Mines Branch Information Circular IC 291

EVALUATION OF CANADIAN COMMERCIAL COALS: SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA - 1971

by

T. E. Tibbetts*

ABSTRACT

The physical and chemical analyses of forty-nine coal samples 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 1971. They represent the production on a specified day of the coals as commercially prepared at the mine or, referring to the channel samples, the coal seam where mining was in progress or planned.

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Direction des mines Circulaire d'information IC 291

EVALUATION DES HOUILLES COMMERCIALES CANADIENNES: SASKATCHEWAN, ALBERTA ET COLOMBIE-BRITANNIQUE - 1971

par

T. E. Tibbetts*

RÉSUMÉ

L'auteur décrit les résultats d'analyses physiques et chimiques de 49 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 1971 par le Centre de recherche sur les combustibles. Ils sont représentatifs de la production journalière de la houille préparée commercialement à la mine, ou, dans le cas des échantillons de veines, de la couche de houille où l'extraction était en cours ou projetée.

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*Name changed to Manalta Coal Ltd., 21 February, 1972.

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COAL AREAS AND PRINCIPAL MINES

(with approximate production in 1971 in thousands of short tons)

SASKATCHEWAN

(SOURIS VALLEY AREA)

Battle River Coal Co. Ltd.	585
Manitoba and Saskatchewan Coal Company Limited	550
Utility Coals Limited	2,100

ALBERTA

1. Subbituminous

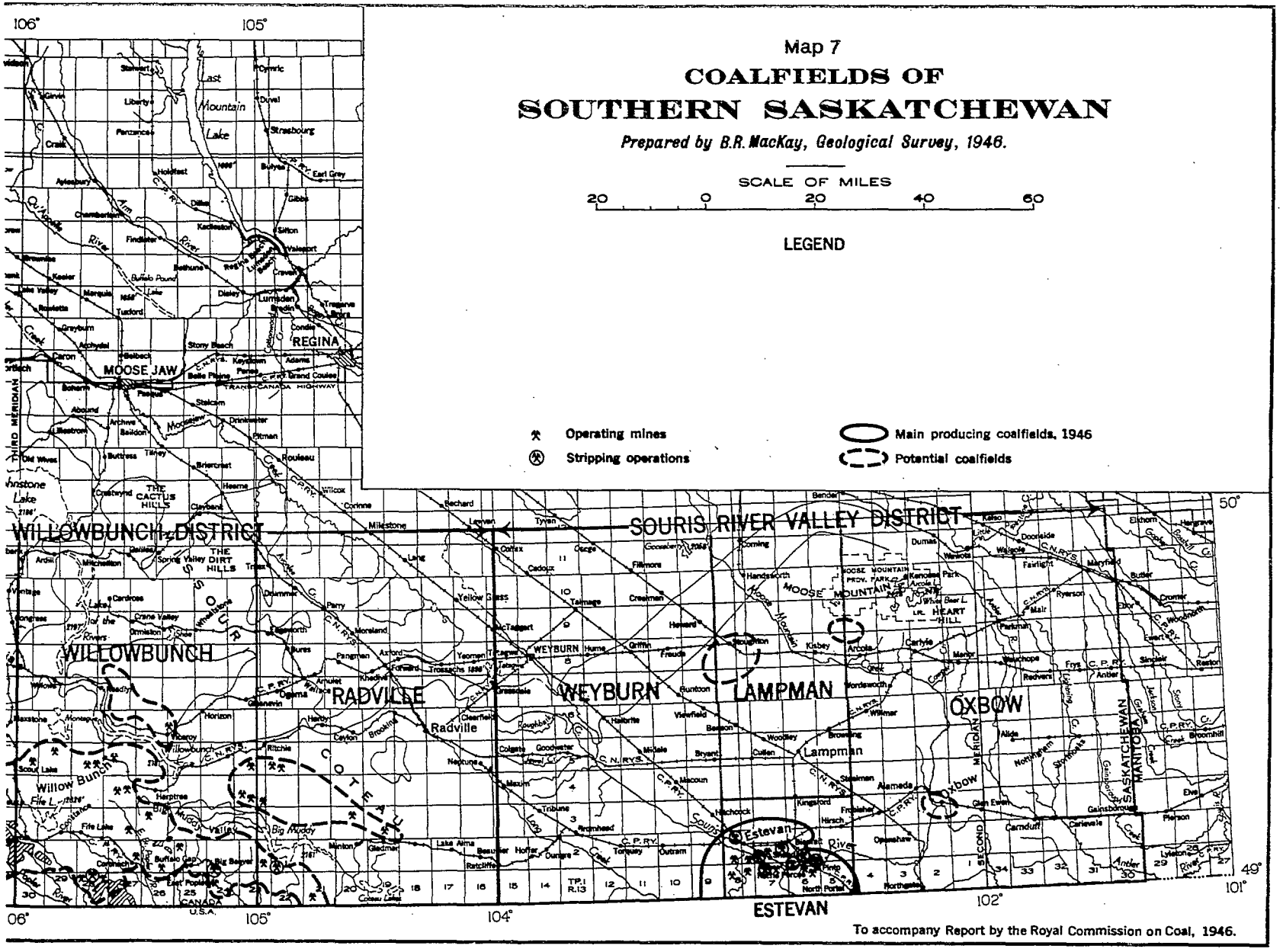
Castor Area	
Alberta Coal Ltd. (Vesta Mine) (No. 1046)	300
Forestburg Collieries Ltd. (No. 1578)	560
Drumheller Area	
Century Coals Limited (No. 1742)	60
Edmonton Area	
Star-Key Mines Ltd. (No. 1626)	24
Pembina Area	
Alberta Coal Ltd. (Whitewood Mine) (No. 1757)	2,200
Warburg Coal Co. Ltd. (No. 1670)	12
Sheerness Area	
Alberta Coal Ltd. (Roselyn Mine) (No. 443)	16

