

Mines Branch Information Circular IC 305

EVALUATION OF CANADIAN COMMERCIAL COALS: 1972  
SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA

by

T.E. Tibbetts\* and W.J. Montgomery\*\*

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ABSTRACT

The physical and chemical analyses of forty-one 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 eleven 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 1972. 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 305

EVALUATION DES HOUILLES COMMERCIALES CANADIENNES: 1972  
SASKATCHEWAN, ALBERTA ET COLOMBIE-BRITANNIQUE

par

T.E. Tibbetts\* et W.J. Montgomery\*\*

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### RÉSUMÉ

L'auteur décrit les résultats d'analyses physiques et chimiques de 41 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 11 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 1972 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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COAL AREAS AND PRINCIPAL MINES  
(with approximate production in 1972 in thousands of short tons)

SASKATCHEWAN  
(SOURIS VALLEY AREA)

Manalta Coal Ltd.  
Manitoba and Saskatchewan Coal Co. Ltd.  
Utility Coals Limited

ALBERTA

1. Subbituminous

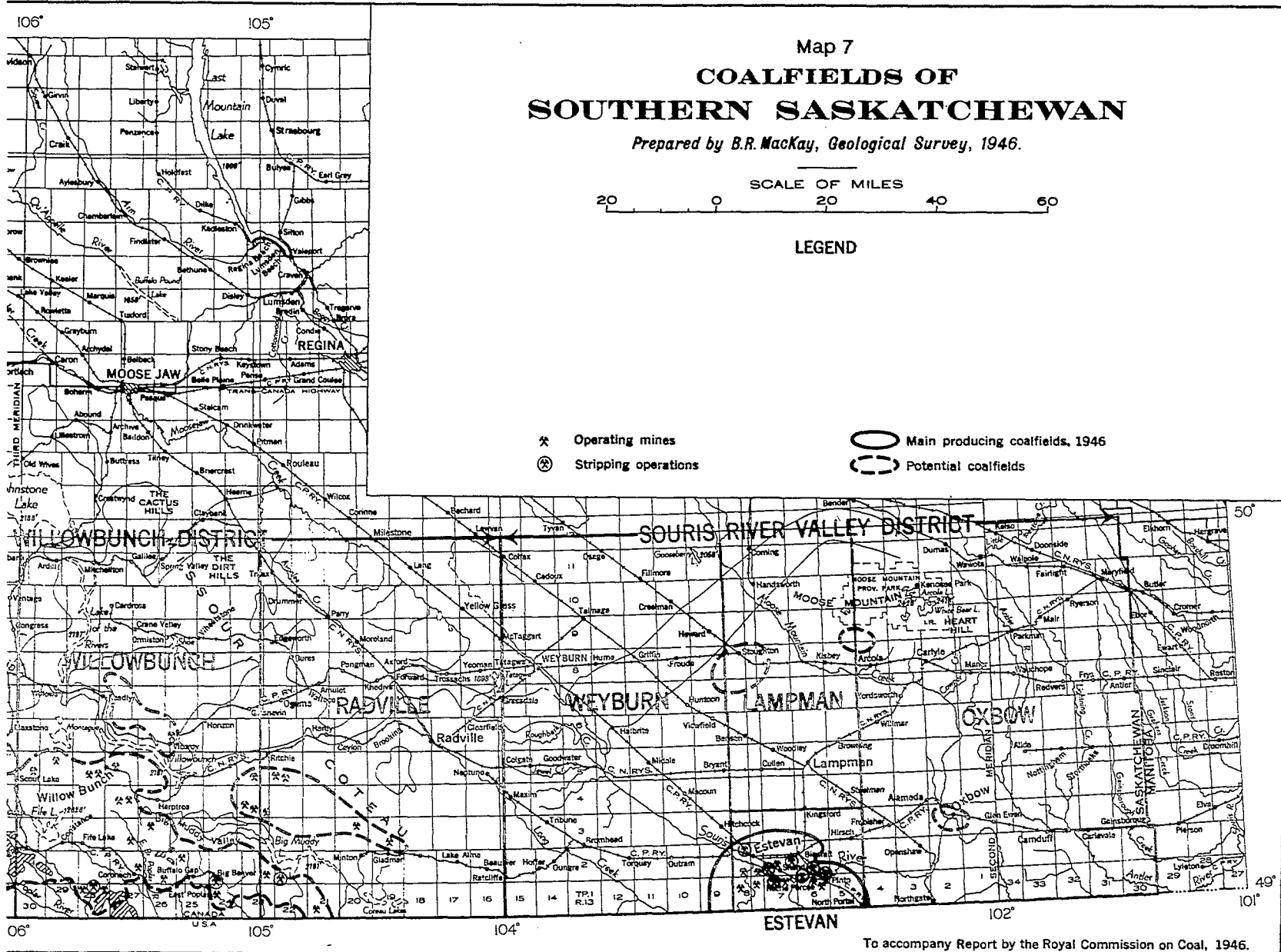
Castor Area		
Manalta Coal Ltd. (Vesta Mine) (No. 1046)		550
Forestburg Collieries Ltd. (No. 1578)		610
Drumheller Area		
Century Coals Limited (No. 1742)		54
Edmonton Area		
Egg Lake Coal Co. Ltd. (No. 1582)		11
Star-Key Mines Ltd. (No. 1626)		21
Pembina Area		
Manalta Coal Ltd. (Whitewood Mine) (No. 1757)		2,250
Manalta Coal Ltd. (Highvale Mine) (No. 1769)		1,300
Sheerness Area		
Manalta Coal Ltd. (Roselyn Mine) (No. 443)		11

2. Bituminous

Cascade Area		
The Canmore Mines Ltd. (No. 2)		200
Crowsnest Area		
Coleman Collieries Ltd. (Nos. 1695, 1747, 1764)		1,010
Mountain Park Area		
Cardinal River Coals Ltd. (No. 1768)		1,210
Smokey River Area		
McIntyre Porcupine Mines Ltd. (Nos. 1765, 1771)		2,840

