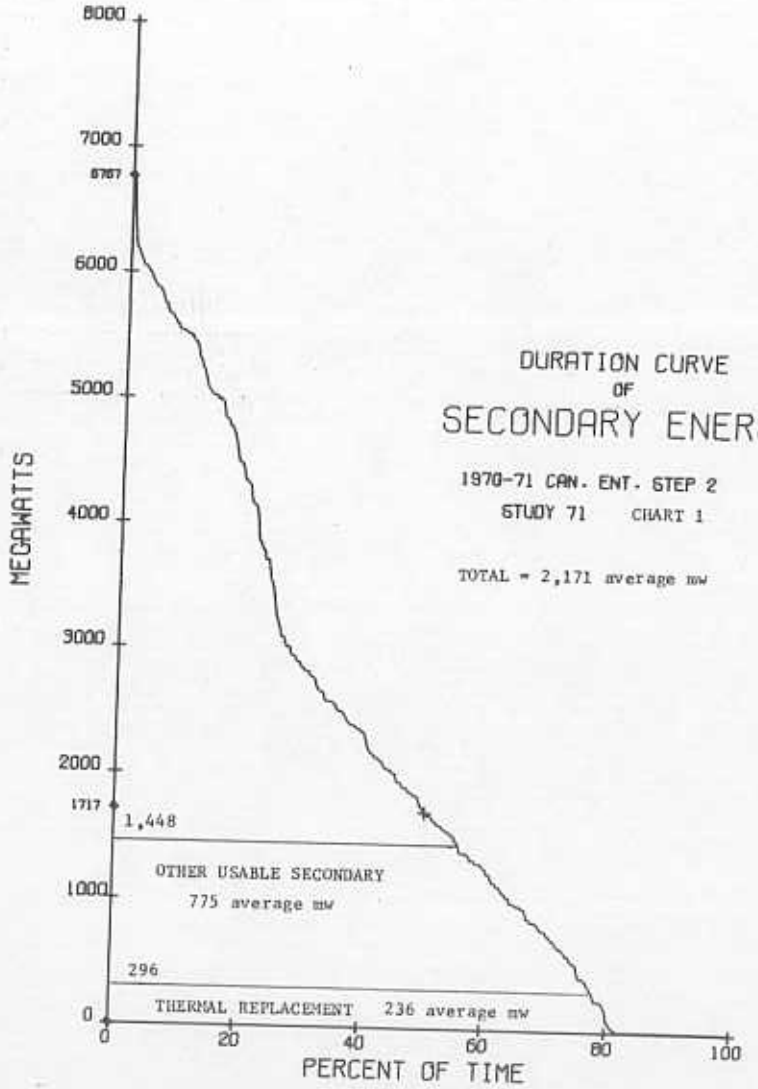
4/30/69

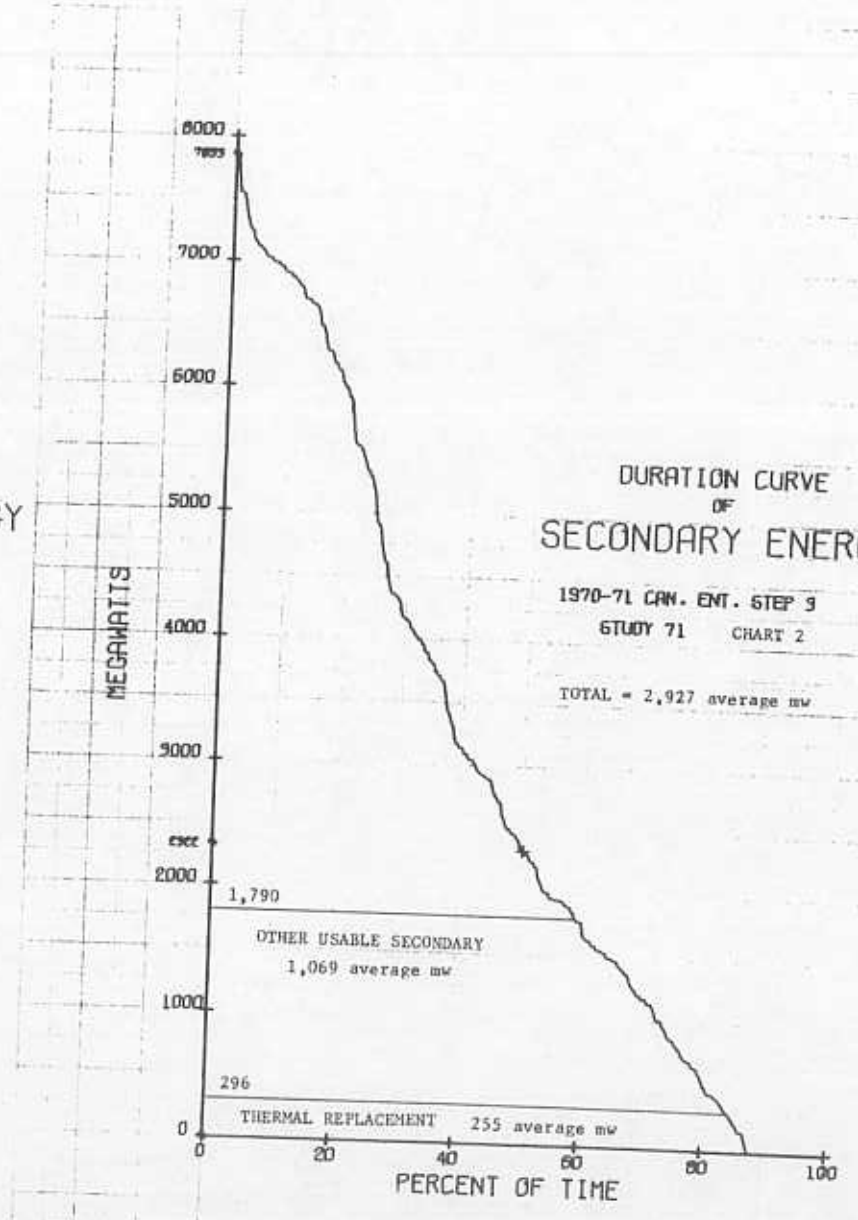




April 30, 1969

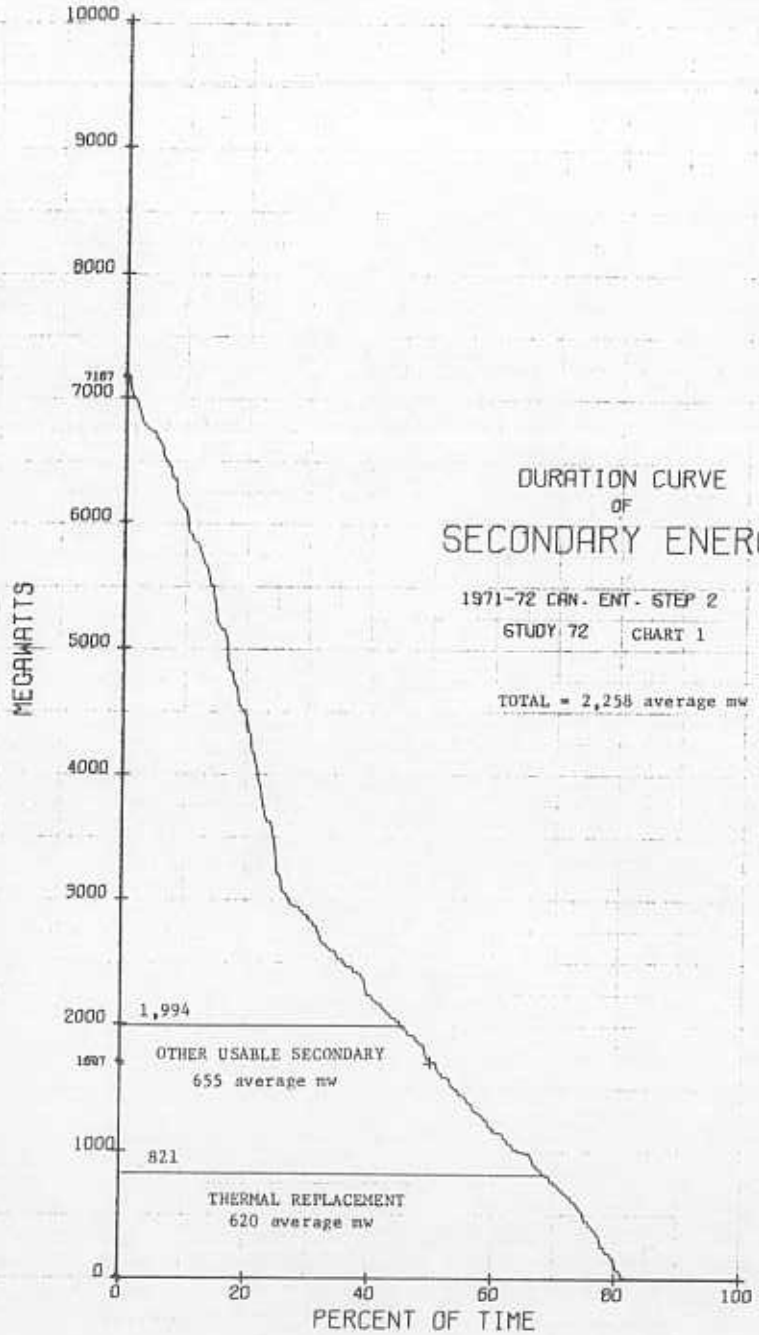
SHEET 1 of 6

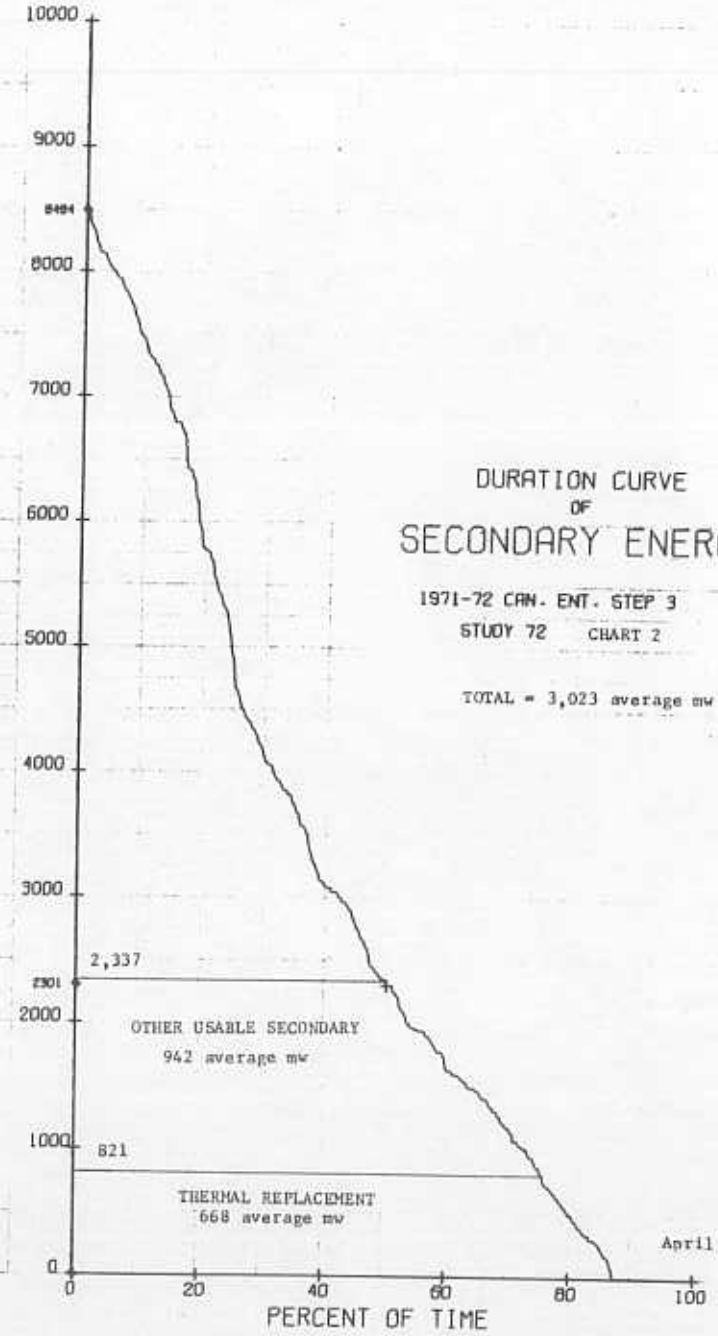




SHEET 2 of 6

