

Mines Branch Information Circular IC 314

EVALUATION OF CANADIAN COMMERCIAL COALS: 1973
SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA

by

T. E. Tibbetts*

ABSTRACT

The physical and chemical analyses of forty-four samples of coal are reported. In addition, the chemical analyses of ash of most of the same coals are reported in a separate section.

Coals from sixteen mining operations in the three coal mining provinces, Saskatchewan, Alberta, and British Columbia - are represented; they include lignite, subbituminous, and bituminous coals.

The samples were taken and analyzed by the Fuels Research Centre during the year 1973. They represent the production, on a specified day, of the coals as commercially prepared at the mine.

*Head, Coal and Peat Resources Evaluation, Fuels Research Centre, Mines Branch, Department of Energy, Mines and Resources, Ottawa, Canada.

Direction des mines Circulaire d'information IC 314

EVALUATION DES HOUILLES COMMERCIALES CANADIENNES: 1973
SASKATCHEWAN, ALBERTA ET COLOMBIE-BRITANNIQUE

par

T. E. Tibbetts*

RESUME

L'auteur décrit les résultats d'analyses physiques et chimiques de 44 échantillons de houille. Il donne de plus les résultats de l'analyse chimique de la cendre de la plupart de ces charbons dans une section séparée.

Les échantillons proviennent de 16 charbonnages dans trois provinces de l'Ouest, soit la Saskatchewan, l'Alberta et la Colombie-Britannique; ils comprennent de la lignite, de la houille maigre et de la houille grasse.

Les échantillons ont été prélevés et analysés en 1973 par le Centre de recherche sur les combustibles. Ils sont représentatifs de la production journalière de la houille préparée commercialement à la mine.

*Chef, l'évaluation des ressources en houille et en tourbe, Centre de recherche sur combustibles, Direction des mines, ministère de l'énergie, des Mines et des Ressources, Ottawa, Canada.

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Fording Coal Ltd.	40
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COAL AREAS AND PRINCIPAL MINES

(with approximate production in 1973 in thousands of short tons)

SASKATCHEWAN

(SOURIS VALLEY AREA)

Manalta Coal Ltd. (Klimax Mine)	530
Manalta Coal Ltd. (Utility Mine)	2,870
Manitoba and Saskatchewan Coal Co. Ltd.	580

ALBERTA

1. Subbituminous

Ardley Area	
Sissons Mine Ltd. (No. 809)	16
Camrose Area	
Burnstad Coal Ltd. (No. 724)	12
Dodds Coal Mining Co. Ltd. (No. 215)	11
Castor Area	
Manalta Coal Ltd. (Vesta Mine) (No. 1046)	460
Forestburg Collieries Ltd. (No. 1578)	530
Stettler Coal Co. Ltd. (No. 1614)	18
Drumheller Area	
Century Coals Limited (No. 1742)	32
Subway Coal Ltd. (No. 1666)	9
Edmonton Area	
Egg Lake Coal Co. Ltd. (No. 1582)	17
Star-Key Mines Ltd. (No. 1626)	22
Pembina Area	
Manalta Coal Ltd. (Whitewood Mine) (No. 1757)	2,490
Manalta Coal Ltd. (Highvale Mine) (No. 1769)	1,280
Sheerness Area	
Manalta Coal Ltd. (Roselyn Mine) (No. 443)	9
Westlock Area	
North Point Coal Co. Ltd. (No. 1562)	14

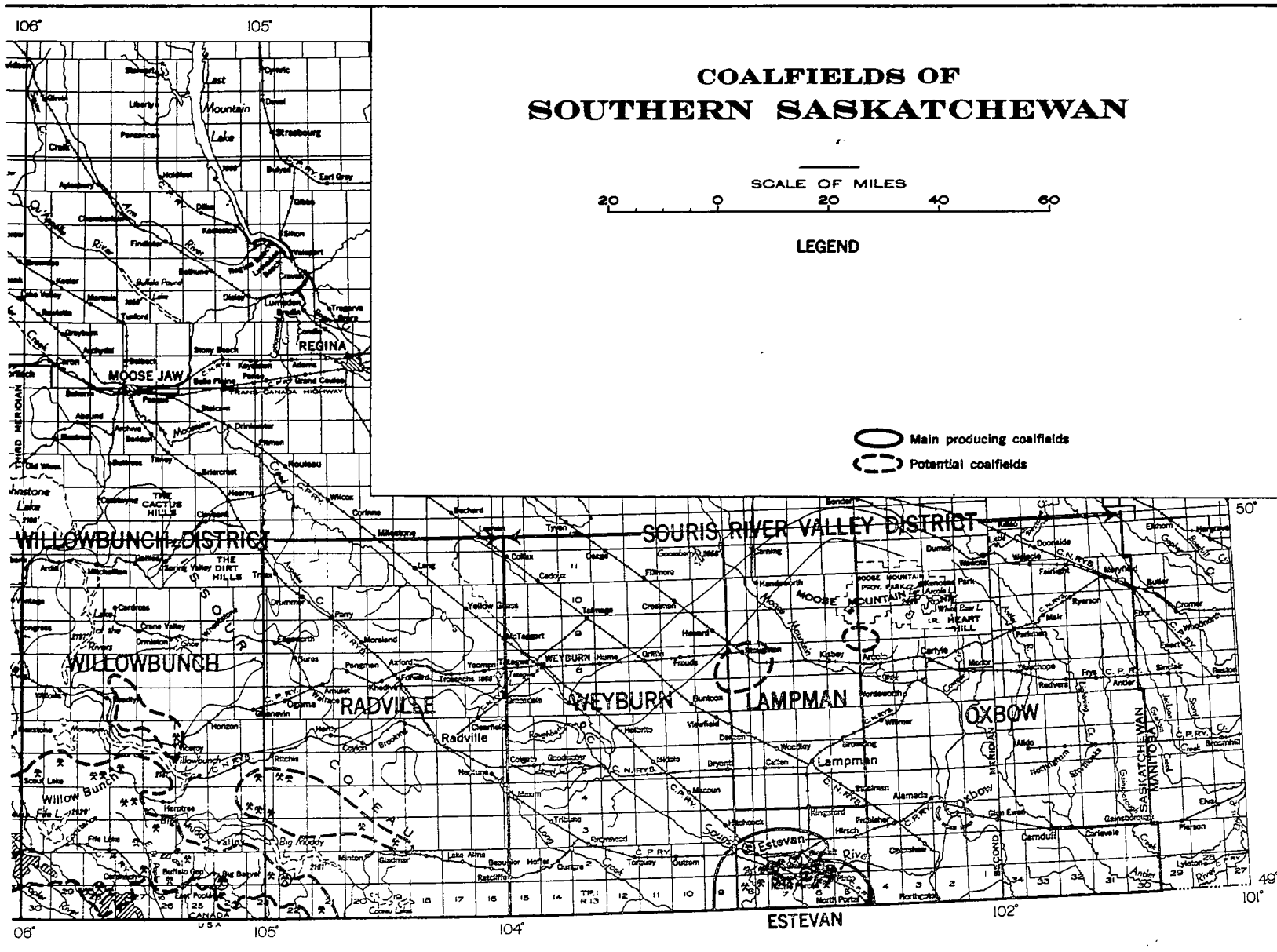
ALBERTA (Cont'd)