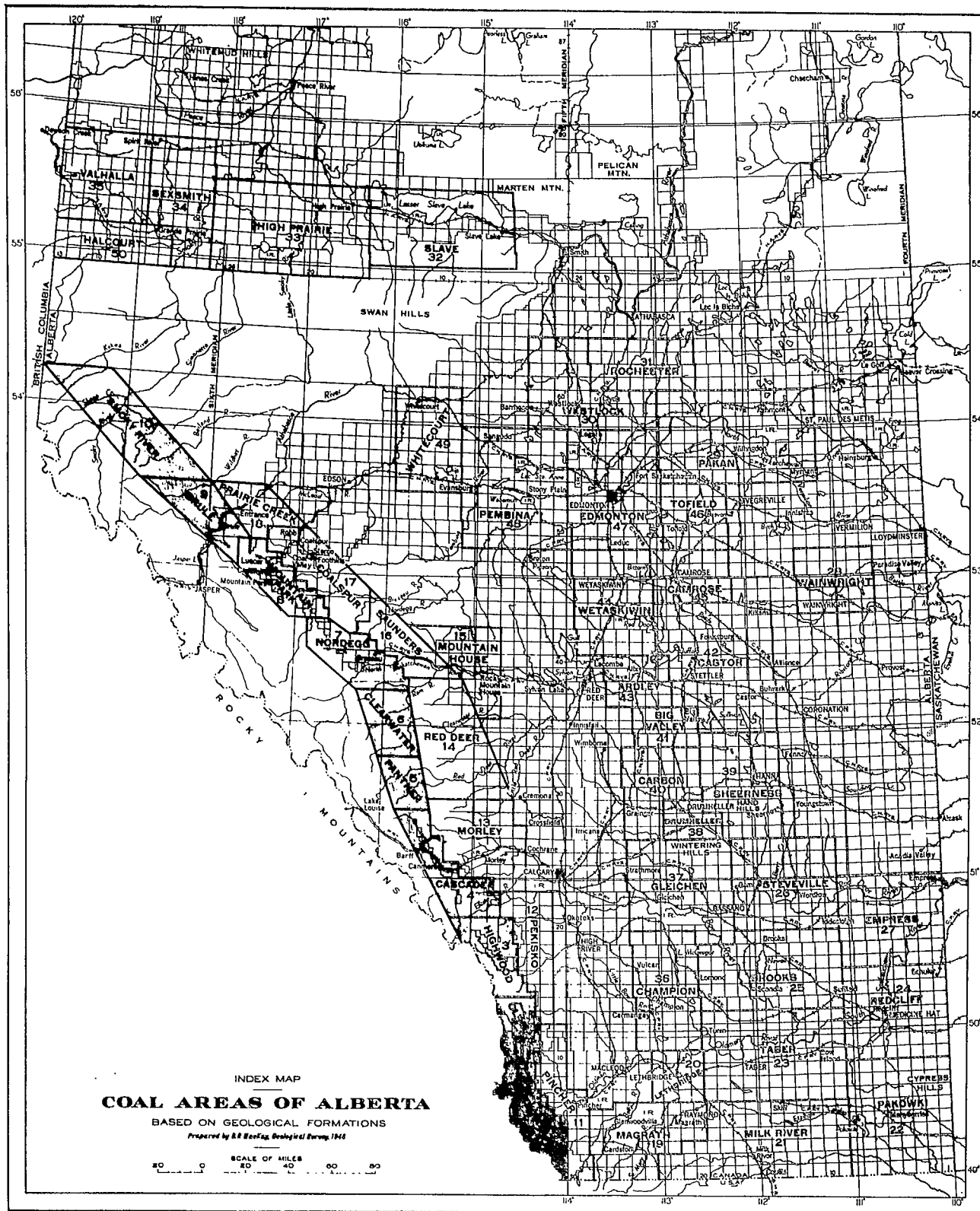
BRITISH COLUMBIA

East Kootenay District		
Kaiser Resources Limited		6,310
Fording Coal Limited		1,010



To accompany Report by the Royal Commission on Coal, 1946.

1  
 1  
 1



# COALFIELDS AND COAL AREAS OF BRITISH COLUMBIA

Prepared by B. R. MacKay, Geological Survey, 1948.