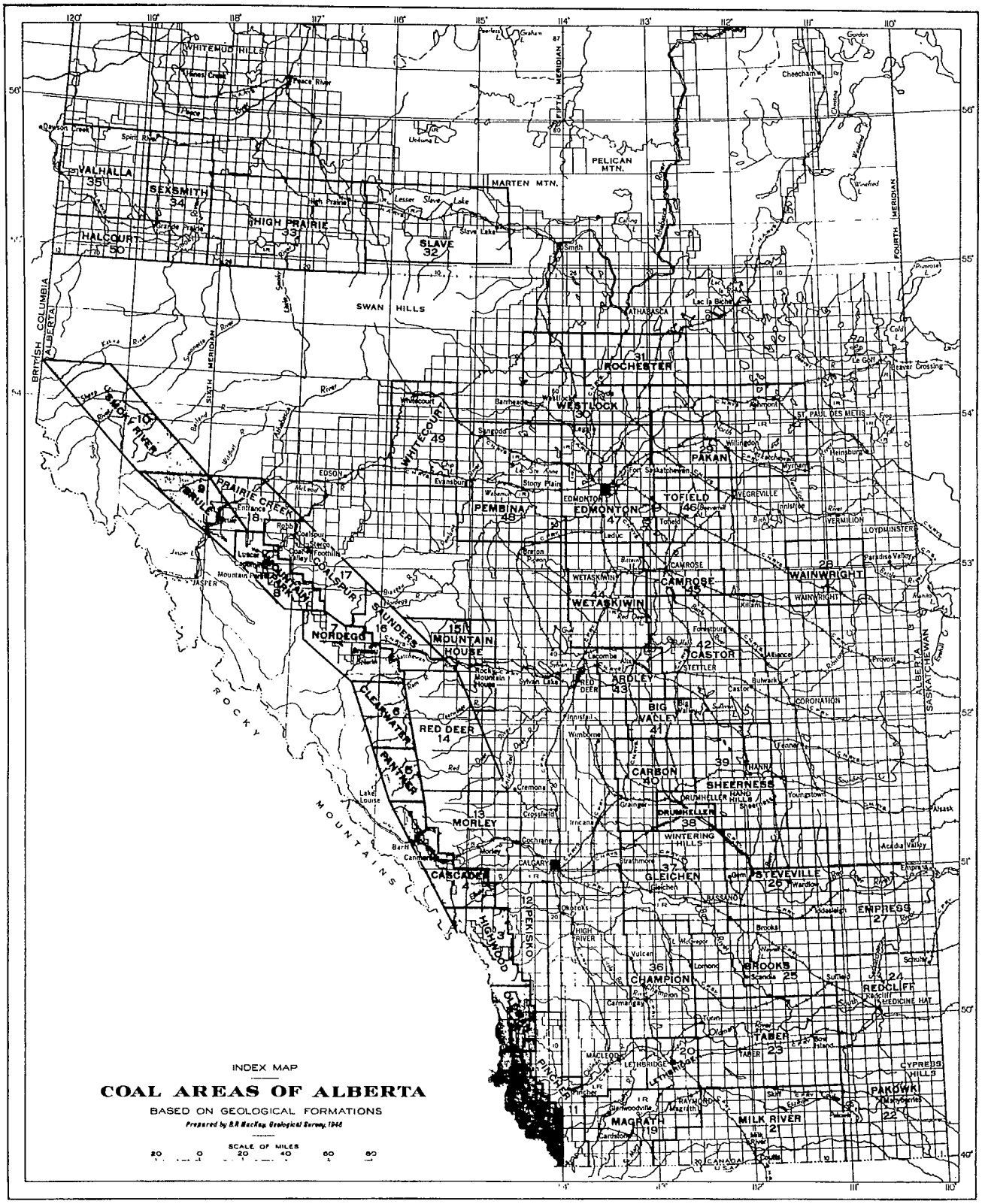
2. Bituminous

Cascade Area	
The Canmore Mines Ltd. (No. 2)	370
Crowsnest Area	
Coleman Collieries Ltd. (Nos. 1695, 1747, 1764)	1,019
Mountain Park Area	
Cardinal River Coals Ltd. (No. 1768)	1,000
Smokey River Area	
McIntyre Porcupine Coal Mines Ltd. (No. 1765)	2,230

BRITISH COLUMBIA

East Kootenay District	
Kaiser Resources Limited	4,600


Map 7
COALFIELDS OF
SOUTHERN SASKATCHEWAN
Prepared by B.R. MacKay, Geological Survey, 1946.
SCALE OF MILES
20 0 20 40 60
LEGEND
Operating mines
Stripping operations
Main producing coalfields, 1946
Potential coalfields
WILLOWBUNCH DISTRICT
SOURIS RIVER VALLEY DISTRICT
WILLOWBUNCH
RADVILLE
WEYBURN
LAMPMAN
OXBOW
ESTEVAN
REGINA
MOOSE JAW
106°
105°
104°
102°
101°
50°
49°
To accompany Report by the Royal Commission on Coal, 1946.


INDEX MAP
COAL AREAS OF ALBERTA
BASED ON GEOLOGICAL FORMATIONS
Prepared by R.R. MacKay, Geological Survey, 1946
SCALE OF MILES
20 0 20 40 60 80
WHITEMUD HILLS
PELICAN MTN.
MARTEN MTN.
SWAN HILLS
ATHABASCA
VALHALLA 35
SEXSMITH 34
HIGH PRAIRIE 33
HALCOURT 50
SLAVE 32
ROCHESTER 31
WESTLOCK 30
WHITECOURT 49
PEMBINA 48
EDMONTON 47
PAKAN 45
TOFIELD 46
CAMROSE 44
WAINWRIGHT 28
WETASKIWIN
NORDEGG 7
MOUNTAIN HOUSE 15N
CASTOR 42
ARDLEY 43
RED DEER 14
BIG VALLEY 41
CARBON 40
SHEERNESS 39
DRUMHELLER 38
MORLEY 13
CASCADE 4
WINTERING HILLS 37
GLEICHEN
STEVEVILLE 26
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REDCLIFF 24
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LETHBRIDGE 20
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MILK RIVER 2
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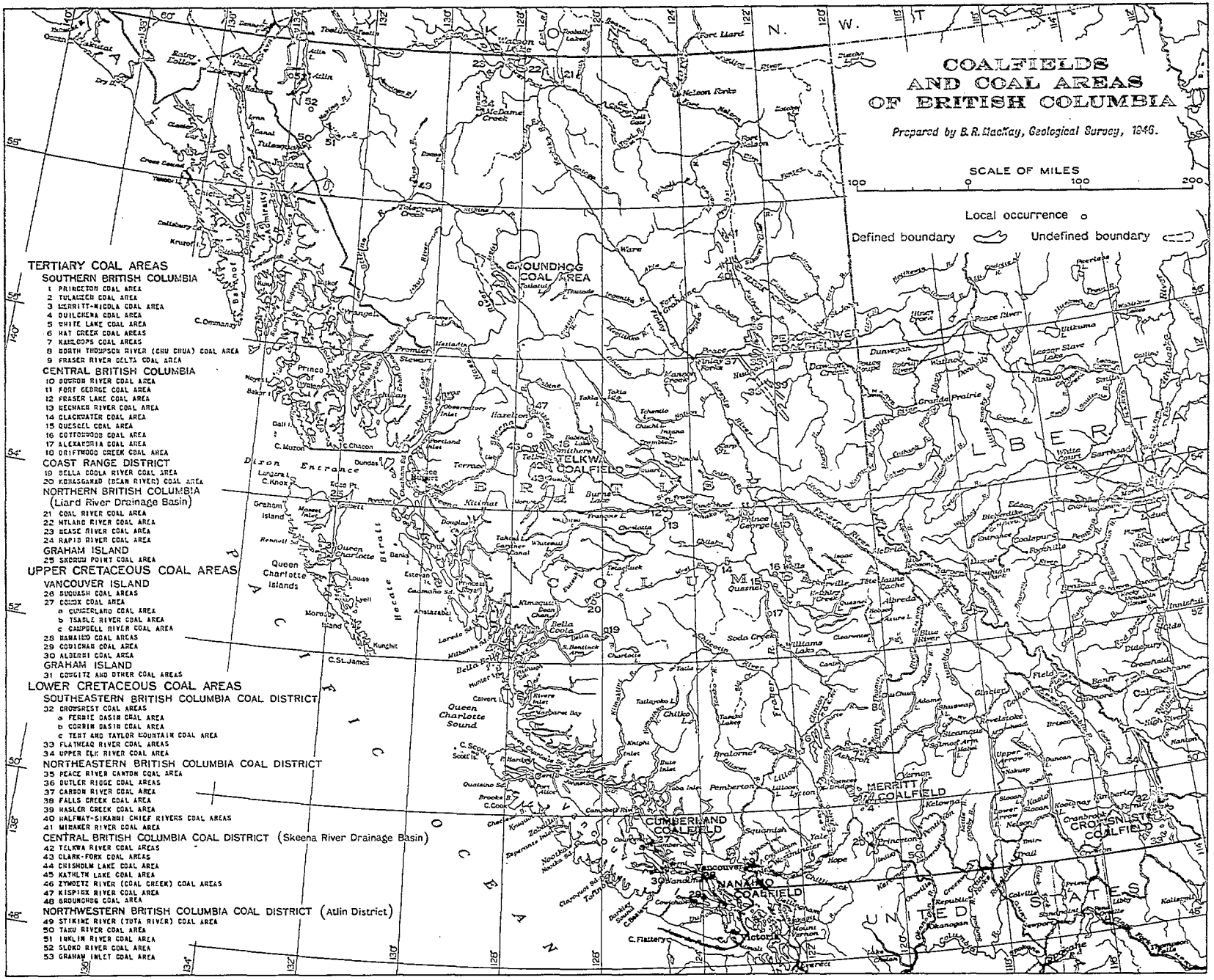
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
FIFTH MERIDIAN
SIXTH MERIDIAN
FOURTH MERIDIAN
CANADA
U.S.A.