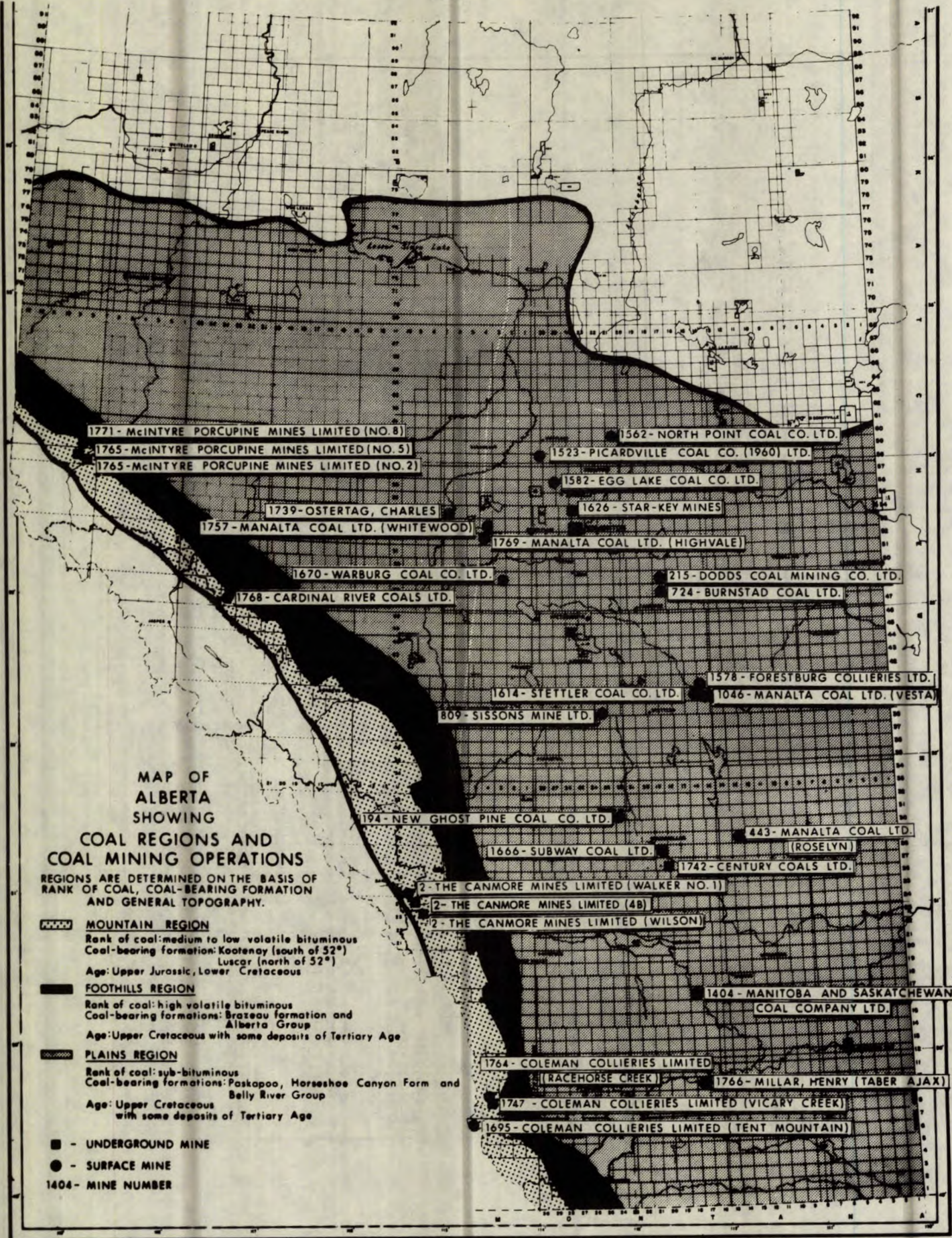
2. Bituminous

Cascade Area		
The Canmore Mines Ltd. (No. 2)		230
Crowsnest Area		
Coleman Collieries Ltd. (Nos. 1695, 1747, 1764)		1,000
Mountain Park Area		
Cardinal River Coals Ltd. (No. 1768)		1,900
Smokey River Area		
McIntyre Porcupine Mines Ltd. (Nos. 1765, 1771)		2,420

BRITISH COLUMBIA

East Kootenay District		
Kaiser Resources Limited		7,220
Fording Coal Limited		3,500

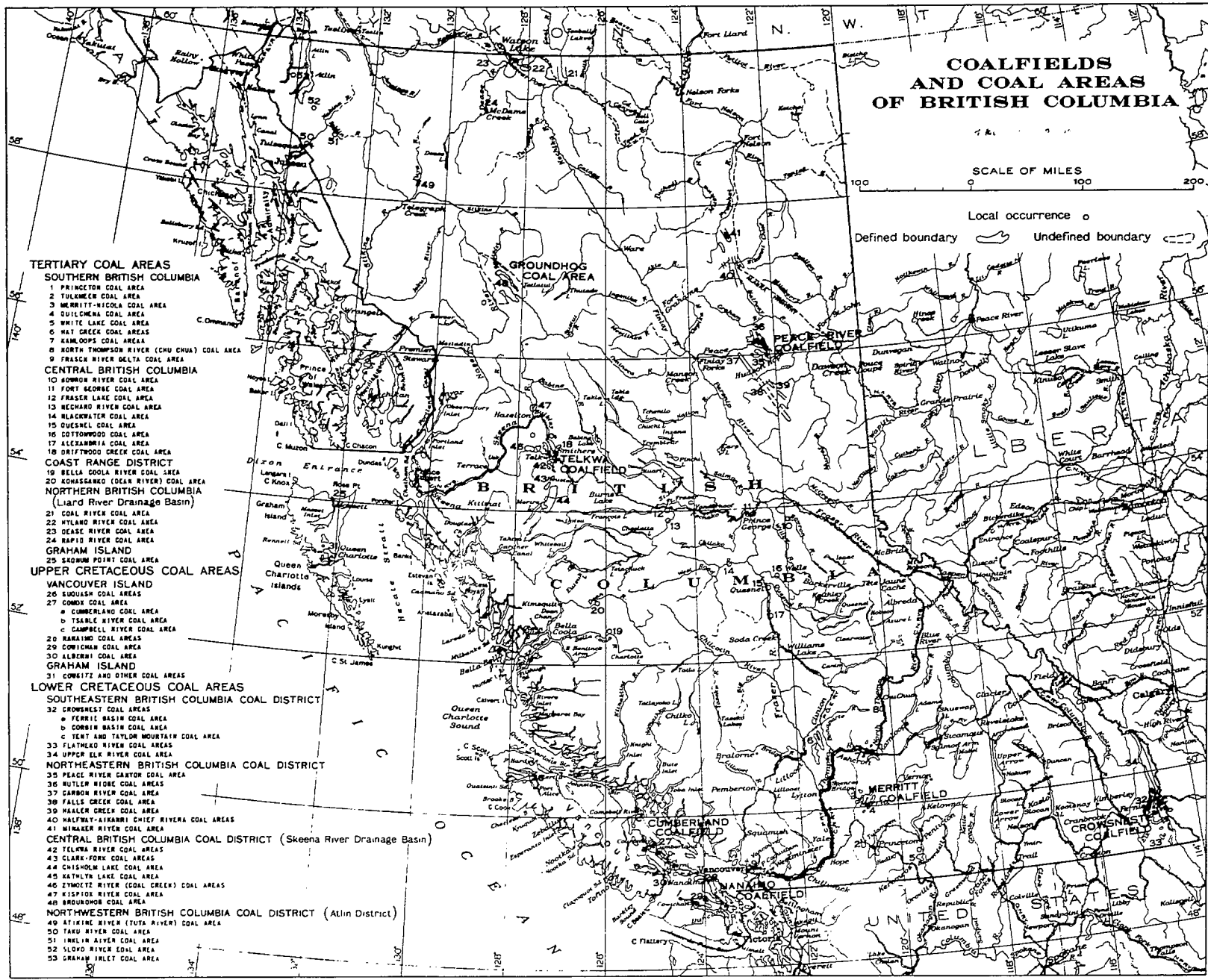




COALFIELDS AND COAL AREAS OF BRITISH COLUMBIA

SCALE OF MILES
0 100 200

Local occurrence ○
Defined boundary ——— Undefined boundary - - -



TERTIARY COAL AREAS

- SOUTHERN BRITISH COLUMBIA**
- 1 PRINCETON COAL AREA
 - 2 TOLMEC COAL AREA
 - 3 MERRITT-NICOLA COAL AREA
 - 4 QUILCHENA COAL AREA
 - 5 WHITE LAKE COAL AREA
 - 6 HAT CREEK COAL AREAS
 - 7 KAMLOOPS COAL AREA
 - 8 NORTH THOMPSON RIVER (CHU CHUA) COAL AREA
 - 9 FRASER RIVER DELTA COAL AREA

CENTRAL BRITISH COLUMBIA

- 10 KOWD RIVER COAL AREA
- 11 FORT GEORGE COAL AREA
- 12 FRASER LAKE COAL AREA
- 13 NECHARD RIVER COAL AREA
- 14 BLACKWATER COAL AREA
- 15 QUESALET COAL AREA
- 16 COTTONWOOD COAL AREA
- 17 ALEXANDRIA COAL AREA
- 18 DRIFTWOOD CREEK COAL AREA