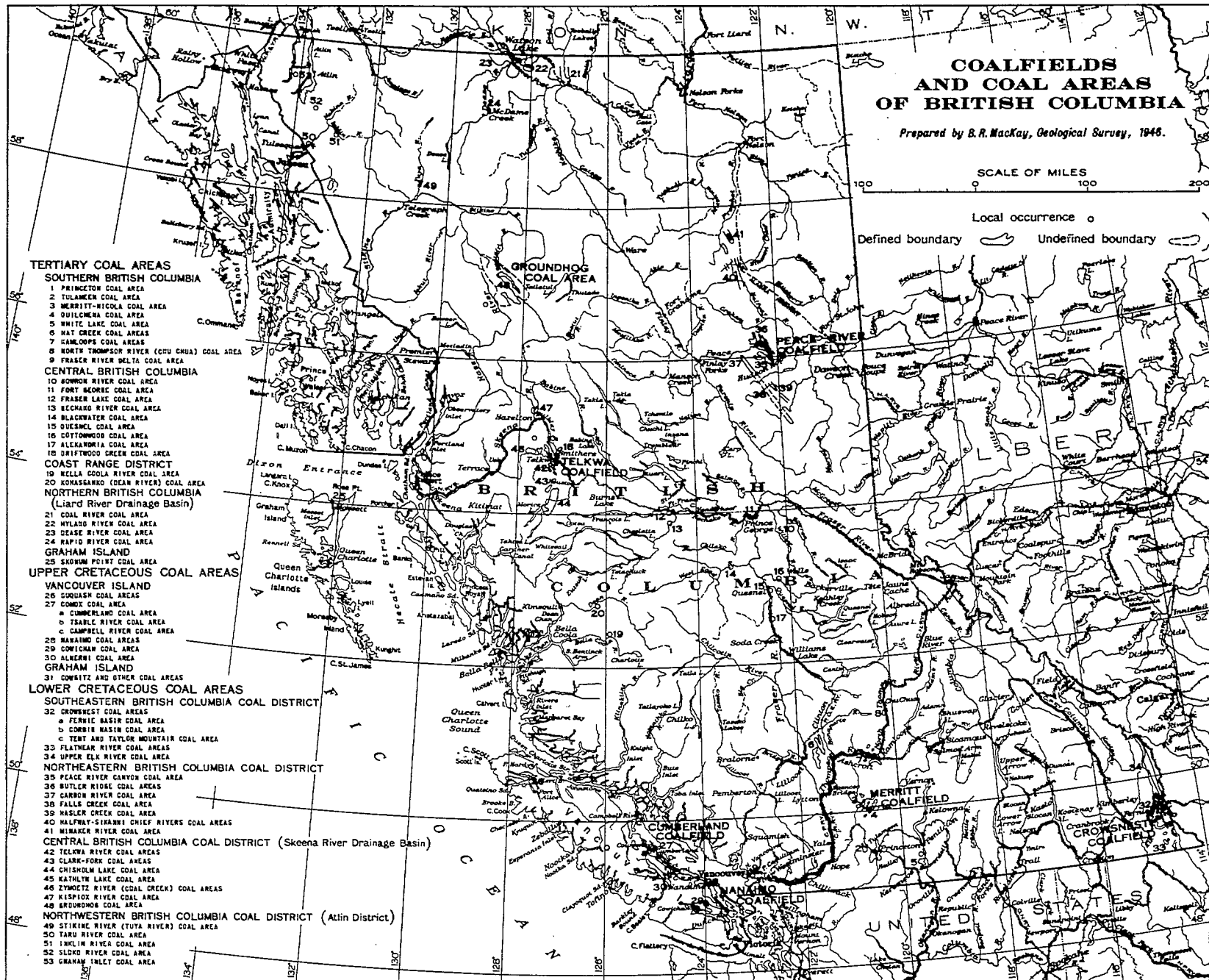
SCALE OF MILES

100 0 100 200

Local occurrence o

Defined boundary

Undefined boundary



## TERTIARY COAL AREAS

### SOUTHERN BRITISH COLUMBIA

- 1 PRINCETON COAL AREA
- 2 TULAMEN COAL AREA
- 3 MERRITT-NICOLA COAL AREA
- 4 GUILCHENA COAL AREA
- 5 WHITE LAKE COAL AREA
- 6 NAT 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 BOMOH RIVER COAL AREA
- 11 FORT GEORGE COAL AREA
- 12 FRASER LAKE COAL AREA
- 13 KICHANO RIVER COAL AREA
- 14 BLAUEWATER COAL AREA
- 15 QUENSLER COAL AREA
- 16 COTTONGWOOD COAL AREA
- 17 ALEXANDRIA COAL AREA
- 18 BRITWOOD CREEK COAL AREA

### COAST RANGE DISTRICT

- 19 HELLA COALA RIVER COAL AREA
- 20 KOKASANKO (OGAN RIVER) COAL AREA

### NORTHERN BRITISH COLUMBIA

(Liard River Drainage Basin)

- 21 COAL RIVER COAL AREA
- 22 NYLAND RIVER COAL AREA
- 23 BEASE RIVER COAL AREA
- 24 RAPID RIVER COAL AREA

### GRAHAM ISLAND

- 25 SAQUIM POINT COAL AREA

### UPPER CRETACEOUS COAL AREAS

#### VANCOUVER ISLAND

- 26 CUDASH COAL AREAS
- 27 COMOX COAL AREA
- a CUMBERLAND COAL AREA
- b TSARLE RIVER COAL AREA
- c CAMPBELL RIVER COAL AREA

- 28 HAVASD COAL AREAS
- 29 COMICHAM COAL AREA
- 30 ALBERNI COAL AREA

### GRAHAM ISLAND

- 31 COMBITZ AND OTHER COAL AREAS

### LOWER CRETACEOUS COAL AREAS

#### SOUTHEASTERN BRITISH COLUMBIA COAL DISTRICT

- 32 CROWNEST COAL AREAS
- a FERNIC BASIN COAL AREA
- b CORRIE BASIN COAL AREA
- c TERT AND TAYLOR MOUNTAIN COAL AREA

- 33 PLATHAR RIVER COAL AREAS
- 34 UPPER ELK RIVER COAL AREA

#### NORTHEASTERN BRITISH COLUMBIA COAL DISTRICT

- 35 PEACE RIVER CANYON COAL AREA
- 36 BUTLER RIDGE COAL AREAS
- 37 CARBON RIVER COAL AREA
- 38 FALLS CREEK COAL AREA
- 39 HASLER CREEK COAL AREA

- 40 HALFRAY-SIKAHNI CHIEF RIVERS COAL AREAS
- 41 MIBAKER RIVER COAL AREA

#### CENTRAL BRITISH COLUMBIA COAL DISTRICT (Skeena River Drainage Basin)

- 42 TELKWA RIVER COAL AREAS
- 43 CLARK-FORT COAL AREAS
- 44 CHISHOLM LAKE COAL AREA
- 45 KATHLIE LAKE COAL AREA
- 46 TYNDETZ RIVER (COAL CREEK) COAL AREAS
- 47 KISPLOZ RIVER COAL AREA
- 48 BOUNDAROK COAL AREA

#### NORTHWESTERN BRITISH COLUMBIA COAL DISTRICT (Atlin District)

- 49 STIKINE RIVER (TUYA RIVER) COAL AREA
- 50 TARU RIVER COAL AREA
- 51 INKILIN RIVER COAL AREA
- 52 SLIGO RIVER COAL AREA
- 53 GRAHAM INLET COAL AREA



## INTRODUCTION

This publication contains the analyses of commercial coal samples collected in Saskatchewan, Alberta and British Columbia during 1972, 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 on the dry basis and the chemical analyses of ash of selected samples are reported in Section IV.