COALFIELDS
AND COAL AREAS
OF BRITISH COLUMBIA
Prepared by R. R. MacKay, Geological Survey, 1946.
SCALE OF MILES
100 0 100 200
Local occurrence
Defined boundary
Undefined boundary
TERTIARY COAL AREAS
SOUTHERN BRITISH COLUMBIA
1 PRINCETON COAL AREA
2 TULAMEEN COAL AREA
3 MERRITT-NICOLA COAL AREA
4 QUILCHENA COAL AREA
5 WHITE LAKE COAL AREA
6 HAT CREEK COAL AREAS
7 KAMLOOPS COAL AREAS
8 NORTH THOMPSON RIVER (CHU CHUA) COAL AREA
9 FRASER RIVER DELTA COAL AREA
CENTRAL BRITISH COLUMBIA
10 BOWRON RIVER COAL AREA
11 FORT GEORGE COAL AREA
12 FRASER LAKE COAL AREA
13 BECHAKA RIVER COAL AREA
14 BLACKWATER COAL AREA
15 QUESSEL COAL AREA
16 COTTONWOOD COAL AREA
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18 DRIFTWOOD CREEK COAL AREA
COAST RANGE DISTRICT
19 BELLA COOLA RIVER COAL AREA
20 KOMAGANAD (DEAN RIVER) COAL AREA
NORTHERN BRITISH COLUMBIA
(Liard River Drainage Basin)
21 COAL RIVER COAL AREA
22 MTLARD RIVER COAL AREA
23 BEASE RIVER COAL AREA
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27 COMOX COAL AREA
a CUMBERLAND COAL AREA
b TSABLE RIVER COAL AREA
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28 HAMAIEO COAL AREAS
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30 ALBERNI COAL AREA
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31 COUGITZ AND OTHER COAL AREAS
LOWER CRETACEOUS COAL AREAS
SOUTHEASTERN BRITISH COLUMBIA COAL DISTRICT
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a FERNIE BASIN COAL AREA
b CORRIN BASIN COAL AREA
c TENT AND TAYLOR MOUNTAIN COAL AREA
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35 PEACE RIVER CANYON COAL AREA
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51 INKLIN RIVER COAL AREA
52 SLOKO RIVER COAL AREA
53 GRAHAM INLET COAL AREA
GROUNDHOG COAL AREA
TELKWA COALFIELD
MERRITT COALFIELD
CUMBERLAND COALFIELD
NANAIMO COALFIELD
CROWSNEST COALFIELD
ALBERTA
PACIFIC OCEAN
UNITED STATES

INTRODUCTION

This publication contains the analyses of commercial coal samples collected in Saskatchewan, Alberta and British Columbia during 1971, under the project entitled "Evaluation of Canadian Commercial Coals". All analyses were conducted by the Fuels Research Centre. The analyses of lignite coals from Saskatchewan are reported in Section I on the equilibrium "in situ" moisture basis. On the same basis, analyses 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 and the chemical analyses of ash of selected samples are reported in Section IV.

In order to follow coal quality and to ensure that changes in quality are not due to improper sampling, the Fuels Research Centre has sampled commercial coals at the mines in eastern and western Canada since 1954. The project is conducted under the direction of the Coal and Peat Resources Evaluation Section.

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 non-producing mines, channel samples were taken to permit some assessment of the quality of the coal. 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 ..... BATTLE RIVER COAL CO. LTD.*

Mine Location ..... Estevan, Estevan Area, Saskatchewan

Name of Mine or Coal ..... Klimax Mine

Date Sampled	19-10-71	19-10-71	19-10-71	19-10-71
Weight Sampled (approx.) .....tons	60	20	40	40
Size: Mine Designation	Egg	Booker	Pea	Bug Dust
Screen Opening .....in.	4 to 2 sq	2 to 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	2942-71	2943-71	2944-71	2945-71
Proximate Analysis				
Moisture .....%	34.6	34.2	34.0	32.4
Ash .....%	6.1	6.5	7.2	8.7
Volatile Matter .....%	27.3	26.7	27.3	28.7
Fixed Carbon .....%	32.0	32.6	31.5	30.2
Sulphur .....%	0.6	0.6	0.8	1.0
Calorific Value .....Btu/lb.	7220	7160	7260	7320
Ash Fusibility				
Initial Temp. .....°F	2400	2430	2320	2000
Softening Temp: (a) Spherical .....°F	2450	2450	2390	2200
(b) Hemispherical.....°F	2480	2480	2420	2250
Fluid Temp. .....°F	2530	2540	2470	2310
Grindability Index (Hardgrove)	42	45	-	62
Free Swelling Index (ASTM)	-	-	-	-
Classification by Rank (ASTM)	Lignite A			

* A division of Alberta Coal Ltd.

Mine Operator ..... MANITOBA AND SASKATCHEWAN COAL CO. LIMITED

Mine Location ..... Bienfait, Bienfait Area, Saskatchewan

Name of Mine or Coal ..... M & S Mine

Date Sampled	20-10-71	20-10-71	20-10-71	20-10-71	20-10-71
Weight Sampled (approx.) .....tons	12	40	30	40	10
Size: Mine Designation	Cobble	Egg	Booker	Pea	Bug Dust
Screen Opening .....in.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ rd to 2 sq	2 to 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	2936-71	2937-71	2938-71	2939-71	2940-71
Proximate Analysis					
Moisture .....%	34.6	34.0	31.8	32.7	31.8
Ash .....%	5.9	5.9	7.1	7.0	8.8
Volatile Matter .....%	27.8	27.9	27.1	27.0	27.1
Fixed Carbon .....%	31.7	32.2	34.0	33.3	32.3
Sulphur .....%	0.4	0.4	0.4	0.4	0.6
Calorific Value .....Btu/lb.	7300	7290	7670	7430	-
Ash Fusibility					
Initial Temp. .....°F	2100	2000	1850	2000	1940
Softening Temp: (a) Spherical .....°F	2130	2060	2050	2140	2060
(b) Hemispherical.....°F	2160	2150	2120	2160	2110
Fluid Temp. .....°F	2190	2200	2230	2250	2360
Grindability Index (Hardgrove)	35	40	41	44	51
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Lignite A				

Mine Operator ..... UTILITY COALS LTD.

Mine Location ..... Estevan, Estevan Area, Saskatchewan

Name of Mine or Coal ..... Utility Mine

Date Sampled	19-10-71
Weight Sampled (approx.) .....tons	35
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus 2
FRC Laboratory No.	2941-71
Proximate Analysis	
Moisture .....%	33.1
Ash .....%	10.8
Volatile Matter .....%	24.8
Fixed Carbon .....%	31.3
Sulphur .....%	0.4
Calorific Value .....Btu/lb.	6760
Ash Fusibility	
Initial Temp. .....°F	2000
Softening Temp: (a) Spherical .....°F	2070
(b) Hemispherical.....°F	2190
Fluid Temp. .....°F	2400
Grindability Index (Hardgrove)	49
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Lignite A

SECTION II

SUBBITUMINOUS COALS

FROM

ALBERTA

(Analyses are reported on the Equilibrium Moisture Basis.)