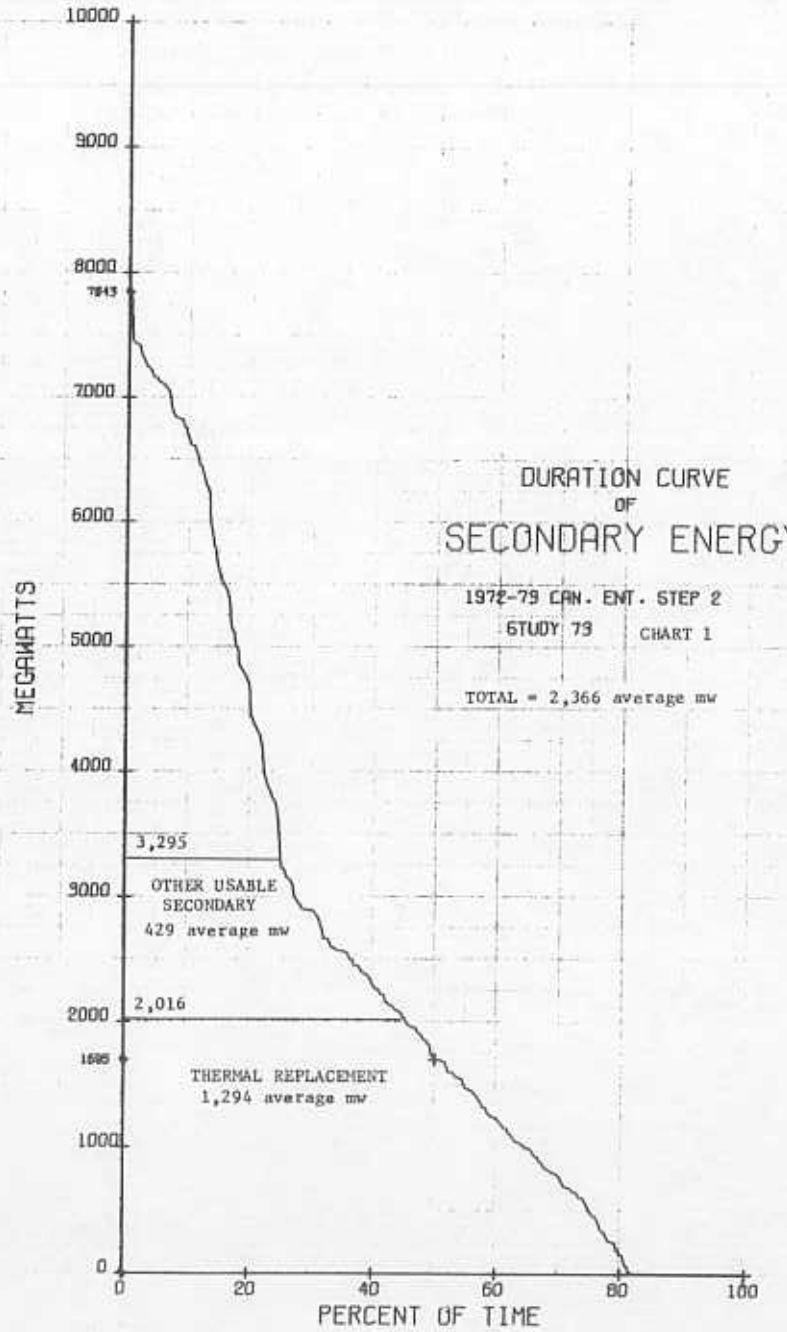
April 30, 1969

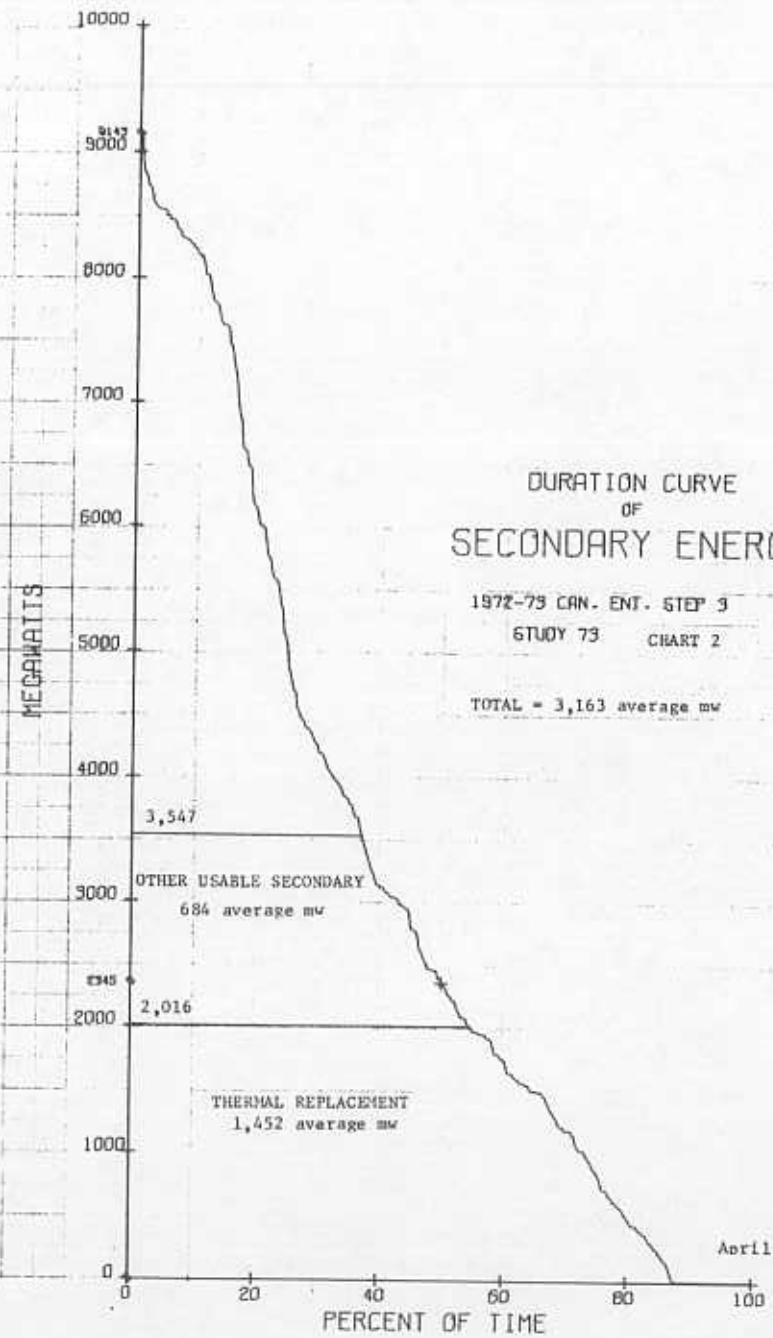




SHEET 3 of 6

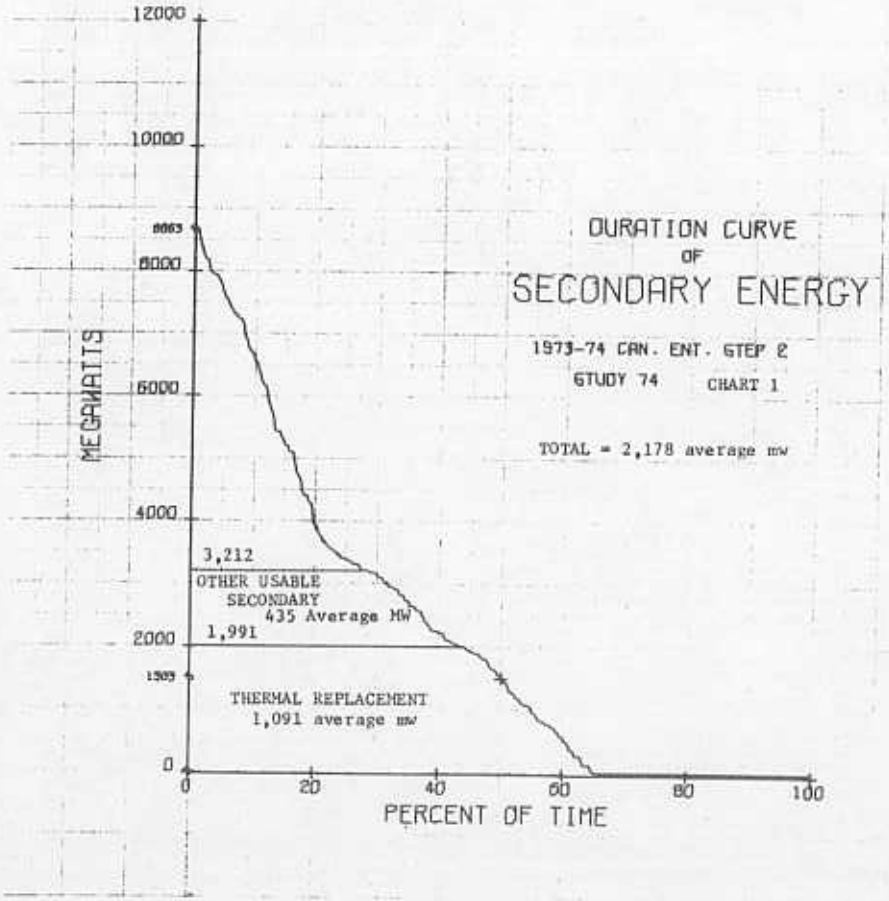
April 30, 1969

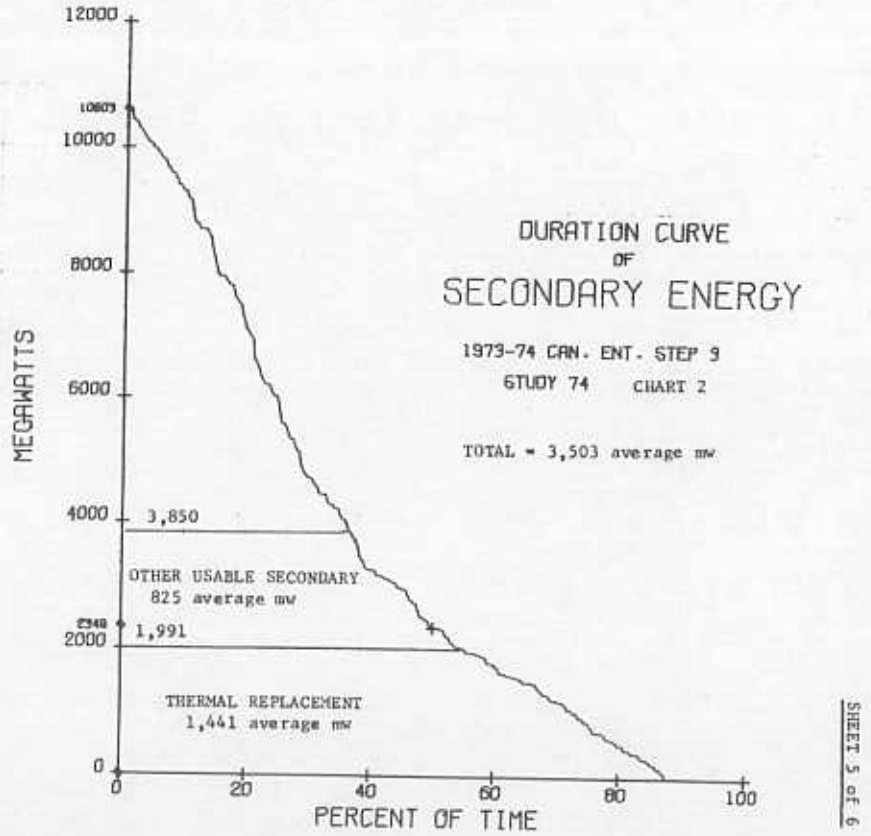




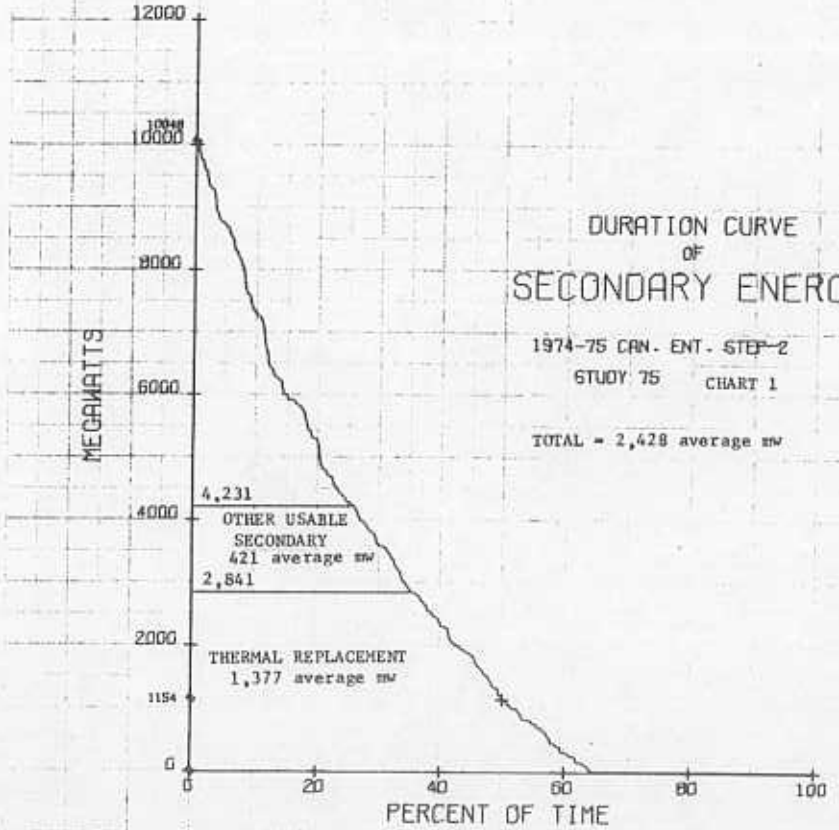