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

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

Date Sampled .....	18-10-72	18-10-72	18-10-72
Weight Sampled (approx.) ..... tons	50	50	50
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. ....	4233-72	4234-72	4235-72
Proximate Analysis			
Moisture ..... %	33.1	31.8	28.8
Ash ..... %	7.5	9.8	12.1
Volatile Matter ..... %	29.3	29.2	28.8
Fixed Carbon ..... %	30.1	29.2	30.3
Sulphur ..... %	0.6	0.7	0.9
Calorific Value ..... Btu/lb.	7230	7020	7200
Ash Fusibility			
Initial Temp. ....°F	2070	1990	1850
Softening Temp:(a) Spherical ....°F	2140	2130	2040
(b) Hemispherical.°F	2160	2150	2220
Fluid Temp. ....°F	2260	2270	2260
Grindability Index (Hardgrove) .....	-	-	67
Free Swelling Index (ASTM) .....	-	-	-
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 ..... MANITOBA AND SASKATCHEWAN COAL CO. LIMITED  
 Mine Location ..... Bienfait, Bienfat Area, Saskatchewan  
 Sec. 11, Tp. 2; R. 6, W.2.  
 Name of Mine(or Coal) and Seam ..... M & S Strip Mine; Top Seam

Date Sampled .....	17-10-72	17-10-72	17-10-72
Weight Sampled (approx.) ..... tons	55	40	20
Size: Mine Designation .....	Booker	Pea	Slack
Screen Opening ..... in.	2 to 1 sq	1 to $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq
FRC Laboratory No. ....	4230-72	4231-72	4232-72
Proximate Analysis			
Moisture ..... %	32.0	30.3	30.6
Ash ..... %	6.4	7.2	7.9
Volatile Matter ..... %	28.6	28.6	27.9
Fixed Carbon ..... %	33.0	33.9	33.6
Sulphur ..... %	0.4	0.3	0.5
Calorific Value ..... Btu/lb.	7520	7640	7490
Ash Fusibility			
Initial Temp. ....°F	1980	1850	1980
Softening Temp:(a) Spherical ....°F	2070	2040	2100
(b) Hemispherical.°F	2080	2080	2130
Fluid Temp. ....°F	2170	2140	2300
Grindability Index (Hardgrove) .....			51
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.

Mine Operator ..... UTILITY COALS LTD.  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Sec. 31, 32, 36, Tp. 1; R. 8, W2.  
 Name of Mine (or Coal) and Seam ..... Utility Strip Mine; Top Seam.

Date Sampled ..... 17-10-72

Weight Sampled (approx.) ..... tons 200

Size: Mine Designation ..... Power Plant Coal

Screen Opening ..... in. Minus  $1\frac{1}{2}$

FRC Laboratory No. .... 4229-72

Proximate Analysis

Moisture ..... % 31.3

Ash ..... % 11.0

Volatile Matter ..... % 27.3

Fixed Carbon ..... % 30.4

Sulphur ..... % 0.4

Calorific Value ..... Btu/lb. 6870

Ash Fusibility

Initial Temp. .... °F 2040

Softening Temp: (a) Spherical .... °F 2130

(b) Hemispherical. °F 2350

Fluid Temp. .... °F 2500

Grindability Index (Hardgrove) ..... 50

Free Swelling Index (ASTM) ..... -

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.

SECTION II

SUBBITUMINOUS COALS

FROM

ALBERTA

(Analyses are reported on the Equilibrium Moisture Basis.)

Mine Operator ..... MANALTA COAL LTD. No. 443  
 Mine Location ..... Sheerness, Sheerness Area, Alberta  
 Sec. 14, Tp. 29; R. 13, W4.  
 Name of Mine (or Coal) and Seam ..... Roselyn Strip Mine

Date Sampled .....	25-10-72	25-10-72	25-10-72	25-10-72	25-10-72
Weight Sampled (approx.) ..... tons	18	10	15	15	10
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. ....	4942-72	4943-72	4944-72	4945-72	4946-72
Proximate Analysis					
Moisture ..... %	26.2	27.2	25.9	27.9	24.8
Ash ..... %	6.4	6.4	6.3	6.3	9.4
Volatile Matter ..... %	30.4	31.7	29.3	30.6	29.7
Fixed Carbon ..... %	37.0	34.7	38.5	35.2	36.1
Sulphur ..... %	0.5	0.4	0.4	0.4	0.5
Calorific Value ..... Btu/lb.	8140	8110	8250	8050	8030
Ash Fusibility					
Initial Temp. .... °F	1940	1880	1860	1860	1990
Softening Temp: (a) Spherical .... °F	2020	2010	2020	2010	2070
(b) Hemispherical. °F	2040	2050	2080	2090	2200
Fluid Temp. .... °F	2090	2130	2120	2140	2230
Grindability Index (Hardgrove) .....	-	-	-	28	32
Free Swelling Index (ASTM) .....	-	-	-	-	-
Classification by Rank (ASTM) .....	Subbituminous C				

Remarks:



Mine Operator ..... MANALTA COAL LTD. No. 1046  
 Mine Location ..... Halkirk, Castor Area, Alberta  
 Sec. 36, Tp. 40; R.15, W4  
 Name of Mine (or Coal) ..... Vesta Strip Mine

Date Sampled .....	26-10-72	26-10-72	26-10-72	26-10-72	26-10-72
Weight Sampled (approx.) ..... tons	60	50	60	70	35
Size: Mine Designation .....	Lump	Egg	Nut	Stoker	Slack
Screen Opening ..... in.	Plus 4 $\frac{1}{2}$ sq	4 $\frac{1}{2}$ to 2 $\frac{1}{2}$ sq	2 to 1 sq	1 $\frac{1}{8}$ to 5 $\frac{1}{8}$ sq	Minus 5 $\frac{1}{8}$ sq
FRC Laboratory No. ....	4937-72	4938-72	4939-72	4940-72	4941-72
<b>Proximate Analysis</b>					
Moisture ..... %	28.9	25.2	23.4	24.4	25.3
Ash ..... %	5.7	6.0	6.7	6.9	8.4
Volatile Matter ..... %	28.2	30.5	31.1	30.0	28.5
Fixed Carbon ..... %	37.2	38.3	38.8	38.7	37.8
Sulphur ..... %	0.4	0.5	0.4	0.4	0.4
Calorific Value ..... Btu/lb.	8230	8640	8750	8550	8340
<b>Ash Fusibility</b>					
Initial Temp. ....°F	1850	1820	1990	2000	2030
Softening Temp:(a) Spherical ....°F	2080	2030	2040	2060	2150
(b) Hemispherical.°F	2120	2150	2150	2170	2440
Fluid Temp. ....°F	2180	2380	2290	2260	2500
Grindability Index (Hardgrove) .....	-	-	32	32	35
Free Swelling Index (ASTM) .....	-	-	-	-	-
Classification by Rank (ASTM) .....	Subbituminous C				

Remarks: Total seam thickness is 7.8 ft. Depth of overburden is about 46.8 ft.