Mine Operator ..... ALBERTA COAL LTD.* - No. 443

Mine Location ..... Sheerness, Sheerness Area, Alberta

Name of Mine or Coal ..... Roselyn Mine

Date Sampled	24-11-71	24-11-71	24-11-71	24-11-71	24-11-71
Weight Sampled (approx.) .....tons	18	8	15	35	20
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Opening .....in.	10 to 6 rd	6 to 3 rd	3 to $1\frac{1}{2}$ rd	$1\frac{1}{2}$ rd to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$sq
FRC Laboratory No.	3085-71	3086-71	3087-71	3088-71	3089-71
Proximate Analysis					
Moisture .....%	26.9	26.9	26.7	27.1	27.1
Ash .....%	6.6	6.2	6.7	6.3	6.9
Volatile Matter .....%	30.5	29.3	29.7	29.5	29.6
Fixed Carbon .....%	46.0	37.6	36.9	37.1	36.4
Sulphur .....%	0.5	0.4	0.5	0.5	0.7
Calorific Value .....Btu/lb.	8110	8150	8000	8040	8050
Ash Fusibility					
Initial Temp. .....°F	1980	1950	1980	1980	1980
Softening Temp: (a) Spherical .....°F	2020	2000	2050	2040	2040
(b) Hemispherical.....°F	2090	2030	2100	2090	2080
Fluid Temp. .....°F	2150	2080	2200	2250	2300
Grindability Index (Hardgrove)	-	-	-	28	30
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Subbituminous C				

*Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1046

Mine Location ..... Halkirk, Castor Area, Alberta

Name of Mine or Coal ..... Vesta Mine

Date Sampled	15-11-71	15-11-71	15-11-71
Weight Sampled (approx.) .....tons	50	35	25
Size: Mine Designation	Lump	Egg	Nut
Screen Opening .....in.	Plus $4\frac{1}{2}$ sq	$4\frac{1}{2}$ to 2 sq	2 to 1 sq
FRC Laboratory No.	3051-71	3052-71	3053-71
Proximate Analysis			
Moisture .....%	24.9	25.1	25.5
Ash .....%	6.7	7.3	7.5
Volatile Matter .....%	30.6	30.1	29.6
Fixed Carbon .....%	47.8	37.5	37.4
Sulphur .....%	0.4	0.3	0.4
Calorific Value .....Btu/lb.	8620	8500	8390
Ash Fusibility			
Initial Temp. .....°F	1950	2000	2000
Softening Temp: (a) Spherical .....°F	2080	2100	2100
(b) Hemispherical.....°F	2180	2210	2210
Fluid Temp. .....°F	2500	2500	2450
Grindability Index (Hardgrove)	-	-	-
Free Swelling Index (ASTM)	-	-	-
Classification by Rank (ASTM)	Subbituminous C		

*Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1046

Mine Location ..... Halkirk, Castor Area, Alberta

Name of Mine or Coal ..... Vesta Mine

Date Sampled	15-11-71	15-11-71	15-11-71
Weight Sampled (approx.) .....tons	60	40	100
Size: Mine Designation	Stoker	Slack	Pit Run+
Screen Opening .....in.	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq	Minus 1
FRC Laboratory No.	3054-71	3055-71	3056-71
Proximate Analysis			
Moisture .....%	25.6	25.6	26.3
Ash .....%	7.0	8.0	8.1
Volatile Matter .....%	40.1	28.5	28.7
Fixed Carbon .....%	37.3	37.9	36.9
Sulphur .....%	0.4	0.5	0.5
Calorific Value .....Btu/lb.	8530	8350	8150
Ash Fusibility			
Initial Temp. .....°F	1990	1980	2010
Softening Temp: (a) Spherical .....°F	2080	2090	2110
(b) Hemispherical.....°F	2150	2170	2350
Fluid Temp. .....°F	2400	2700	2700
Grindability Index (Hardgrove)	31	32	33
Free Swelling Index (ASTM)	-	-	-
Classification by Rank (ASTM)	Subbituminous C		

*Name changed to Manalta Coal Ltd.
+Crushed at power plant.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1757

Mine Location ..... Wabamun, Pembina Area, Alberta

Name of Mine or Coal ..... Whitewood Mine

Date Sampled	12-10-72
Weight Sampled (approx.) .....tons	100
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus $\frac{3}{4}$
FRC Laboratory No.	2951-71
Proximate Analysis	
Moisture .....%	20.6
Ash .....%	15.2
Volatile Matter .....%	26.3
Fixed Carbon .....%	37.9
Sulphur .....%	0.2
Calorific Value .....Btu/lb.	7820
Ash Fusibility	
Initial Temp. .....°F	2150
Softening Temp: (a) Spherical .....°F	2310
(b) Hemispherical.....°F	2450
Fluid Temp. .....°F	2650
Grindability Index (Hardgrove)	47
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Subbituminous B

*Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1769

Mine Location ..... Wabamun, Pembina Area, Alberta

Name of Mine or Coal ..... Highvale Mine

Date Sampled	12-10-71
Weight Sampled (approx.) .....tons	100
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus $\frac{3}{4}$
FRC Laboratory No.	2952-71
Proximate Analysis	
Moisture .....%	18.1
Ash .....%	14.7
Volatile Matter .....%	27.0
Fixed Carbon .....%	40.2
Sulphur .....%	0.3
Calorific Value .....Btu/lb.	8285
Ash Fusibility	
Initial Temp. .....°F	2250
Softening Temp: (a) Spherical .....°F	2360
(b) Hemispherical.....°F	2420
Fluid Temp. .....°F	2500
Grindability Index (Hardgrove)	45
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Subbituminous B

*Name changed to Manalta Coal Ltd.

Mine Operator ..... CENTURY COALS LTD. - No. 1742

Mine Location ..... East Coulee, Drumheller Area, Alberta

Name of Mine or Coal ..... Atlas

Date Sampled	23-11-71	23-11-71	23-11-71	23-11-71	23-11-71
Weight Sampled (approx.) .....tons	45	35	20	25	38
Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Opening .....in.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ to 2 rd	2 to $1\frac{3}{8}$ rd	$1\frac{3}{8}$ to $\frac{5}{8}$ rd	Minus $\frac{5}{8}$ rd
FRC Laboratory No.	3081-71	3081-71	3082-71	3083-71	3084-71
Proximate Analysis					
Moisture .....%	19.1	18.9	19.0	19.2	19.3
Ash .....%	6.9	7.7	9.0	8.7	9.2
Volatile Matter .....%	31.7	31.2	30.0	31.9	30.5
Fixed Carbon .....%	42.3	42.2	42.0	40.2	41.0
Sulphur .....%	0.4	0.5	0.7	0.7	0.4
Calorific Value .....Btu/lb.	9460	9360	9130	9120	9020
Ash Fusibility					
Initial Temp. .....°F	2000	2120	2320	2200	2090
Softening Temp: (a) Spherical .....°F	2100	2260	2360	2360	2250
(b) Hemispherical.....°F	2180	2460	2440	2410	2510
Fluid Temp. .....°F	2450	2590	2530	2550	2670
Grindability Index (Hardgrove)	-	-	-	35	34
Free Swelling Index (ASTM)	-	-	-	-	-
Classification by Rank (ASTM)	Subbituminous B				