COAST RANGE DISTRICT

- 19 BELLA COOLA RIVER COAL AREA
- 20 KONSASSAKO (OCEAN RIVER) COAL AREA

NORTHERN BRITISH COLUMBIA

- (Liard River Drainage Basin)
- 21 COAL RIVER COAL AREA
 - 22 WILAND RIVER COAL AREA
 - 23 GEASE RIVER COAL AREA
 - 24 RAPID RIVER COAL AREA

GRAHAM ISLAND

- 25 SAGHON POINT COAL AREA

UPPER CRETACEOUS COAL AREAS

VANCOUVER ISLAND

- 26 SQUISSH COAL AREAS
- 27 COMOX COAL AREA
- a CUMBERLAND COAL AREA
- b TSABLE RIVER COAL AREA
- c CAMPBELL RIVER COAL AREA

28 RAINIUM COAL AREAS

- 29 COMICHAN COAL AREA
- 30 ALBERNI COAL AREA

GRAHAM ISLAND

- 31 COMSITTE OTHER COAL AREAS

LOWER CRETACEOUS COAL AREAS

SOUTHEASTERN BRITISH COLUMBIA COAL DISTRICT

- 32 CROWNEST COAL AREAS
- a FERRIE BASIN COAL AREA
- b CORBIN BASIN COAL AREA
- c TERT AND TAYLOR MOUNTAIN COAL AREA

33 FLATHEAD RIVER COAL AREAS

- 34 UPPER ELE RIVER COAL AREA

NORTHEASTERN BRITISH COLUMBIA COAL DISTRICT

- 35 PEACE RIVER GANTON COAL AREA
- 36 NUTLÉN RIVER COAL AREAS
- 37 CARBON RIVER COAL AREA
- 38 FALLS CREEK COAL AREA
- 39 HALLER CREEK COAL AREA
- 40 HALKETT-NISSIBAMI MIST RIVERS COAL AREAS
- 41 MINKER RIVER COAL AREA

CENTRAL BRITISH COLUMBIA COAL DISTRICT (Skeena River Drainage Basin)

- 42 TELKWA RIVER COAL AREAS
- 43 CLARE-FORK COAL AREAS
- 44 CRUSHON LAKE COAL AREA
- 45 KATHLYN LAKE COAL AREA
- 46 TZYMOETZ RIVER (COAL CREEK) COAL AREAS
- 47 KISPIDE RIVER COAL AREA
- 48 BROWNHOOG COAL AREA

NORTHWESTERN BRITISH COLUMBIA COAL DISTRICT (Atlin District)

- 49 ATLIN RIVER (TUTA RIVER) COAL AREA
- 50 FARU RIVER COAL AREA
- 51 WELBY RIVER COAL AREA
- 52 SLOHO RIVER COAL AREA
- 53 GRANBY INLET COAL AREA

INTRODUCTION

This publication contains the analyses of commercial coal samples collected in Saskatchewan, Alberta and British Columbia during 1973, under the project entitled "Evaluation of Canadian Commercial Coals". All analyses were conducted by the Fuels Research Centre. Those of lignite coals from Saskatchewan are reported in Section I on the equilibrium ("in situ") moisture basis. On the same basis, those of subbituminous coals from Alberta are reported in Section II. Section III contains the analyses, on the as-received moisture basis, of bituminous coals from Alberta and British Columbia. The ultimate analyses on the dry basis and the chemical analyses of ash of selected samples are reported in Section IV.

The calorific value is the gross value as defined by ASTM at the moisture content shown under proximate analysis.

To follow coal quality and to ensure that changes in quality are not due to improper sampling, the Mines Branch has sampled commercial coals at the mines and delivery points in eastern and western Canada since 1954. The project is conducted under the direction of the Fuels Research Centre.

Outputs from mines in western Canada were sampled by members of the staff of the Western Regional Laboratory, Metals Reduction and Energy Centre, with the assistance of the mine operators. In some instances samples were taken from coal-feeding conveyers to power plants. The gross samples were crushed and split before being shipped to Fuels Research Centre, Ottawa, for analysis.

All samples collected under this project are obtained in accordance with reliable specifications. Normal production and preparation procedures are followed at the mine during the sampling periods so that the samples will truly represent the products prepared for market.

GLOSSARY OF ABBREVIATED TERMS

- sq . - square-hole screen
- rd - round-hole screen
- sl - slot-hole screen
- - not determined
- ASTM - American Society for Testing and Materials

SECTION I

LIGNITE COALS

FROM

SASKATCHEWAN

(Analyses are reported on the Equilibrium Moisture Basis)

Mine Operator MANALTA COAL LTD.
 Mine Location Estevan, Estevan Area, Saskatchewan
 Sec. 19-22 and 27, Tp. 2; R. 7, W2
 Name of Mine or Coal Klimax Strip Mine; Top Seam

Date Sampled	17-9-73	17-9-73
Weight Sampled (approx.)tons	120	60
Size: Mine Designation	Slack	Slack
Screen Openingin.	Minus 2 sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3839-73	3840-73
Proximate Analysis		
Moisture%	30.6	30.2
Ash%	8.6	9.8
Volatile Matter%	29.1	28.4
Fixed Carbon%	31.7	31.6
Sulphur%	0.4	0.5
Calorific ValueBtu/lb.	7450	7360
Ash Fusibility		
Initial Temp.°F	2050	1950
Softening Temp: (a) Spherical°F	2170	2100
(b) Hemispherical.....°F	2190	2160
Fluid Temp.°F	2260	2390
Grindability Index (Hardgrove)	55	
Free Swelling Index (ASTM)	-	56
Classification by Rank (ASTM)	Lignite A	

Remarks: The total seam thickness of 8 ft is mined. Thickness of the overburden is about 50 ft. The seam is level and the base is clay.

Mine Operator MANALTA COAL LTD.
 Mine Location Estevan, Estevan Area, Saskatchewan
 Sec. 31, 32, 36, Tp. 1; R. 8, W2.
 Name of Mine or Coal Utility Strip Mine; Top Seam.

Date Sampled	18-10-73
Weight Sampled (approx.)tons	100
Size: Mine Designation	Power Plant Coal
Screen Openingin.	Minus 1 $\frac{1}{2}$
FRC Laboratory No.	3838-73
Proximate Analysis	
Moisture%	28.6
Ash%	11.4
Volatile Matter%	27.5
Fixed Carbon%	32.5
Sulphur%	0.2
Calorific ValueBtu/lb.	7280
Ash Fusibility	
Initial Temp.°F	2000
Softening Temp: (a) Spherical°F	2060
(b) Hemispherical.....°F	2280
Fluid Temp.°F	2460
Grindability Index (Hardgrove)	49
Free Swelling Index (ASTM)	49
Classification by Rank (ASTM)	Lignite A

Remarks: Total seam thickness of 10 ft is mined. Average thickness of the overburden is about 48 ft. The seam is level and the base is clay.

Mine Operator MANITOBA AND SASKATCHEWAN COAL CO. LIMITED
 Mine Location Bienfait, Bienfait Area, Saskatchewan
 Sec. 11, Tp. 2; R. 6, W2
 Name of Mine or Coal M & S Strip Mine; Top Seam

Date Sampled	17-9-73	17-9-73	17-9-73
Weight Sampled (approx.)tons	100	40	60
Size: Mine Designation	Slack	Pea	Slack
Screen Openingin.	Minus 2 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3841-73	3842-73	3843-72
Proximate Analysis			
Moisture	29.8	31.2	30.0
Ash	7.3	7.3	7.9
Volatile Matter	34.4	28.6	27.3
Fixed Carbon	28.5	32.9	34.8
Sulphur	0.4	0.3	0.4
Calorific ValueBtu/lb.	7780	7680	7680
Ash Fusibility			
Initial Temp.°F	2000	2130	2050
Softening Temp: (a) Spherical°F	2200	2170	2160
(b) Hemispherical.....°F	2230	2200	2180
Fluid Temp.°F	2360	2300	2300
Grindability Index (Hardgrove)	46	45	49
Free Swelling Index (ASTM)	-	-	-
Classification by Rank (ASTM)		Lignite A	

Remarks: Total seam thickness of 8-1/2 ft is mined. Thickness of the overburden is about 65 ft. The seam is level and the base is clay.

SECTION II

SUBBITUMINOUS COALS

FROM

ALBERTA

(Analyses are reported on the Equilibrium Moisture Basis.)