Mine Operator ..... MANALTA COAL LTD. - No 1757  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Sec. 14-16, 21-23, Tp. 53; R4, W5.  
 Name of Mine (or Coal) ..... Whitewood Strip Mine; Seams 1, 2, 3, 4 and 5.

Date Sampled .....	10-10-72
Weight Sampled (approx.) ..... tons	1000
Size: Mine Designation .....	Feed to Power Plant
Screen Opening ..... in.	Minus $\frac{3}{4}$
FRC Laboratory No. ....	4227-72
Proximate Analysis	
Moisture ..... %	19.2
Ash ..... %	10.9
Volatile Matter ..... %	29.3
Fixed Carbon ..... %	40.6
Sulphur ..... %	0.2
Calorific Value ..... Btu/lb.	8400
Ash Fusibility	
Initial Temp. ....°F	2070
Softening Temp: (a) Spherical ....°F	2480
(b) Hemispherical.°F	2630
Fluid Temp. ....°F	2660
Grindability Index (Hardgrove) .....	42
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. 20, 29, 30, Tp. 52; R.4, W5.  
 Name of Mine(or Coal) ..... Highvale Strip Mine; Seams 1 and 2.

Date Sampled .....	10-10-72
Weight Sampled (approx.) ..... tons	100
Size: Mine Designation .....	Feed to Power Plant
Screen Opening ..... in.	Minus $\frac{3}{4}$
FRC Laboratory No. ....	4228-72
Proximate Analysis	
Moisture ..... %	18.4
Ash ..... %	13.6
Volatile Matter ..... %	27.9
Fixed Carbon ..... %	40.1
Sulphur ..... %	0.2
Calorific Value ..... Btu/lb.	8260
Ash Fusibility	
Initial Temp. ....°F	2350
Softening Temp:(a) Spherical ....°F	2510
(b) Hemispherical.°F	2580
Fluid Temp. ....°F	2640
Grindability Index (Hardgrove) .....	47
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 ..... CENTURY COALS LTD. - No. 1742  
 Mine Location ..... East Coulee, Drumheller Area, Alberta  
 Sec. 6 and 7, Tp. 27; R 18, W4  
 Name of Mine(or Coal) and Seam ..... Atlas (Underground) Mine, Seams 1 and 2.

Date Sampled .....	5-10-72	5-10-72	5-10-72	5-10-72	5-10-72
Weight Sampled (approx.) ..... tons	120	30	15	20	10
Size: Mine Designation .....	Lump	Egg	Nut	Stoker	Slack
Screen Opening ..... in.	Plus 4 1/2 rd	4 1/2 to 2 rd	2 to 1 3/8 rd	1 3/8 to 5/8 rd	Minus 5/8 rd
FRC Laboratory No. ....	4154-72	4155-72	4156-72	4157-72	4158-72
Proximate Analysis					
Moisture ..... %	17.6	17.8	18.4	18.9	17.9
Ash ..... %	7.1	7.1	8.9	10.4	8.9
Volatile Matter ..... %	31.3	31.2	30.8	29.1	30.3
Fixed Carbon ..... %	44.0	43.9	41.9	41.6	42.9
Sulphur ..... %	0.5	0.5	0.5	0.5	0.6
Calorific Value ..... Btu/lb.	9610	9660	9410	9100	9250
Ash Fusibility					
Initial Temp. ....°F	1950	2050	2250	2220	2230
Softening Temp:(a) Spherical ....°F	2130	2190	2450	2400	2450
(b) Hemispherical.°F	2310	2270	2530	2550	2550
Fluid Temp. ....°F	2700	2520	2700+	2700+	2590
Grindability Index (Hardgrove) .....	-	-	-	34	35
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 ..... EGG LAKE COAL CO. LTD. - No. 1582  
 Mine Location ..... Morinville, Edmonton Area, Alberta  
 Sec. 36, Tp. 56; R.26, W4.  
 Name of Mine or Coal ..... Egg Lake Strip Mine.

Date Sampled .....	31-10-72
Weight Sampled (approx.) ..... tons	-
Size: Mine Designation .....	Channel Sample
Screen Opening ..... in.	-
FRC Laboratory No. ....	4952-72
Proximate Analysis	
Moisture ..... %	30.0
Ash ..... %	8.4
Volatile Matter ..... %	28.3
Fixed Carbon ..... %	33.3
Sulphur ..... %	0.2
Calorific Value ..... Btu/lb.	7160
Ash Fusibility	
Initial Temp. ....°F	2060
Softening Temp:(a) Spherical ....°F	2240
(b) Hemispherical.°F	2330
Fluid Temp. ....°F	2460
Grindability Index (Hardgrove) .....	44
Free Swelling Index (ASTM) .....	-
Classification by Rank (ASTM) .....	Subbituminous C

Remarks: Average overburden of seam is approximately 10 ft of soft clay. The base is blue clay. Clay bands are found within the seam.

Mine Operator ..... FORESTBURG COLLIERIES LTD. - No. 1578  
 Mine Location ..... Forestburg, Castor Area, Alberta  
 Sec. 1, Tp. 41; R.16, W4. Sec. 6, Tp. 41; R.15,  
 Name of Mine (or Coal) ..... W4. Sec. 31, Tp. 40; R.15, W4.  
 Diplomat Strip Mine

Date Sampled .....	1-11-72	1-11-72	1-11-72	1-11-72	1-11-72
Weight Sampled (approx.) ..... tons	18	40	30	35	25
Size: Mine Designation .....	Lump	Egg	Nut	Stoker	Slack
Screen Opening ..... in.	Plus 4 1/2 rd	4 1/2 to 2 rd	2 rd to 1 1/4 sq	1 1/4 sq to 1 1/2 sl	Minus 1/2 sl
FRC Laboratory No. ....	4947-72	4948-72	4949-72	4950-72	4951-72
Proximate Analysis					
Moisture ..... %	24.7	23.7	25.0	25.0	25.9
Ash ..... %	5.6	5.8	6.2	6.5	6.3
Volatile Matter ..... %	31.1	31.4	30.1	29.8	30.0
Fixed Carbon ..... %	38.6	39.1	38.7	38.7	37.8
Sulphur ..... %	0.4	0.4	0.4	0.5	0.5
Calorific Value ..... Btu/lb.	8750	8830	8620	8850	8470
Ash Fusibility					
Initial Temp. ....°F	1960	2020	1990	2000	1920
Softening Temp:(a) Spherical ....°F	2110	2110	2050	2050	2050
(b) Hemispherical.°F	2160	2140	2080	2110	2100
Fluid Temp. ....°F	2280	2180	2210	2430	2380
Grindability Index (Hardgrove) .....	-	-	30	30	29
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.