Mine Operator ..... EGG LAKE COAL CO. LTD. - No. 1582

Mine Location ..... Morinville, Edmonton Area, Alberta

Name of Mine or Coal ..... Egg Lake (North Pit)

Date Sampled	13-10-71
Weight Sampled (approx.) .....tons	-
Size: Mine Designation	Channel Sample
Screen Opening .....in.	-
FRC Laboratory No.	2953-71
Proximate Analysis	
Moisture .....%	25.9
Ash .....%	7.0
Volatile Matter .....%	30.3
Fixed Carbon .....%	36.8
Sulphur .....%	0.3
Calorific Value .....Btu/lb.	8140
Ash Fusibility	
Initial Temp. .....°F	2060
Softening Temp: (a) Spherical .....°F	2360
(b) Hemispherical.....°F	2410
Fluid Temp. .....°F	2470
Grindability Index (Hardgrove)	29
Free Swelling Index (ASTM)	-
Classification by Rank (ASTM)	Subbituminous C

Mine Operator ..... FORESTBURG COLLIERIES LTD. - No. 1578

Mine Location ..... Forestburg, Castor Area, Alberta

Name of Mine or Coal ..... Diplomat Mine

Date Sampled	16-11-71	16-11-71	16-11-71
Weight Sampled (approx.) .....tons	40	20	25
Size: Mine Designation	Lump	Egg	Nut
Screen Opening .....in.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ to 2 rd	2 rd to $1\frac{1}{4}$ sq
FRC Laboratory No.	3045-71	3046-71	3047-71
Proximate Analysis			
Moisture .....%	27.8	25.7	25.3
Ash .....%	5.5	5.9	6.1
Volatile Matter .....%	30.2	29.8	29.6
Fixed Carbon .....%	36.5	38.6	39.0
Sulphur .....%	0.4	0.6	0.3
Calorific Value .....Btu/lb.	8350	8640	8760
Ash Fusibility			
Initial Temp. .....°F	1990	2050	1950
Softening Temp: (a) Spherical .....°F	2070	2100	2010
(b) Hemispherical.....°F	2210	2170	2080
Fluid Temp. .....°F	2470	2320	2450
Grindability Index (Hardgrove)	-	-	-
Free Swelling Index (ASTM)	-	-	-
Classification by Rank (ASTM)	Subbituminous C		

Mine Operator ..... FORESTBURG COLLIERIES LTD. - No. 1578

Mine Location ..... Forestburg, Castor Area, Alberta

Name of Mine or Coal ..... Diplomat Mine

Date Sampled	16-11-71	16-11-71	16-11-71
Weight Sampled (approx.) .....tons	40	30	100
Size: Mine Designation	Stoker	Slack	Pit Run+
Screen Opening .....in.	$1\frac{1}{4}$ sq to $\frac{1}{2}$ sl	Minus $\frac{1}{2}$ sl	Minus 1
FRC Laboratory No.	3048-71	3049-71	3050-71
Proximate Analysis			
Moisture .....%	25.2	26.0	26.0
Ash .....%	6.5	6.8	10.0
Volatile Matter .....%	29.2	29.8	28.3
Fixed Carbon .....%	39.1	37.4	35.7
Sulphur .....%	0.5	0.5	0.5
Calorific Value .....Btu/lb.	8640	8510	7980
Ash Fusibility			
Initial Temp. .....°F	2130	1990	2100
Softening Temp: (a) Spherical .....°F	2160	2150	2310
(b) Hemispherical.....°F	2320	2210	2490
Fluid Temp. .....°F	2540	2300	2700
Grindability Index (Hardgrove)	31	33	33
Free Swelling Index (ASTM)	-	-	-
Classification by Rank (ASTM)	Subbituminous C		

+Crushed at power plant.

Mine Operator ..... STAR-KEY MINES LTD. - No. 1626

Mine Location ..... St. Albert, Edmonton Area, Alberta

Name of Mine or Coal ..... Star-Key Mine

Date Sampled	14-10-71	14-10-71	14-11-71	14-10-71	14-10-71
Weight Sampled (approx.) .....tons	80	40	30	40	20
Size: Mine Designation	Lump	Stove	Nut	Stoker	Slack
Screen Opening .....in.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ rd 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.	2946-71	2947-71	2948-71	2949-71	2950-71
Proximate Analysis					
Moisture .....%	23.2	24.2	22.4	23.2	23.3
Ash .....%	8.7	7.9	9.9	10.2	10.5
Volatile Matter .....%	29.6	29.1	28.0	28.1	27.7
Fixed Carbon .....%	38.5	38.8	39.7	38.5	38.5
Sulphur .....%	0.2	0.3	0.3	0.3	0.3
Calorific Value .....Btu/lb.	8400	8400	8370	8450	8230
Ash Fusibility					
Initial Temp. .....°F	2210	2160	2400	2360	2300
Softening Temp: (a) Spherical .....°F	2410	2260	2490	2450	2370
(b) Hemispherical.....°F	2510	2400	2550	2560	2410
Fluid Temp. .....°F	2700	2700	2700	2700	2700
Grindability Index (Hardgrove)	-	-	30	30	31
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	THE CANMORE MINES LTD. - No. 2
Mine Location	Canmore, Cascade Area, Alberta
Name of Mine or Coal	Wilson Mine

Date Sampled	4-11-71	4-11-71	4-11-71
Weight Sampled (approx.) .....tons	25	20	100
Size: Mine Designation	Cobble	Stoker	Slack
Screen Opening .....in.	5 to 2 sq	$1\frac{1}{4}$ sq to $\frac{1}{4}$ sl	Minus $\frac{1}{4}$ sl
FRC Laboratory No.	2988-71	2989-71	2990-71
Proximate Analysis			
Moisture .....%	1.7	4.2	9.8
Ash .....%	7.3	5.1	7.0
Volatile Matter .....%	11.8	11.5	11.1
Fixed Carbon .....%	79.2	79.2	72.1
Sulphur .....%	0.6	0.7	0.6
Calorific Value .....Btu/lb.	14,090	14,080	12,890
Ash Fusibility			
Initial Temp. .....°F	2700+	2700+	2700+
Softening Temp: (a) Spherical .....°F	2700+	2700+	2700+
(b) Hemispherical.....°F	2700+	2700+	2700+
Fluid Temp. .....°F	2700+	2700+	2700+
Grindability Index (Hardgrove)	-	67	82
Free Swelling Index (ASTM)		Nonagglomerate	
Classification by Rank (ASTM)		Semianthracite	

Mine Operator ..... CARDINAL RIVER COALS LTD. - No. 1768

Mine Location ..... Hinton, Mountain Park Area, Alberta

Name of Mine or Coal ..... Cardinal River Mine

Date Sampled	27-10-71	27-10-71
Weight Sampled (approx.) .....tons	60	80
Size: Mine Designation	Clean Coal Product	Raw Coal Feed
Screen Opening .....in.	Minus $1\frac{3}{4}$ rd	Minus $1\frac{3}{4}$ rd
FRC Laboratory No.	2992-71	2993-71
Proximate Analysis		
Moisture .....%	3.0	3.5
Ash .....%	7.6	26.2
Volatile Matter .....%	23.6	21.3
Fixed Carbon .....%	65.8	49.0
Sulphur .....%	0.2	0.3
Calorific Value .....Btu/lb.	13,870	10,620
Ash Fusibility		
Initial Temp. .....°F	2390	2300
Softening Temp: (a) Spherical .....°F	2460	2500
(b) Hemispherical.....°F	2700	2650
Fluid Temp. .....°F	2700+	2700+
Grindability Index (Hardgrove)	80	78
Free Swelling Index (ASTM)	$5\frac{1}{2}$	2
Classification by Rank (ASTM)	Medium-volatile bituminous	