Mine Operator CENTURY COALS LTD. - No. 1742
 Mine Location East Coulee, Drumheller Area, Alberta
 Sec. 6, Tp. 27; R 18, W4
 Name of Mine or Coal Atlas (Underground) Mine, Seams 1 and 2.

Date Sampled	9-10-73	9-10-73	9-10-73	9-10-73	9-10-73
Weight Sampled (approx.)tons	90	20	8	15	25
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Openingin.	12 to 4 $\frac{1}{2}$ rd	4 $\frac{1}{2}$ to 2 rd	2 to 1 $\frac{3}{8}$ rd	1 $\frac{3}{8}$ to 5 $\frac{5}{8}$ rd	Minus 5 $\frac{5}{8}$ rd
FRC Laboratory No.	3830-73	3831-73	3832-73	3833-73	3834-73
Proximate Analysis					
Moisture%	18.2	18.0	18.0	18.8	19.3
Ash%	6.6	7.5	8.6	8.8	8.7
Volatile Matter%	32.0	31.8	34.3	30.4	30.9
Fixed Carbon%	43.2	42.7	39.1	42.0	41.1
Sulphur%	0.4	0.4	0.4	0.4	0.4
Calorific ValueBtu/lb.	9640	9590	9390	9330	9270
Ash Fusibility					
Initial Temp.°F	1920	2010	2080	2040	2020
Softening Temp: (a) Spherical°F	2110	2140	2300	2360	2330
(b) Hemispherical.....°F	2340	2350	2480	2520	2510
Fluid Temp.°F	2480	2460	2700+	2630	2660
Grindability Index (Hardgrove)	-	-	-	35	33
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Subbituminous B				

Remarks: Total seam thickness is 12 ft and the depth is about 500 ft. The two seams mined are separated by a shale parting that varies from less than 1/2 in. to several inches. Approximately 3 ft of the top seam is left to increase the stability of the mine roof. Roof and floor of the seam are shale.

Mine Operator FORESTBURG COLLIERIES LTD. - No. 1578
 Mine Location Forestburg, Castor Area, Alberta
 Sec. 6, Tp. 41; R. 15, W4
 Name of Mine or Coal Diplomat Strip Mine

Date Sampled	16-10-73	16-10-73	16-10-73	16-10-73	16-10-73
Weight Sampled (approx.)tons	-	-	-	-	-
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Openingin.	Plus 4 1/2 rd	4 1/2 to 2 rd	2 rd to 1 1/4 sq	1 to 1/2 sq	Minus 1/2 sq
FRC Laboratory No.	3971-73	3970-73	3969-73	3968-73	3972-73
Proximate Analysis					
Moisture%	25.4	24.8	25.0	24.9	25.2
Ash%	5.0	5.3	5.3	5.3	6.3
Volatile Matter%	31.6	31.5	31.4	31.5	31.2
Fixed Carbon%	38.0	38.4	38.3	38.3	37.3
Sulphur%	0.4	0.3	0.3	0.3	0.4
Calorific ValueBtu/lb.	8800	8850	8820	8790	8620
Ash Fusibility					
Initial Temp.°F	2030	2060	2070	2080	2080
Softening Temp: (a) Spherical°F	2110	2130	2100	2130	2140
(b) Hemispherical.....°F	2200	2210	2200	2200	2210
Fluid Temp.°F	2240	2260	2230	2260	2240
Grindability Index (Hardgrove)	-	-	-	32	34
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)				Subbituminous C	

Remarks: One seam is mined and thickness varies from 4 to 9 ft. Overburden varies from 25 to 60 ft, composed of brown till (25-50 ft) and grey shale (0 - 10 ft). The seam is underlain by brown fire clay.

Mine Operator FORESTBURG COLLIERIES LTD. - No. 1578
 Mine Location Forestburg, Castor Area, Alberta
 Sec. 6, Tp. 41; R. 15, W4.
 Name of Mine or Coal Diplomat Strip Mine

Date Sampled 17-10-73
 Weight Sampled (approx.) tons -

Size: Mine Designation Feed to Power Plant
 Screen Opening in. Minus 1

FRC Laboratory No. 3967-73

Proximate Analysis

Moisture	%	24.6
Ash	%	7.1
Volatile Matter	%	30.3
Fixed Carbon	%	38.0
Sulphur	%	0.5
Calorific Value	Btu/lb.	8540
Ash Fusibility		
Initial Temp.	°F	1870
Softening Temp: (a) Spherical	°F	2150
(b) Hemispherical.....	°F	2240
Fluid Temp.	°F	2350
Grindability Index (Hardgrove)		35
Free Swelling Index (ASTM)		-
Classification by Rank (ASTM)		Subbituminous C

Mine Operator MANALTA COAL LTD. - No. 443
 Mine Location Sheerness, Sheerness Area, Alberta
 Sec. 13, Tp. 29; R. 13, W4.
 Name of Mine or Coal Roselyn Strip Mine

Date Sampled	11-10-73	11-10-73	11-10-73	11-10-73	11-10-73
Weight Sampled (approx.)tons	10	8	20	40	20
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Openingin.	10 to 6 rd	6 to 3 rd	3 to $1\frac{1}{2}$ rd	$1\frac{1}{2}$ rd to $\frac{1}{4}$ sq	Minus $\frac{1}{4}$ sq
FRC Laboratory No.	3825-73	3826-73	3827-73	3828-73	3829-73
Proximate Analysis					
Moisture%	22.9	22.6	24.2	24.7	23.7
Ash%	6.8	6.3	6.2	6.1	8.1
Volatile Matter%	31.4	31.7	30.3	30.9	29.7
Fixed Carbon%	38.9	39.4	39.3	38.3	38.5
Sulphur%	0.4	0.4	0.4	0.4	0.6
Calorific ValueBtu/lb.	8690	8790	8620	8530	8520
Ash Fusibility					
Initial Temp.°F	1900	1930	1920	1920	1860
Softening Temp: (a) Spherical°F	1930	2080	2020	1970	1950
(b) Hemispherical.....°F	1990	2160	2110	2020	2020
Fluid Temp.°F	2230	2320	2210	2280	2290
Grindability Index (Hardgrove)	-	-	-	30	30
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Subbituminous C				

Mine Operator MANALTA COAL LTD. No. 1046
 (Battle River Coal Division)
 Mine Location Halkirk, Castor Area, Alberta
 Sec. 20, Tp. 40; R. 15, W4
 Name of Mine or Coal Vesta Strip Mine

Date Sampled	15-10-73	15-10-73	15-10-73	15-10-73	15-10-73
Weight Sampled (approx.)tons	-	-	-	-	-
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Openingin.	Plus $4\frac{1}{2}$ sq	$4\frac{1}{2}$ to 2 sq	2 to 1 sq	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq
FRC Laboratory No.	3977-73	3974-73	3973-73	3975-73	3978-73
Proximate Analysis					
Moisture	25.7	25.7	25.6	25.9	24.2
Ash	5.4	6.6	6.4	6.3	7.2
Volatile Matter	31.6	29.3	29.5	30.6	31.0
Fixed Carbon	37.3	38.4	38.5	37.2	37.6
Sulphur	0.4	0.4	0.4	0.3	0.5
Calorific ValueBtu/lb.	8690	8500	8520	8440	8640
Ash Fusibility					
Initial Temp.°F	1860	1990	1830	1970	1880
Softening Temp: (a) Spherical°F	2020	2070	2040	2200	2080
(b) Hemispherical.....°F	2180	2180	2130	2400	2190
Fluid Temp.°F	2220	2340	2560	2420	2250
Grindability Index (Hardgrove)	-	-	-	30	30
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)				Subbituminous C	

Remarks: Total seam thickness is 7-8 ft. Depth of overburden is about 48 ft.