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  
 Sec. 22, Tp. 24; R.10, W5.  
 Name of Mine or Coal ..... Wilson Underground Mine; Wilson Seam

Date Sampled .....	24-10-72	24-10-72	24-10-72
Weight Sampled (approx.) ..... tons	20	35	132
Size: Mine Designation .....	Cobble	Stoker	Slack
Screen Opening ..... in.	5 to $1\frac{1}{4}$ sq	$1\frac{1}{4}$ sq to $\frac{1}{4}$ sl	Minus $\frac{1}{4}$ sl
FRC Laboratory No. ....	4933-72	4934-72	4935-72
Proximate Analysis			
Moisture ..... %	3.2	4.7	11.8
Ash ..... %	7.5	6.1	7.9
Volatile Matter ..... %	10.9	11.2	10.2
Fixed Carbon ..... %	78.4	78.0	70.1
Sulphur ..... %	0.8	0.8	0.8
Calorific Value ..... Btu/lb.	13,790	13,850	12,430
Ash Fusibility			
Initial Temp. ....°F	2640+	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) .....	-	68	77
Free Swelling Index (ASTM) .....		Nonagglomerate	
Classification by Rank (ASTM) .....		Semianthracite	

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 ..... Hinton, Mountain Park Area, Alberta  
 Sec. 22, Tp. 47; R.24, W5.  
 Name of Mine or Coal ..... Luscar Strip Mine

Date Sampled .....	25-9-72	25-9-72	22-9-72
Weight Sampled (approx.) ..... tons	5	90	Stockpile
Size: Mine Designation .....	Clean Coal Product	Raw Coal Feed	"Oxidized"
Screen Opening ..... in.	Minus 2 rd	Minus 2 rd	Coal from Stockpile
FRC Laboratory No. ....	4148-72	4147-72	4149-72
Proximate Analysis			
Moisture ..... %	2.4	3.5	2.0
Ash ..... %	8.4	28.6	11.4
Volatile Matter ..... %	22.6	18.5	21.1
Fixed Carbon ..... %	66.6	49.4	65.5
Sulphur ..... %	0.3	0.4	0.4
Calorific Value ..... Btu/lb.	13,950	10,330	13,160
Ash Fusibility			
Initial Temp. ....°F	2180	2250	2510
Softening Temp:(a) Spherical ....°F	2510	2700+	2700+
(b) Hemispherical.°F	2690	2700+	2700+
Fluid Temp. ....°F	2700+	2700+	2700+
Grindability Index (Hardgrove) .....	83	-	-
Free Swelling Index (ASTM) .....	3 $\frac{1}{2}$ -4	1 $\frac{1}{2}$	1 $\frac{1}{2}$
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 feet 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 .....	4-10-72
Weight Sampled (approx.) ..... tons	300-400 (from Stockpile)
Size: Mine Designation .....	Clean Coal Product
Screen Opening ..... in.	Minus 2 rd
FRC Laboratory No. ....	4150-72
Proximate Analysis	
Moisture ..... %	3.1
Ash ..... %	8.9
Volatile Matter ..... %	21.9
Fixed Carbon ..... %	66.1
Sulphur ..... %	0.5
Calorific Value ..... Btu/lb.	13,600
Ash Fusibility	
Initial Temp. ....°F	2590
Softening Temp:(a) Spherical ....°F	2700+
(b) Hemispherical.°F	2700+
Fluid Temp. ....°F	2700+
Grindability Index (Hardgrove) .....	90
Free Swelling Index (ASTM) .....	7
Classification by Rank (ASTM) .....	Medium-volatile bituminous



Mine Operator ..... McINTYRE PORCUPINE MINES LTD. - No. 1765, No. 1771  
 Mine Location ..... Grand Cache, Smoky River Area, Alberta  
 Name of Mine and Seam ..... McIntyre Mine; No. 4 Seam

Date Sampled .....	27-9-72
Weight Sampled (approx.) ..... tons	150
Size: Mine Designation .....	Clean Coal Product
Screen Opening ..... in.	Minus $1\frac{1}{2}$ sq
FRC Laboratory No. ....	4153-72
Proximate Analysis	
Moisture ..... %	3.7
Ash ..... %	5.9
Volatile Matter ..... %	18.7
Fixed Carbon ..... %	71.7
Sulphur ..... %	0.5
Calorific Value ..... Btu/lb.	14,110
Ash Fusibility	
Initial Temp. ....°F	2330
Softening Temp:(a) Spherical ....°F	2700
(b) Hemispherical.°F	2700+
Fluid Temp. ....°F	2700+
Grindability Index (Hardgrove) .....	94
Free Swelling Index (ASTM) .....	6
Classification by Rank (ASTM) .....	Low-volatile bituminous

Remarks: Registered Number 1765 includes McIntyre underground mines Nos. 2 and 5. Registered Number 1771 includes McIntyre strip mine No. 8. Most common feed to the preparation plant consists of equal proportions from the three mines.  
 Seam thickness is about 20 ft. Overburden is up to 100 ft of shale and sandstone.