Mine Operator ..... COLEMAN COLLIERIES LTD. - No. 1747

Mine Location ..... Coleman, Crowsnest Area, Alberta

Name of Mine or Coal ..... Vicary Creek and Tent Mountain Mines

Date Sampled	3-11-71
Weight Sampled (approx.) .....tons	150
Size: Mine Designation	Clean Coal
Screen Opening .....in.	Minus 2 sq
FRC Laboratory No.	3090-71
Proximate Analysis	
Moisture .....%	3.4
Ash .....%	11.8
Volatile Matter .....%	21.8
Fixed Carbon .....%	63.0
Sulphur .....%	0.6
Calorific Value .....Btu/lb.	12,980
Ash Fusibility	
Initial Temp. .....°F	2700+
Softening Temp: (a) Spherical .....°F	2700+
(b) Hemispherical.....°F	2700+
Fluid Temp. .....°F	2700+
Grindability Index (Hardgrove)	87
Free Swelling Index (ASTM)	$3\frac{1}{2}$
Classification by Rank (ASTM)	Medium-volatile bituminous

Mine Operator	McINTYRE PORCUPINE MINES LTD. - No. 1765
Mine Location	Grand Cache, Smoky River Area, Alberta
Name of Mine or Coal	Smoky River Mine

Date Sampled	26-10-71
Weight Sampled (approx.) .....tons	9000
Size: Mine Designation	Clean Coal Product
Screen Opening .....in.	Minus $1\frac{1}{2}$ sq
FRC Laboratory No.	2991-71
Proximate Analysis	
Moisture .....%	5.9
Ash .....%	7.1
Volatile Matter .....%	18.5
Fixed Carbon .....%	68.5
Sulphur .....%	0.4
Calorific Value .....Btu/lb.	13,690
Ash Fusibility	
Initial Temp. .....°F	2450
Softening Temp: (a) Spherical .....°F	2600
(b) Hemispherical.....°F	2750+
Fluid Temp. .....°F	2750+
Grindability Index (Hardgrove)	95
Free Swelling Index (ASTM)	$8\frac{1}{2}$
Classification by Rank (ASTM)	Low-volatile bituminous

Mine Operator ..... KAISER RESOURCES LTD.

Mine Location ..... Michel-Natal, East Kootenay District, British Columbia

Name of Mine or Coal ..... Elkview and Michel Plant

Date Sampled	2-11-71	2-11-71
Weight Sampled (approx.) .....tons	650	150
Size: Mine Designation	Clean Coal Product	Oxidized Coal Product
Screen Opening .....in.	Minus $1\frac{1}{2}$ sq	Minus 2 sq
FRC Laboratory No.	2985-71	2986-71
Proximate Analysis		
Moisture .....%	2.8	8.9
Ash .....%	9.5	13.7
Volatile Matter .....%	22.2	19.1
Fixed Carbon .....%	65.5	58.3
Sulphur .....%	0.2	0.3
Calorific Value .....Btu/lb.	13,660	11,060
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)	86	96
Free Swelling Index (ASTM)	6	Nonagglomerate
Classification by Rank (ASTM)	Medium-volatile bituminous	

SECTION IV - ULTIMATE AND ASH ANALYSES

A - SASKATCHEWAN

B - ALBERTA

C - BRITISH COLUMBIA

A. SASKATCHEWAN

Mine Operator ..... BATTLE RIVER COAL CO. LTD. *

Mine Location ..... Estevan, Estevan Area, Saskatchewan

Name of Mine or Coal ..... Klimax Mine

Date Sampled	19-10-71	19-10-71	19-10-71
Weight Sampled (approx.).....tons	20	40	40
Size: Mine Designation	Booker	Pea	Bug Dust
Screen Opening .....in.	2 to 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	2943-71	2944-71	2945-71
Ultimate Analysis			
Carbon .....%	67.1	66.4	65.4
Hydrogen .....%	4.3	4.1	4.0
Sulphur .....%	0.9	1.2	1.4
Nitrogen .....%	1.1	1.0	1.0
Ash .....%	9.9	10.9	12.9
Oxygen (by difference) .....%	16.7	16.4	15.3
Ash Analysis			
SiO_2 .....%	23.3	23.0	25.2
Al_2O_3 .....%	16.0	17.3	18.6
Fe_2O_3 .....%	4.5	6.7	7.5
TiO_2 .....%	0.5	0.5	0.7
P_2O_5 .....%	0.2	0.1	0.2
CaO .....%	27.2	25.2	19.7
MgO .....%	6.9	5.7	4.8
SO_3 .....%	17.5	18.9	15.9
Na_2O .....%	2.7	2.5	6.3
K_2O .....%	0.4	0.2	0.3

* A division of Alberta Coal Ltd.

Mine Operator ..... MANITOBA AND SASKATCHEWAN COAL CO. (LIMITED)

Mine Location ..... Bienfait, Bienfait Area, Saskatchewan

Name of Mine or Coal ..... M & S Mine

Date Sampled	20-10-71	20-10-71	20-10-71
Weight Sampled (approx.).....tons	30	40	10
Size: Mine Designation	Booker	Pea	Bug Dust
Screen Opening .....in.	2 to 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	2938-71	2939-71	2940-71
Ultimate Analysis			
Carbon .....%	67.5	66.4	65.4
Hydrogen .....%	4.2	4.2	4.0
Sulphur .....%	0.6	0.6	0.8
Nitrogen .....%	1.0	1.1	1.1
Ash .....%	10.4	10.5	12.9
Oxygen (by difference) .....%	16.3	17.2	15.8
Ash Analysis			
SiO_2 .....%	29.2	29.5	30.7
Al_2O_3 .....%	20.5	19.9	19.1
Fe_2O_3 .....%	6.0	5.3	5.2
TiO_2 .....%	0.5	0.5	0.6
P_2O_5 .....%	0.2	0.1	0.1
CaO .....%	19.8	19.0	16.5
MgO .....%	4.7	4.8	3.6
SO_3 .....%	9.5	11.0	9.6
Na_2O .....%	9.4	9.5	7.4
K_2O .....%	0.4	0.4	0.9

Mine Operator ..... UTILITY COALS LTD.

Mine Location ..... Estevan, Estevan Area, Saskatchewan

Name of Mine or Coal ..... Utility Mine

Date Sampled	19-10-71
Weight Sampled (approx.).....tons	35
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus 2
FRC Laboratory No.	2941-71
Ultimate Analysis	
Carbon .....%	61.5
Hydrogen .....%	3.7
Sulphur .....%	0.6
Nitrogen .....%	1.0
Ash .....%	16.1
Oxygen (by difference) .....%	17.1
Ash Analysis	
SiO_2 .....%	39.7
Al_2O_3 .....%	24.9
Fe_2O_3 .....%	3.6
TiO_2 .....%	1.0
P_2O_5 .....%	0.7
CaO .....%	13.5
MgO .....%	3.3
SO_3 .....%	7.6
Na_2O .....%	6.4
K_2O .....%	0.6