Mine Operator MANALTA COAL LTD. - No. 1046
 (Battle River Coal Division)
 Mine Location Halkirk, Castor Area, Alberta
 Sec. 20, Tp. 40; R. 15, W4.
 Name of Mine or Coal Vesta Strip Mine

Date Sampled Weight Sampled (approx.) tons	15-10-73 -
Size: Mine Designation Screen Opening in.	Feed to Power Plant Minus 1 sq
FRC Laboratory No.	3976-73
Proximate Analysis Moisture% Ash% Volatile Matter% Fixed Carbon% Sulphur% Calorific ValueBtu/lb. Ash Fusibility Initial Temp.°F Softening Temp: (a) Spherical°F (b) Hemispherical.....°F Fluid Temp.°F Grindability Index (Hardgrove) Free Swelling Index (ASTM) Classification by Rank (ASTM)	25.2 8.3 29.1 37.4 0.3 8270 1860 2120 2140 2220 30 - Subbituminous C

Mine Operator MANALTA COAL LTD. - No. 1757
 Mine Location Wabamun, Pembina Area, Alberta
 Sec. 14 and 15, Tp. 53; R4, W5.
 Name of Mine or Coal Whitewood Strip Mine; Seams 1, 2, 3, 4 and 5.

Date Sampled	7-9-73
Weight Sampled (approx.) tons	250
Size: Mine Designation	Feed to Power Plant
Screen Opening in.	Minus $\frac{3}{4}$
FRC Laboratory No.	3844-73
Proximate Analysis	
Moisture	19.5
Ash	17.2
Volatile Matter	29.1
Fixed Carbon	34.2
Sulphur	0.2
Calorific Value Btu/lb.	7810
Ash Fusibility	
Initial Temp. °F	2050
Softening Temp: (a) Spherical °F	2320
(b) Hemispherical °F	2390
Fluid Temp. °F	2700+
Grindability Index (Hardgrove)	45
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Subbituminous B

Remarks: Total thickness of coal seams is about 21 ft and average thickness of overburden is about 55 ft. Thicknesses of the seams are as follows: No. 1 - 5 ft, No. 2 - 2 ft, No. 3 - 9 ft, No. 4 - 3 ft, and No. 5 bottom 2 ft.

Mine Operator MANALTA COAL LTD. - No. 1769
 Mine Location Seba Beach, Pembina Area, Alberta
 Sec. 29, Tp. 52; R.4, W5.
 Name of Mine or Coal Highvale Strip Mine; Seams 1 and 2.

Date Sampled	7-9-73
Weight Sampled (approx.) tons	125
Size: Mine Designation	Feed to Power Plant
Screen Opening in.	Minus $\frac{3}{4}$
FRC Laboratory No.	3845-73
Proximate Analysis	
Moisture%	18.7
Ash%	14.7
Volatile Matter%	27.0
Fixed Carbon%	39.6
Sulphur%	0.2
Calorific ValueBtu/lb.	8250
Ash Fusibility	
Initial Temp.°F	2340
Softening Temp: (a) Spherical°F	2460
(b) Hemispherical.....°F	2570
Fluid Temp.°F	2700
Grindability Index (Hardgrove)	42
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Subbituminous B

Remarks: Total thickness of coal mined is 23 ft. Average thickness of overburden is 40 ft. There is a 1.5 ft shale parting between upper seam No. 1 and seam No. 2. There are thin partings in the coal seams. Stratigraphically lower are seams No. 3 and No. 4 not presently mined.

Mine Operator STAR-KEY MINES LTD. - No. 1626
 St. Albert, Edmonton Area, Alberta
 Mine Location Sec. 35, Tp. 54; R. 25, W4.
 Name of Mine or Coal Star-Key

Date Sampled	22-10-73	22-10-73	22-10-73	22-10-73	22-10-73
Weight Sampled (approx.)tons	75	75	15	15	10
Size: Mine Designation	Lump	Stove	Nut	Stoker	Slack
Screen Openingin.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ to 2 sq	2 to $1\frac{1}{8}$ sq	$1\frac{1}{8}$ to $\frac{3}{8}$ sq	Minus $\frac{3}{8}$ sq
FRC Laboratory No.	3960-73	3961-73	3962-73	3963-73	3964-73
Proximate Analysis					
Moisture%	22.8	23.7	24.2	24.1	23.8
Ash%	8.7	8.7	10.0	9.1	12.7
Volatile Matter%	29.6	29.0	28.9	28.5	27.5
Fixed Carbon%	38.9	38.3	36.9	38.3	36.0
Sulphur%	0.3	0.3	0.3	0.3	0.4
Calorific ValueBtu/lb.	8590	8410	8200	8350	7780
Ash Fusibility					
Initial Temp.°F	1950	1980	2230	2140	1850
Softening Temp: (a) Spherical°F	2250	2260	2350	2270	2330
(b) Hemispherical.....°F	2460	2430	2480	2510	2460
Fluid Temp.°F	2600	2590	2590	2560	2570
Grindability Index (Hardgrove)	30	32	34	34	35
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Subbituminous C				

SECTION III

BITUMINOUS COALS
FROM
ALBERTA AND BRITISH COLUMBIA

(Analyses are reported on As-Received Moisture Basis)

Mine Operator CANMORE MINES LTD. - No. 2
 Mine Location Canmore, Cascade Area, Alberta
 Tp. 24; R. 10, W5.
 Name of Mine or Coal Wilson Underground Mine; Wilson Seam

Date Sampled	4-10-73	4-10-73
Weight Sampled (approx.) tons	200	4
Size: Mine Designation	Clean Coal Product	Stoker
Screen Opening in.	Minus $1\frac{1}{4}$ sq	$1\frac{1}{4}$ sq to $\frac{1}{4}$ sl
FRC Laboratory No.	3846-73	3847-73
Proximate Analysis		
Moisture%	6.6	4.4
Ash%	9.5	8.1
Volatile Matter%	10.6	10.8
Fixed Carbon%	73.3	76.7
Sulphur%	0.7	0.7
Calorific ValueBtu/lb.	13,050	13,630
Ash Fusibility		
Initial Temp.°F	2410	2700+
Softening Temp: (a) Spherical°F	2700+	2700+
(b) Hemispherical.....°F	2700+	2700+
Fluid Temp.°F	2700+	2700+
Grindability Index (Hardgrove)	64	64
Free Swelling Index (ASTM)	-	-
Classification by Rank (ASTM)	Semi-anthracite	

Remarks: A typical section of the Wilson seam shows a total thickness of 15 ft with black shale partings up to 2 ft in thickness. Both roof and floor are hard shale.

Mine Operator CARDINAL RIVER COALS LTD. - No. 1768
 Mine Location Luscar, Mountain Park Area, Alberta
 Sec. 15, 16, 22, Tp. 47; R.24, W5.
 Name of Mine or Coal Luscar Strip Mine

Date Sampled	26-9-73	26-9-73
Weight Sampled (approx.)tons	150	200
Size: Mine Designation	Clean Coal Product (From Preparation Plant)	Raw Coal Feed
Screen Openingin.	Minus 2 sq	Minus 2 sq
FRC Laboratory No.	3835-73	3836-73
Proximate Analysis		
Moisture%	3.0	3.9
Ash%	8.5	19.6
Volatile Matter%	20.3	18.4
Fixed Carbon%	68.2	58.1
Sulphur%	0.2	0.2
Calorific ValueBtu/lb.	13,810	10,330
Ash Fusibility		
Initial Temp.°F	2280	2250
Softening Temp: (a) Spherical°F	2490	2400
(b) Hemispherical.....°F	2540	2700+
Fluid Temp.°F	2700+	2700+
Grindability Index (Hardgrove)	85	85
Free Swelling Index (ASTM)	5.5	2
Classification by Rank (ASTM)	Medium-volatile bituminous	

Remarks: The seam is irregular with large variations in thickness and depth. Most of the coal deposit is almost vertical and is stripped in 33 ft benches. Stripping ratio is approximately 6:1. Seam thickness is about 40 ft and overburden is up to 200 ft of shale and sandstone.