Mine Operator ..... KAISER RESOURCES LTD.  
 Mine Location ..... Michel-Natal, East Kootenay District, British Columbia.  
 Name of Mines and Seam ..... Harmer (strip mine) Hydraulic and North Balmer Mines, No. 10 Seam

Date Sampled .....	2-10-72	2-10-72
Weight Sampled (approx.) ..... tons	2000	250

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

FRC Laboratory No. ....	4152-72	4151-72
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Proximate Analysis

Moisture ..... %	6.1	3.6
Ash ..... %	8.7	13.9
Volatile Matter ..... %	21.1	20.3
Fixed Carbon ..... %	64.1	62.2
Sulphur ..... %	0.4	0.4
Calorific Value ..... Btu/lb.	13,230	12,240

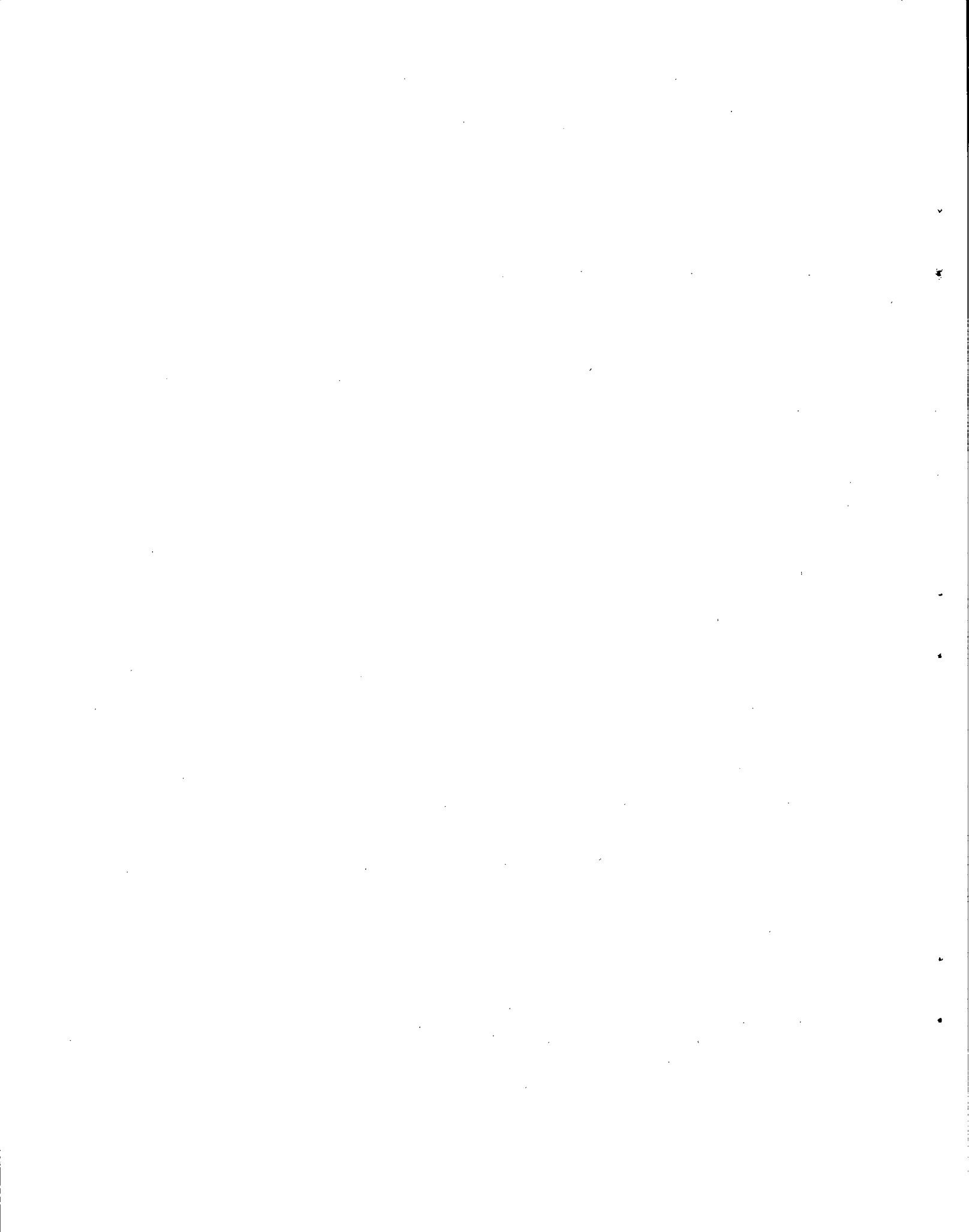
Ash Fusibility

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	
Free Swelling Index (ASTM) .....	7- $7\frac{1}{2}$	1
Classification by Rank (ASTM) .....	Medium-volatile bituminous	

Remarks: The feed to the Elkview plant consists of about 80%. Harmer strip mine coal and 20% South Balmer hydraulic mine coal. The oxidized coal is from the outcrop of the Harmer mine.

Overburden at the Harmer mine is 40 to 50 ft of shale. Stripping ratio is 7:1.



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

Date Sampled .....	18-10-72
Weight Sampled (approx.)..... tons	50
Size: Mine Designation .....	Bug Dust
Screen Opening ..... in.	Minus $\frac{1}{2}$ sq
FRC Laboratory No. ....	4235-72

Ultimate Analysis

Carbon .....	%	61.7
Hydrogen .....	%	3.6
Sulphur .....	%	1.3
Nitrogen .....	%	1.3
Ash .....	%	17.1
Oxygen (by difference) .....	%	15.0

Ash Analysis

SiO <sub>2</sub> .....	%	34.9
Al <sub>2</sub> O <sub>3</sub> .....	%	22.9
Fe <sub>2</sub> O <sub>3</sub> .....	%	6.9
TiO <sub>2</sub> .....	%	0.9
P <sub>2</sub> O <sub>5</sub> .....	%	0.2
CaO .....	%	13.2
MgO .....	%	2.8
SO <sub>3</sub> .....	%	12.9
Na <sub>2</sub> O .....	%	4.8
K <sub>2</sub> O .....	%	0.2



Mine Operator ..... MANITOBA AND SASKATCHEWAN COAL CO. (LIMITED)  
 Mine Location ..... Bienfait, Bienfait Area, Saskatchewan  
 Name of Mine or Coal ..... M & S Mine

Date Sampled ..... 17-10-72  
 Weight Sampled (approx.).....tons 10

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

FRC Laboratory No. .... 4232-72

Ultimate Analysis

Carbon .....% 65.9  
 Hydrogen .....% 3.9  
 Sulphur .....% 0.7  
 Nitrogen .....% 1.0  
 Ash .....% 11.4  
 Oxygen (by difference) .....% 17.1

Ash Analysis

SiO<sub>2</sub> .....% 32.2  
 Al<sub>2</sub>O<sub>3</sub> .....% 21.1  
 Fe<sub>2</sub>O<sub>3</sub> .....% 5.2  
 TiO<sub>2</sub> .....% 0.7  
 P<sub>2</sub>O<sub>5</sub> .....% 0.1  
 CaO .....% 16.5  
 MgO .....% 4.1  
 SO<sub>3</sub> .....% 9.0  
 Na<sub>2</sub>O .....% 9.3  
 K<sub>2</sub>O .....% 0.4