B. ALBERTA

Mine Operator ..... ALBERTA COAL LTD.*- No.443

Mine Location ..... Sheerness, Sheerness Area, Alberta

Name of Mine or Coal ..... Roselyn Mine

Date Sampled	24-11-71	24-11-71
Weight Sampled (approx.).....tons	35	20
Size: Mine Designation	Stoker	Slack
Screen Opening .....in.	$1\frac{1}{2}$ rd to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No.	3088-71	3089-71
Ultimate Analysis		
Carbon .....%	66.5	66.2
Hydrogen .....%	4.3	4.2
Sulphur .....%	0.8	0.9
Nitrogen .....%	1.3	1.3
Ash .....%	8.6	9.4
Oxygen (by difference) .....%	18.5	18.0
Ash Analysis		
SiO_2 .....%	27.8	30.0
Al_2O_3 .....%	17.1	18.2
Fe_2O_3 .....%	21.4	17.7
TiO_2 .....%	0.3	0.4
P_2O_5 .....%	0.4	0.4
CaO .....%	15.5	15.6
MgO .....%	1.9	1.8
SO_3 .....%	9.6	9.8
Na_2O .....%	2.7	2.6
K_2O .....%	0.4	0.5

* Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.*- No. 1046

Mine Location ..... Halkirk, Castor Area, Alberta

Name of Mine or Coal ..... Vesta Mine

Date Sampled	15-11-71	15-11-71	15-11-71
Weight Sampled (approx.).....tons	60	40	100
Size: Mine Designation	Stoker	Slack	Pit Run
Screen Opening .....in.	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq	Minus 1
FRC Laboratory No.	3054-71	3055-71	3056-71
Ultimate Analysis			
Carbon .....%	67.7	66.9	66.1
Hydrogen .....%	4.5	4.4	4.3
Sulphur .....%	0.6	0.7	0.7
Nitrogen .....%	1.3	1.3	1.3
Ash .....%	9.5	10.7	10.9
Oxygen (by difference) .....%	16.4	16.0	16.7
Ash Analysis			
SiO_2 .....%	42.1	42.1	40.4
Al_2O_3 .....%	25.3	23.8	25.3
Fe_2O_3 .....%	4.3	5.0	4.2
TiO_2 .....%	0.1	0.4	0.6
P_2O_5 .....%	0.9	0.8	0.9
CaO .....%	10.6	12.8	12.4
MgO .....%	0.2	1.0	1.0
SO_3 .....%	7.9	6.6	6.0
Na_2O .....%	6.6	5.6	5.5
K_2O .....%	0.1	0.4	1.5

*Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1757

Mine Location ..... Wabamun, Pembina Area, Alberta

Name of Mine or Coal ..... Whitewood Mine

Date Sampled	12-10-72
Weight Sampled (approx.).....tons	100
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus $\frac{3}{4}$
FRC Laboratory No.	2951-72
Ultimate Analysis	
Carbon .....%	60.4
Hydrogen .....%	3.6
Sulphur .....%	0.3
Nitrogen .....%	0.7
Ash .....%	19.1
Oxygen (by difference) .....%	15.9
Ash Analysis	
SiO_2 .....%	55.8
Al_2O_3 .....%	22.1
Fe_2O_3 .....%	3.2
TiO_2 .....%	0.5
P_2O_5 .....%	0.8
CaO .....%	12.8
MgO .....%	2.0
SO_3 .....%	3.6
Na_2O .....%	0.3
K_2O .....%	0.4

*Name changed to Manalta Coal Ltd.

Mine Operator ..... ALBERTA COAL LTD.* - No. 1769

Mine Location ..... Wabamun, Pembina Area, Alberta

Name of Mine or Coal ..... Highvale Mine

Date Sampled	12-10-71
Weight Sampled (approx.).....tons	100
Size: Mine Designation	Power Plant Coal
Screen Opening .....in.	Minus $\frac{3}{4}$
FRC Laboratory No.	2952-71
Ultimate Analysis	
Carbon .....%	62.0
Hydrogen .....%	3.7
Sulphur .....%	0.4
Nitrogen .....%	0.7
Ash .....%	18.0
Oxygen (by difference) .....%	15.2
Ash Analysis	
SiO_2 .....%	48.8
Al_2O_3 .....%	28.7
Fe_2O_3 .....%	3.6
TiO_2 .....%	0.6
P_2O_5 .....%	0.1
CaO .....%	12.4
MgO .....%	0.9
SO_3 .....%	2.9
Na_2O .....%	2.7
K_2O .....%	0.8

*Name changed to Manalta Coal Ltd.

Mine Operator	THE CANMORE MINES LTD. - No. 2
Mine Location	Canmore, Cascade Area, Alberta
Name of Mine or Coal	Wilson Mine

Date Sampled	4-11-71	4-11-71
Weight Sampled (approx.).....tons	20	100
Size: Mine Designation	Stoker	Slack
Screen Opening .....in.	$1\frac{1}{4}$ sq to $\frac{1}{4}$ sl	Minus $\frac{1}{4}$ sl
FRC Laboratory No.	2989-71	2990-71
Ultimate Analysis		
Carbon .....%	86.8	84.3
Hydrogen .....%	4.0	3.8
Sulphur .....%	0.7	0.7
Nitrogen .....%	1.5	1.5
Ash .....%	5.3	7.7
Oxygen (by difference) .....%	1.7	2.0
Ash Analysis		
SiO_2 .....%	54.0	58.4
Al_2O_3 .....%	37.0	32.0
Fe_2O_3 .....%	2.8	2.7
TiO_2 .....%	1.0	1.1
P_2O_5 .....%	0.9	0.7
CaO .....%	1.5	0.8
MgO .....%	0.3	0.4
SO_3 .....%	0.7	0.4
Na_2O .....%	0.3	0.5
K_2O .....%	0.4	1.8

Mine Operator ..... CARDINAL RIVER COALS LTD. - No. 1768

Mine Location ..... Hinton, Mountain Park Area, Alberta

Name of Mine or Coal ..... Cardinal River Mine

Date Sampled	27-10-71	27-10-71
Weight Sampled (approx.).....tons	60	80
Size: Mine Designation	Clean Coal Product	Raw Coal Feed
Screen Opening .....in.	Minus $1\frac{3}{4}$ rd	Minus $1\frac{3}{4}$ rd
FRC Laboratory No.	2992-71	2993-71
Ultimate Analysis		
Carbon .....%	82.8	62.2
Hydrogen .....%	4.6	3.7
Sulphur .....%	0.3	0.3
Nitrogen .....%	1.1	0.8
Ash .....%	7.8	27.1
Oxygen (by difference) .....%	3.4	4.9
Ash Analysis		
SiO_2 .....%	49.7	60.3
Al_2O_3 .....%	29.0	23.9
Fe_2O_3 .....%	4.1	3.2
TiO_2 .....%	0.9	0.8
P_2O_5 .....%	0.4	0.2
CaO .....%	6.2	4.5
MgO .....%	1.8	1.7
SO_3 .....%	5.4	2.2
Na_2O .....%	1.2	2.3
K_2O .....%	0.4	1.1

Mine Operator ..... COLEMAN COLLIERIES LTD. - No. 1747

Mine Location ..... Coleman, Crowsnest Area, Alberta

Name of Mine or Coal ..... Vicory Creek and Tent Mountain Mines

Date Sampled	3-11-71
Weight Sampled (approx.).....tons	150
Size: Mine Designation	Clean Coal
Screen Opening .....in.	Minus 2 sq
FRC Laboratory No.	3090-71
Ultimate Analysis	
Carbon .....%	77.3
Hydrogen .....%	4.4
Sulphur .....%	0.6
Nitrogen .....%	1.1
Ash .....%	12.2
Oxygen (by difference) .....%	4.4
Ash Analysis	
SiO_2 .....%	-
Al_2O_3 .....%	-
Fe_2O_3 .....%	-
TiO_2 .....%	-
P_2O_5 .....%	-
CaO .....%	-
MgO .....%	-
SO_3 .....%	-
Na_2O .....%	-
K_2O .....%	-