Mine Operator COLEMAN COLLIERIES LTD. - No. 1747
 Mine Location Coleman, Crowsnest Area, Alberta
 Sec. 19, Tp. 9: R.4, W5.
 Name of Mine or Coal Vicary Creek Underground Mine

Date Sampled	2-10-73
Weight Sampled (approx.) tons	1400
Size: Mine Designation Screen Opening in.	Clean Coal Product (From Preparation Plant) Minus 2 sq
FRC Laboratory No.	3850-73
Proximate Analysis	
Moisture%	3.4
Ash%	8.3
Volatile Matter%	0.7
Fixed Carbon%	7.6
Sulphur%	0.5
Calorific ValueBtu/lb.	13,680
Ash Fusibility	
Initial Temp.°F	2550
Softening Temp: (a) Spherical°F	2700+
(b) Hemispherical.....°F	2700+
Fluid Temp.°F	2700+
Grindability Index (Hardgrove)	84
Free Swelling Index (ASTM)	5
Classification by Rank (ASTM)	Medium-volatile bituminous

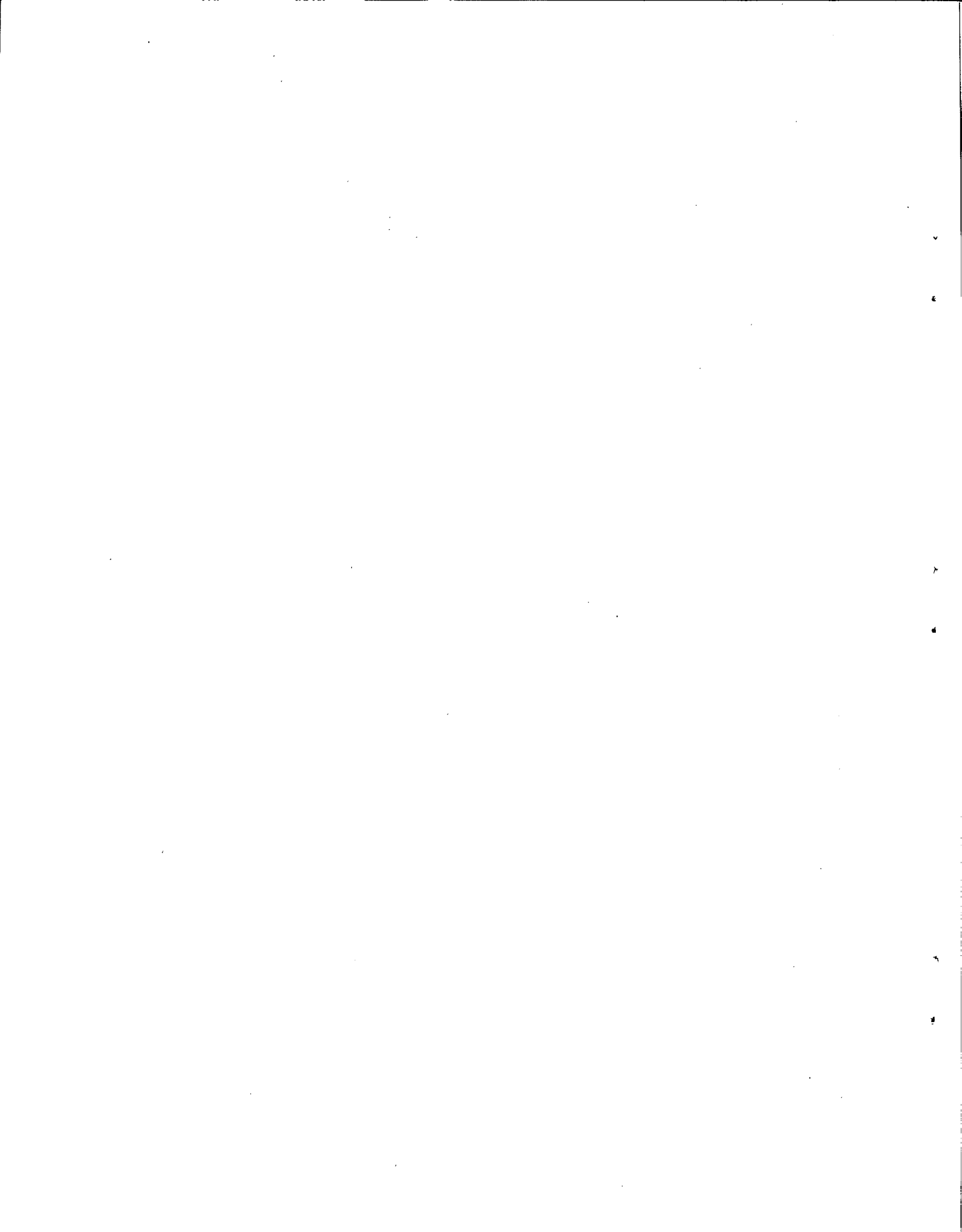
Mine Operator KAISER RESOURCES LTD.
 Mine Location Michel-Natal, East Kootenay District, British Columbia.
 Name of Mine or Coal Elkview Plant, Balmer Seam

Date Sampled	2-10-73	2-10-73
Weight Sampled (approx.)tons	6770	250
Size: Mine Designation	Clean Coal Product (From Preparation Plant)	Oxidized Coal
Screen Openingin.	Minus $1\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3848-73	3849-73
Proximate Analysis		
Moisture%	6.1	5.9
Ash%	9.3	13.6
Volatile Matter%	18.7	20.5
Fixed Carbon%	65.9	60.0
Sulphur%	0.3	0.2
Calorific ValueBtu/lb.	13,180	11,660
Ash Fusibility		
Initial Temp.°F	2700+	2700+
Softening Temp: (a) Spherical°F	2700+	2700+
(b) Hemispherical.....°F	2700+	2700+
Fluid Temp.°F	2700+	2700+
Grindability Index (Hardgrove)	92	89
Free Swelling Index (ASTM)	-	-
Classification by Rank (ASTM)	Low- to medium-volatile bituminous	

Mine Operator McINTYRE PORCUPINE MINES LTD. - No. 1765, No. 1771
 Mine Location Grand Cache, Smoky River Area, Alberta
 Name of Mine or Coal McIntyre Underground Mine (No. 2); No. 4 Seam
 McIntyre Strip Mine (No. 8)

Date Sampled	24-9-73
Weight Sampled (approx.) tons	400
Size: Mine Designation	Clean Coal Product (From Preparation Plant)
Screen Opening in.	Minus $1\frac{1}{2}$ sq
FRC Laboratory No.	3837-73
Proximate Analysis	
Moisture%	4.0
Ash%	8.5
Volatile Matter%	18.0
Fixed Carbon%	59.5
Sulphur%	0.5
Calorific ValueBtu/lb.	13,690
Ash Fusibility	
Initial Temp.°F	2170
Softening Temp: (a) Spherical°F	2700+
(b) Hemispherical.....°F	2700+
Fluid Temp.°F	2700+
Grindability Index (Hardgrove)	94
Free Swelling Index (ASTM)	7
Classification by Rank (ASTM)	Low-volatile bituminous

Remarks: Seam thickness is about 20 ft. Overburden is up to 100 ft of shale and sandstone.



SECTION IV - ULTIMATE AND ASH ANALYSES

A - SASKATCHEWAN

B - ALBERTA

C - BRITISH COLUMBIA

A. SASKATCHEWAN

Mine Operator MANALTA COAL LTD.
 Mine Location Estevan, Estevan Area, Saskatchewan
 Sec. 19-22 and 27, Tp. 2; R. 7, W2
 Name of Mine or Coal Klimax Strip Mine; Top Seam

Date Sampled	17-9-73	17-9-73
Weight Sampled (approx.).....tons	120	60
Size: Mine Designation	Slack	Slack
Screen Opening	Minus 2 sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3839-73	3840-73
<u>Ultimate Analysis</u>		
Carbon	64.5	63.7
Hydrogen	4.2	3.9
Sulphur	0.6	0.7
Nitrogen	1.1	1.1
Ash	12.4	14.0
Oxygen (by difference)	17.2	16.6
<u>Ash Analysis</u>		
SiO ₂	33.4	34.8
Al ₂ O ₃	19.9	21.6
Fe ₂ O ₃	5.0	4.6
TiO ₂	0.9	0.9
P ₂ O ₅	0.4	0.3
CaO	18.3	17.2
MgO	3.9	4.0
SO ₃	12.1	10.7
Na ₂ O	6.1	4.5
K ₂ O	0.1	0.2

Mine Operator MANALTA COAL LTD.
 Mine Location Estevan, Estevan Area, Saskatchewan
 Sec. 31, 32, 36, Tp. 1; R. 8, W2
 Name of Mine or Coal Utility Mine

Date Sampled	18-10-73
Weight Sampled (approx.).....tons	100
Size: Mine Designation	Power Plant Coal
Screen Openingin.	Minus $1\frac{1}{2}$
FRC Laboratory No.	3838-73
<u>Ultimate Analysis</u>	
Carbon	60.0
Hydrogen	4.4
Sulphur	0.3
Nitrogen	1.1
Ash	15.9
Oxygen (by difference)	18.3
<u>Ash Analysis</u>	
SiO ₂	39.7
Al ₂ O ₃	2.6
Fe ₂ O ₃	3.7
TiO ₂	0.9
P ₂ O ₅	0.1
CaO	13.5
MgO	3.3
SO ₃	5.6
Na ₂ O	5.8
K ₂ O	0.4