SHEET 4 of 6

April 30, 1969





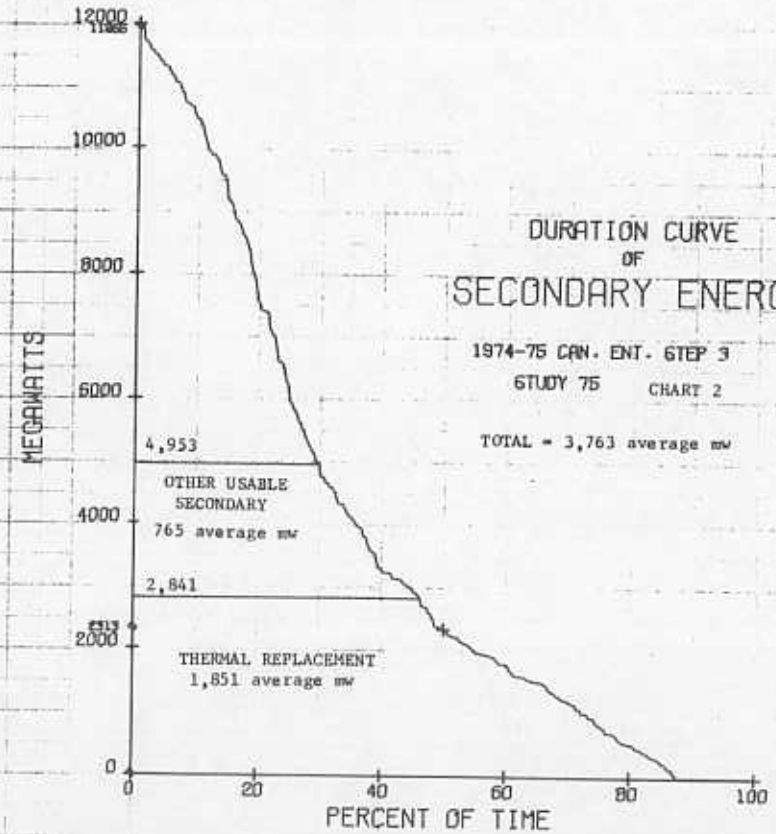
April 30, 1969



DURATION CURVE
OF
SECONDARY ENERGY

1974-75 CAN. ENT. STEP 2
STUDY 75 CHART 1

TOTAL = 2,428 average mw



DURATION CURVE
OF
SECONDARY ENERGY