Mine Operator ..... CENTURY COALS LTD. - No. 1742

Mine Location ..... East Coulee, Drumheller Area, Alberta

Name of Mine or Coal ..... Atlas Mine

Date Sampled	23-11-71	23-11-71
Weight Sampled (approx.).....tons	25	38
Size: Mine Designation	Stoker	Slack
Screen Opening .....in.	$1\frac{3}{8}$ to $\frac{5}{8}$ rd	Minus $\frac{5}{8}$ rd
FRC Laboratory No.	3083-71	3084-71
Ultimate Analysis		
Carbon .....%	66.3	66.3
Hydrogen .....%	4.4	4.5
Sulphur .....%	0.8	0.5
Nitrogen .....%	1.4	1.4
Ash .....%	10.8	11.5
Oxygen (by difference) .....%	16.3	15.8
Ash Analysis		
SiO_2 .....%	45.4	43.6
Al_2O_3 .....%	28.6	26.7
Fe_2O_3 .....%	5.2	4.9
TiO_2 .....%	0.6	0.2
P_2O_5 .....%	1.2	0.9
CaO .....%	8.2	8.6
MgO .....%	1.2	1.5
SO_3 .....%	3.5	5.7
Na_2O .....%	4.6	6.3
K_2O .....%	1.3	0.4

Mine Operator	EGG LAKE COAL CO. LTD. - No. 1582
Mine Location	Morinville, Edmonton Area, Alberta
Name of Mine or Coal	Egg Lake Mine

Date Sampled	13-10-71
Weight Sampled (approx.).....tons	-
Size: Mine Designation	Channel Sample
Screen Opening .....in.	-
FRC Laboratory No.	2953-71
Ultimate Analysis	
Carbon .....%	66.3
Hydrogen .....%	4.2
Sulphur .....%	0.4
Nitrogen .....%	1.2
Ash .....%	9.5
Oxygen (by difference) .....%	18.4
Ash Analysis	
SiO_2 .....%	45.4
Al_2O_3 .....%	26.5
Fe_2O_3 .....%	5.1
TiO_2 .....%	0.5
P_2O_5 .....%	0.9
CaO .....%	13.2
MgO .....%	2.3
SO_3 .....%	5.6
Na_2O .....%	0.7
K_2O .....%	1.0

Mine Operator ..... FORESTBURG COLLIERIES LTD. - No. 1578

Mine Location ..... Forestburg, Castor Area, Alberta

Name of Mine or Coal ..... Diplomat Mine

Date Sampled	16-11-71	16-11-71	16-11-71
Weight Sampled (approx.).....tons	40	30	100
Size: Mine Designation	Stoker	Slack	Pit Run
Screen Opening .....in.	$1\frac{1}{4}$ sq to $\frac{1}{2}$ sl	Minus $\frac{1}{2}$ sl	Minus 1
FRC Laboratory No.	3048-71	3049-71	3050-71
Ultimate Analysis			
Carbon .....%	68.5	67.6	64.3
Hydrogen .....%	4.5	4.5	4.1
Sulphur .....%	0.6	0.7	0.7
Nitrogen .....%	1.4	1.4	1.3
Ash .....%	8.6	9.2	13.6
Oxygen (by difference) .....%	16.4	16.6	16.0
Ash Analysis			
SiO_2 .....%	32.8	38.2	45.4
Al_2O_3 .....%	23.5	21.8	28.5
Fe_2O_3 .....%	5.3	5.5	3.8
TiO_2 .....%	0.2	0.6	0.1
P_2O_5 .....%	1.4	1.4	0.7
CaO .....%	15.1	16.1	11.1
MgO .....%	1.1	1.4	0.8
SO_3 .....%	12.3	8.3	5.1
Na_2O .....%	8.1	7.8	5.4
K_2O .....%	0.1	0.1	0.5

Mine Operator ..... MCINTYRE PORCUPINE MINES LTD. - No. 1765

Mine Location ..... Grand Cache, Smoky River Area, Alberta

Name of Mine or Coal ..... Smoky River Mine

Date Sampled	26-10-71
Weight Sampled (approx.).....tons	9000
Size: Mine Designation	Clean Coal Product
Screen Opening .....in.	Minus $1\frac{1}{2}$ sq
FRC Laboratory No.	2991-71
Ultimate Analysis	
Carbon .....%	84.4
Hydrogen .....%	4.4
Sulphur .....%	0.4
Nitrogen .....%	1.1
Ash .....%	7.5
Oxygen (by difference) .....%	2.2
Ash Analysis	
SiO_2 .....%	51.5
Al_2O_3 .....%	30.7
Fe_2O_3 .....%	6.1
TiO_2 .....%	1.2
P_2O_5 .....%	1.9
CaO .....%	4.6
MgO .....%	0.6
SO_3 .....%	2.0
Na_2O .....%	1.3
K_2O .....%	0.8

Mine Operator ..... STAR-KEY MINES LTD. - No. 1626

Mine Location ..... St. Albert, Edmonton Area, Alberta

Name of Mine or Coal ..... Star-Key Mine

Date Sampled	14-10-71	14-10-71	14-10-71
Weight Sampled (approx.).....tons	30	40	20
Size: Mine Designation	Nut	Stoker	Slack
Screen Opening .....in.	2 to $1\frac{1}{8}$ sq	$1\frac{1}{8}$ to $\frac{3}{8}$ sq	Minus $\frac{3}{8}$ sq
FRC Laboratory No.	2948-71	2949-71	2950-71
Ultimate Analysis			
Carbon .....%	64.5	65.7	63.9
Hydrogen .....%	4.2	4.3	4.1
Sulphur .....%	0.3	0.3	0.4
Nitrogen .....%	1.1	1.2	1.1
Ash .....%	12.7	13.3	13.7
Oxygen (by difference) .....%	17.2	15.2	16.8
Ash Analysis			
SiO_2 .....%	47.0	45.6	44.7
Al_2O_3 .....%	31.5	30.4	29.5
Fe_2O_3 .....%	4.0	4.0	4.1
TiO_2 .....%	0.4	0.4	0.4
P_2O_5 .....%	0.5	0.5	0.6
CaO .....%	9.9	10.2	11.1
MgO .....%	0.9	0.9	1.1
SO_3 .....%	2.7	4.2	4.2
Na_2O .....%	4.3	4.6	4.2
K_2O .....%	0.7	0.9	0.8

C. BRITISH COLUMBIA

Mine Operator ..... KAISER RESOURCES LTD.

Mine Location ..... Michel-Natal, East Kootenay District, British Columbia.

Name of Mine or Coal ..... Elkview and Michel Plant

Date Sampled	2-11-71	2-11-71
Weight Sampled (approx.).....tons	650	150
Size: Mine Designation	Clean Coal Product	Oxidized Coal Product
Screen Opening .....in.	Minus $1\frac{1}{2}$ sq	Minus 2 sq
FRC Laboratory No.	2985-71	2986-71
Ultimate Analysis		
Carbon .....%	80.7	72.6
Hydrogen .....%	4.5	3.6
Sulphur .....%	0.2	0.3
Nitrogen .....%	1.1	1.0
Ash .....%	9.8	15.0
Oxygen (by difference) .....%	3.6	7.5
Ash Analysis		
SiO_2 .....%	60.7	64.1
Al_2O_3 .....%	28.7	30.2
Fe_2O_3 .....%	3.8	2.0
TiO_2 .....%	1.2	1.0
P_2O_5 .....%	0.7	0.4
CaO .....%	1.9	1.6
MgO .....%	0.6	0.4
SO_3 .....%	1.1	0.5
Na_2O .....%	2.6	0.1
K_2O .....%	0.3	0.7