Mine Operator MANITOBA AND SASKATCHEWAN COAL CO.
 Mine Location Bienfait, Bienfait Area, Saskatchewan
 Sec. 11, Tp. 2; R. 6, W2
 Name of Mine or Coal M & S Strip Mine; Top Seam

Date Sampled	17-9-73	17-10-72	17-9-73
Weight Sampled (approx.).....tons	100	40	60
Size: Mine Designation	Slack	Pea	Slack
Screen Openingin.	Minus 2 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3841-73	3842-73	3843-73
<u>Ultimate Analysis</u>			
Carbon	66.4	66.9	66.8
Hydrogen	5.8	4.1	4.0
Sulphur	0.6	0.5	0.6
Nitrogen	1.2	1.1	1.2
Ash	10.4	10.6	11.3
Oxygen (by difference)	15.6	16.8	16.2
<u>Ash Analysis</u>			
SiO ₂	28.6	30.2	28.9
Al ₂ O ₃	20.0	20.0	20.8
Fe ₂ O ₃	5.9	5.4	5.5
TiO ₂	0.7	0.6	0.6
P ₂ O ₅	0.9	0.9	0.8
CaO	21.0	20.7	19.4
MgO	4.7	4.6	4.2
SO ₃	10.0	10.0	10.4
Na ₂ O	5.9	6.2	5.3
K ₂ O	0.1	0.1	0.2

B. ALBERTA

Mine Operator (THE) CANMORE MINES LTD. - No. 2
 Mine Location Canmore, Cascade Area, Alberta
 Tp. 24; R. 10, W5.
 Name of Mine or Coal Wilson Underground Mine; Wilson Seam

Date Sampled	4-10-73	4-10-73
Weight Sampled (approx.).....tons	45	200
Size: Mine Designation	Stoker	Clean Coal Product
Screen Openingin.	$1\frac{1}{4}$ sq to $\frac{1}{4}$ sl	Minus $1\frac{1}{4}$ sq
FRC Laboratory No.	3847-73	3846-73

Ultimate Analysis

Carbon	84.0	81.9
Hydrogen	3.8	3.6
Sulphur	0.7	0.7
Nitrogen	1.5	1.5
Ash	8.4	10.2
Oxygen (by difference)	1.5	2.1

Ash Analysis

SiO ₂	56.4	57.6
Al ₂ O ₃	31.9	30.4
Fe ₂ O ₃	3.8	3.1
TiO ₂	1.0	1.1
P ₂ O ₅	1.0	0.8
CaO	0.8	1.3
MgO	0.7	1.0
SO ₃	0.6	1.0
Na ₂ O	0.5	0.4
K ₂ O	1.1	1.7

Mine Operator CARDINAL RIVER COALS LTD. - No. 1768
 Mine Location Luscar, Mountain Park Area, Alberta
 Sec. 15, 16, 22, Tp. 47; R.24, W5
 Name of Mine or Coal Luscar Strip Mine

Date Sampled	26-9-73	26-9-73
Weight Sampled (approx.).....tons	150	200
Size: Mine Designation	Clean Coal Product	Raw Coal
Screen Openingin.	Minus 2 sq	Minus 2 sq
FRC Laboratory No.	3835-73	3836-73

Ultimate Analysis

Carbon	82.4	70.6
Hydrogen	5.1	4.7
Sulphur	0.2	0.2
Nitrogen	1.2	1.1
Ash	8.8	20.3
Oxygen (by difference)	2.3	3.1

Ash Analysis

SiO ₂	51.0	58.1
Al ₂ O ₃	28.6	27.2
Fe ₂ O ₃	4.4	3.7
TiO ₂	0.8	0.8
P ₂ O ₅	0.3	0.2
CaO	6.4	3.8
MgO	1.8	1.5
SO ₃	4.5	1.9
Na ₂ O	1.5	1.4
K ₂ O	0.3	1.0

Mine Operator CENTURY COALS LTD. - No. 1742
 Mine Location East Coulee, Drumheller Area, Alberta.
 Sec. 6, Tp. 27; R.18, W4
 Name of Mine or Coal Atlas (Underground) Mine, Seams 1 and 2

Date Sampled	9-10-73	9-10-73	9-10-73
Weight Sampled (approx.)..... tons	8	15	25
Size: Mine Designation	Nut	Stoker	Slack
Screen Openingin.	2 to $1\frac{3}{8}$ rd	$1\frac{3}{8}$ to $\frac{5}{8}$ rd	Minus $\frac{5}{8}$ rd
FRC Laboratory No.	3832-73	3833-73	3834-72
<u>Ultimate Analysis</u>			
Carbon	66.6	66.9	66.0
Hydrogen	4.4	4.5	4.4
Sulphur	0.5	0.5	0.5
Nitrogen	1.6	1.5	1.5
Ash	10.5	10.9	10.8
Oxygen (by difference)	16.4	15.7	16.8
<u>Ash Analysis</u>			
SiO ₂	-	48.7	48.2
Al ₂ O ₃	-	28.7	28.3
Fe ₂ O ₃	-	3.5	3.3
TiO ₂	-	0.4	0.4
P ₂ O ₅	-	0.8	0.7
CaO	-	8.1	9.0
MgO	-	1.4	1.3
SO ₃	-	3.4	4.0
Na ₂ O	-	4.8	4.8
K ₂ O	-	0.9	0.9

Mine Operator COLEMAN COLLIERIES LTD. - No. 1747
 Mine Location Coleman, Crowsnest Area, Alberta
 Sec. 19, Tp. 9; R.4, W5.
 Name of Mine or Coal Vicary Creek Underground Mine

Date Sampled	2-10-73
Weight Sampled (approx.).....tons	1400
Size: Mine Designation	Clean Coal Product
Screen Openingin.	Minus 2 sq
FRC Laboratory No.	3850-73

Ultimate Analysis

Carbon	%	82.3
Hydrogen	%	4.5
Sulphur	%	0.5
Nitrogen	%	1.2
Ash	%	8.6
Oxygen (by difference)	%	2.9

Ash Analysis

SiO ₂	%	42.8
Al ₂ O ₃	%	36.3
Fe ₂ O ₃	%	4.2
TiO ₂	%	1.8
P ₂ O ₅	%	1.7
CaO	%	5.6
MgO	%	0.9
SO ₃	%	4.3
Na ₂ O	%	0.5
K ₂ O	%	0.2

Mine Operator FORESTBURG COLLIERIES LTD. - No. 1578
 Mine Location Forestburg, Castor Area, Alberta
 Sec. 6, Tp. 41; R.15, W4
 Name of Mine or Coal Diplomat Strip Mine

Date Sampled	17-10-73	16-10-73	16-10-73
Weight Sampled (approx.).....tons	-	-	-
Size: Mine Designation	Feed to Power Plant	Stoker	Slack
Screen Openingin.	Minus 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3967-73	3968-73	3972-73
<u>Ultimate Analysis</u>			
Carbon	67.3	69.2	68.4
Hydrogen	4.5	4.8	4.5
Sulphur	0.6	0.4	0.5
Nitrogen	1.4	1.5	1.5
Ash	9.4	7.0	8.5
Oxygen (by difference)	16.7	17.1	16.6
<u>Ash Analysis</u>			
SiO ₂	35.9	30.4	30.8
Al ₂ O ₃	22.5	20.7	20.6
Fe ₂ O ₃	5.7	5.7	6.1
TiO ₂	0.4	0.4	0.4
P ₂ O ₅	1.4	1.7	1.5
CaO	18.6	22.9	21.8
MgO	2.2	2.9	2.6
SO ₃	10.0	14.1	14.0
Na ₂ O	2.2	1.3	1.3
K ₂ O	0.7	0.6	0.6

Mine Operator MANALTA COAL LTD. - No. 443
 Mine Location Sheerness, Sheerness Area, Alberta
 Sec. 13, Tp. 29; R.13, W4
 Name of Mine or Coal Roselyn Strip Mine