1974-75 CAN. ENT. STEP 3
STUDY 75 CHART 2

TOTAL = 3,763 average mw

April 30, 1969

C Blake

OCT 8 1969

In reply refer to:
AD

Mr. Wendell E. Johnson
Chairman, United States Section
Permanent Engineering Board
c/o Office, Chief of Engineers
Building T-7, Room 1308
Washington, D.C. 20315

Dear Mr. Johnson:

As reported to the Board in May 1969, the United States and Canadian Entities have now completed the report "Determination of Downstream Power Benefits Resulting from Canadian Storage for Operating Years 1969-70 through 1974-75," dated June 30, 1969, and copies of this report are enclosed. Also enclosed are copies of the agreement signed by the Entities on this report.

It is interesting to note that the values of the capacity and energy for these 6 years are within 2 percent of the values determined in 1964. This assumes a present worth at 4-1/2 percent interest.

Sincerely,

(SGD) H. R. RICHMOND
H. R. Richmond
Chairman
United States Entity

Enclosures

cc:
Division Engineer, Corps of Engineers
Morgan D. Dubrow, Washington, D.C.
W. D. Kennedy, B. C. Hydro
G. H. Fernald, Jr., C of E
B. Goldhammer - P
G. W. Toman - AC
H. M. McIntyre - PR
Adm. Chron. File - A
Secretary, U.S. Entity - AD

AD:HKropitzer:vn 9-25-69