Date Sampled	11-10-73	11-10-73	11-10-73
Weight Sampled (approx.).....tons	20	40	20
Size: Mine Designation	Nut	Stoker	Slack
Screen Openingin.	3 to 1 1/2 rd	1 1/2 rd to 1 1/4 sq	Minus 1/4 sq
FRC Laboratory No.	3827-73	3828-73	3829-73
<u>Ultimate Analysis</u>			
Carbon	67.9	68.7	68.0
Hydrogen	4.4	4.4	6.2
Sulphur	0.6	0.5	0.8
Nitrogen	1.5	1.3	1.5
Ash	8.2	8.1	10.6
Oxygen (by difference)	17.4	16.9	12.9
<u>Ash Analysis</u>			
SiO ₂	-	26.1	30.1
Al ₂ O ₃	-	19.4	18.4
Fe ₂ O ₃	-	18.8	20.0
TiO ₂	-	0.5	0.4
P ₂ O ₅	-	0.4	0.3
CaO	-	17.7	13.5
MgO	-	2.4	1.9
SO ₃	-	11.8	11.6
Na ₂ O	-	2.9	2.2
K ₂ O	-	0.3	0.4

Mine Operator MANALTA COAL LTD. - No. 1046
 (Battle River Coal Division)
 Mine Location Halkirk, Castor Area, Alberta
 Sec. 20, Tp. 40; R.15, W4
 Name of Mine or Coal Vesta Strip Mine

Date Sampled	15-10-73	15-10-73	15-10-73
Weight Sampled (approx.).....tons	-	-	-
Size: Mine Designation	Feed to	Stoker	Slack
Screen Openingin.	Power Plant Minus 1 sq	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq
FRC Laboratory No.	3976-73	3975-73	3978-73
<u>Ultimate Analysis</u>			
Carbon	65.7	67.4	67.7
Hydrogen	4.5	4.5	4.5
Sulphur	0.4	0.4	0.6
Nitrogen	1.5	1.5	1.5
Ash	11.1	8.5	9.6
Oxygen (by difference)	16.8	17.7	16.1
<u>Ash Analysis</u>			
SiO ₂	38.6	34.0	34.9
Al ₂ O ₃	24.8	24.6	23.2
Fe ₂ O ₃	5.6	5.2	5.8
TiO ₂	0.5	0.3	0.5
P ₂ O ₅	1.0	1.2	1.0
CaO	13.7	16.9	15.3
MgO	1.2	1.3	1.3
SO ₃	8.5	10.0	10.8
Na ₂ O	4.2	5.2	4.9
K ₂ O	0.9	0.4	0.7

Mine Operator MANALTA COAL LTD. - No. 1757
 Mine Location Wabamun, Pembina Area, Alberta
 Sec. 14 and 15, Tp. 53; R4. W5
 Name of Mine or Coal Whitewood Strip Mine; Seams 1, 2, 3, 4 and 5.

Date Sampled	7-9-73
Weight Sampled (approx.).....tons	250

Size: Mine Designation	Feed to Power Plant
Screen Opening	Minus $\frac{3}{4}$ in.

FRC Laboratory No.	3844-73
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Ultimate Analysis

Carbon	58.4
Hydrogen	3.5
Sulphur	0.3
Nitrogen	0.8
Ash	21.4
Oxygen (by difference)	15.7

Ash Analysis

SiO ₂	53.5
Al ₂ O ₃	21.8
Fe ₂ O ₃	4.4
TiO ₂	0.6
P ₂ O ₅	0.1
CaO	9.1
MgO	1.8
SO ₃	3.4
Na ₂ O	0.5
K ₂ O	1.4

Mine Operator MANALTA COAL LTD. - No. 1769
 Mine Location Wabamun, Pembina Area, Alberta
 Sec. 29, Tp. 52; R.4, W5
 Name of Mine or Coal Highvale Strip Mine; Seams 1 and 2

Date Sampled 7-9-73

Weight Sampled (approx.).....tons 125

Size: Mine Designation Feed to Power Plant Coal
 Screen Openingin. Minus $\frac{3}{4}$

FRC Laboratory No. 3845-73

Ultimate Analysis

Carbon% 62.3
 Hydrogen% 3.6
 Sulphur% 0.2
 Nitrogen% 0.8
 Ash% 18.1
 Oxygen (by difference)% 15.0

Ash Analysis

SiO₂% 48.4
 Al₂O₃% 27.6
 Fe₂O₃% 3.4
 TiO₂% 0.6
 P₂O₅% 0.1
 CaO% 10.8
 MgO% 0.9
 SO₃% 2.6
 Na₂O% 2.2
 K₂O% 0.7

Mine Operator McINTYRE PORCUPINE MINES LTD. - No. 1765, No. 1771
 Mine Location Grand Cache, Smoky River Area, Alberta
 Name of Mine or Coal McIntyre Underground Mine (No. 2); No. 4 Seam
 McIntyre Strip Mine (No. 8)

Date Sampled	24-9-73
Weight Sampled (approx.)..... tons	400

Size: Mine Designation	Clean Coal Product
Screen Opening in.	Minus $1\frac{1}{2}$ sq

FRC Laboratory No.	3837-73
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Ultimate Analysis

Carbon	%	80.1
Hydrogen	%	4.9
Sulphur	%	0.6
Nitrogen	%	1.2
Ash	%	8.8
Oxygen (by difference)	%	4.4

Ash Analysis

SiO ₂	%	52.9
Al ₂ O ₃	%	30.5
Fe ₂ O ₃	%	4.8
TiO ₂	%	1.2
P ₂ O ₅	%	1.3
CaO	%	3.9
MgO	%	0.9
SO ₃	%	2.5
Na ₂ O	%	0.9
K ₂ O	%	0.7

Mine Operator STAR-KEY MINES LTD. - No. 1626
 Mine Location St. Albert, Edmonton Area, Alberta
 Sec. 35, Tp. 54; R.25, W4.
 Name of Mine or Coal Star-Key

Date Sampled	22-10-73	22-10-73	22-10-73	22-10-73	22-10-73
Weight Sampled (approx.).....tons	75	75	15	15	10
Size: Mine Designation	Lump	Stove	Nut	Stoker	Slack
Screen Openingin.	Plus 4½ rd	4½ to 2 sq	2 to 1/8 sq	1½ to 3/8 sq	Minus 3/8 sq
FRC Laboratory No.	3960-73	3961-73	3962-73	3963-73	3964-73
<u>Ultimate Analysis</u>					
Carbon	65.6	65.5	64.8	65.3	61.7
Hydrogen	4.3	4.3	4.4	4.2	3.9
Sulphur	0.3	0.4	0.4	0.4	0.5
Nitrogen	1.3	1.3	1.3	1.3	1.3
Ash	11.2	11.4	13.1	12.0	16.8
Oxygen (by difference)	19.3	17.1	16.0	16.8	15.8
<u>Ash Analysis</u>					
SiO ₂	-	-	-	46.2	46.1
Al ₂ O ₃	-	-	-	29.1	28.2
Fe ₂ O ₃	-	-	-	4.1	4.7
TiO ₂	-	-	-	0.4	0.4
P ₂ O ₅	-	-	-	0.4	0.3
CaO	-	-	-	10.2	11.4
MgO	-	-	-	1.0	1.0
SO ₃	-	-	-	5.0	5.0
Na ₂ O	-	-	-	4.1	4.2
K ₂ O	-	-	-	0.7	0.6

Mine Operator KAISER RESOURCES LTD.
 Mine Location Michel-Natal, East Kootenay District, B.C.
 Name of Mine or Coal Elkview Plant; Balmer Seam.

Date Sampled	2-10-73	2-10-73
Weight Sampled (approx.).....tons	6700	200
Size: Mine Designation	Clean Coal Product (Elkview Plant)	Oxidized Coal
Screen Openingin.	Minus $1\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3848-73	3849-73
<u>Ultimate Analysis</u>		
Carbon	81.9	73.7
Hydrogen	4.6	3.8
Sulphur	0.3	0.2
Nitrogen	1.1	1.1
Ash	9.9	14.5
Oxygen (by difference)	2.2	6.7
<u>Ash Analysis</u>		
SiO ₂	61.0	61.6
Al ₂ O ₃	29.6	31.8
Fe ₂ O ₃	2.8	1.6
TiO ₂	1.3	1.3
P ₂ O ₅	0.8	0.5
CaO	2.4	1.4
MgO	0.4	0.4
SO ₃	1.2	0.4
Na ₂ O	0.1	0.1
K ₂ O	0.1	0.6