Mine Operator ..... UTILITY COALS LTD.  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Name of Mine or Coal ..... Utility Mine

Date Sampled ..... 17-10-72  
 Weight Sampled (approx.).....tons 200

Size: Mine Designation ..... Power Plant Coal  
 Screen Opening .....in. Minus  $1\frac{1}{2}$

FRC Laboratory No. .... 4229-72

Ultimate Analysis

Carbon .....	%	61.5
Hydrogen .....	%	3.7
Sulphur .....	%	0.6
Nitrogen .....	%	1.0
Ash .....	%	16.0
Oxygen (by difference) .....	%	17.2

Ash Analysis

SiO <sub>2</sub> .....	%	39.8
Al <sub>2</sub> O <sub>3</sub> .....	%	25.2
Fe <sub>2</sub> O <sub>3</sub> .....	%	4.3
TiO <sub>2</sub> .....	%	0.7
P <sub>2</sub> O <sub>5</sub> .....	%	0.5
CaO .....	%	14.0
MgO .....	%	4.0
SO <sub>3</sub> .....	%	7.4
Na <sub>2</sub> O .....	%	3.7
K <sub>2</sub> O .....	%	0.6

B. ALBERTA

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

Date Sampled .....	24-10-72	10-11-72
Weight Sampled (approx.).....tons	35	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. ....	4934-72	4935-72

Ultimate Analysis

Carbon .....	85.2	83.8
Hydrogen .....	3.8	3.7
Sulphur .....	0.9	0.9
Nitrogen .....	1.6	1.6
Ash .....	6.4	8.8
Oxygen (by difference) .....	2.1	1.2

Ash Analysis

SiO <sub>2</sub> .....	57.5	59.3
Al <sub>2</sub> O <sub>3</sub> .....	35.4	32.4
Fe <sub>2</sub> O <sub>3</sub> .....	3.0	2.7
TiO <sub>2</sub> .....	1.0	1.1
P <sub>2</sub> O <sub>5</sub> .....	1.1	0.9
CaO .....	1.6	0.9
MgO .....	0.2	0.6
SO <sub>3</sub> .....	0.2	0.3
Na <sub>2</sub> O .....	0.3	0.4
K <sub>2</sub> O .....	1.1	2.4

Mine Operator ..... CARDINAL RIVER COALS LTD. - No. 1768  
 Mine Location ..... Hinton, Mountain Park Area, Alberta  
 Name of Mine or Coal ..... Luscar Strip Mine

Date Sampled ..... 25-9-72  
 Weight Sampled (approx.)..... tons 50

Size: Mine Designation ..... Clean Coal Product  
 Screen Opening ..... in. Minus 2 rd

FRC Laboratory No. .... 4148-72

Ultimate Analysis

Carbon .....	%	81.4
Hydrogen .....	%	4.3
Sulphur .....	%	0.3
Nitrogen .....	%	1.2
Ash .....	%	8.6
Oxygen (by difference) .....	%	4.2

Ash Analysis

SiO <sub>2</sub> .....	%	50.6
Al <sub>2</sub> O <sub>3</sub> .....	%	30.0
Fe <sub>2</sub> O <sub>3</sub> .....	%	8.6
TiO <sub>2</sub> .....	%	1.0
P <sub>2</sub> O <sub>5</sub> .....	%	0.3
CaO .....	%	3.4
MgO .....	%	1.6
SO <sub>3</sub> .....	%	3.2
Na <sub>2</sub> O .....	%	1.9
K <sub>2</sub> O .....	%	0.6

Mine Operator ..... COLEMAN COLLIERIES LTD. - No. 1747  
 Mine Location ..... Coleman, Crowsnest Area, Alberta  
 Name of Mine or Coal ..... Vicary Creek Mine

Date Sampled .....	4-10-72
Weight Sampled (approx.).....tons	300-400 (from stockpile)
Size: Mine Designation .....	Clean Coal Product
Screen Opening .....in.	Minus 2 rd
FRC Laboratory No. ....	4150-72

Ultimate Analysis

Carbon .....	%	80.6
Hydrogen .....	%	4.4
Sulphur .....	%	0.6
Nitrogen .....	%	1.2
Ash .....	%	9.2
Oxygen (by difference) .....	%	4.0

Ash Analysis

SiO <sub>2</sub> .....	%	43.1
Al <sub>2</sub> O <sub>3</sub> .....	%	37.1
Fe <sub>2</sub> O <sub>3</sub> .....	%	4.5
TiO <sub>2</sub> .....	%	2.3
P <sub>2</sub> O <sub>5</sub> .....	%	2.8
CaO .....	%	5.1
MgO .....	%	0.8
SO <sub>3</sub> .....	%	2.7
Na <sub>2</sub> O .....	%	1.2
K <sub>2</sub> O .....	%	-

Mine Operator ..... CENTURY COALS LTD. - No. 1742  
 Mine Location ..... East Coulee, Drumheller Area, Alberta  
 Name of Mine or Coal ..... Atlas Mine

Date Sampled .....	5-10-72	5-10-72
Weight Sampled (approx.).....tons	20	10
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. ....	4157-72	4158-72

Ultimate Analysis

Carbon .....	64.9	67.2
Hydrogen .....	4.3	4.5
Sulphur .....	0.6	0.8
Nitrogen .....	1.5	1.5
Ash .....	12.8	10.8
Oxygen (by difference) .....	15.9	15.2

Ash Analysis

SiO <sub>2</sub> .....	47.3	42.0
Al <sub>2</sub> O <sub>3</sub> .....	30.8	31.3
Fe <sub>2</sub> O <sub>3</sub> .....	4.3	4.1
TiO <sub>2</sub> .....	0.5	0.5
P <sub>2</sub> O <sub>5</sub> .....	1.1	2.1
CaO .....	6.7	8.7
MgO .....	1.2	1.1
SO <sub>3</sub> .....	2.9	4.4
Na <sub>2</sub> O .....	5.8	6.5
K <sub>2</sub> O .....	0.7	0.7

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

Date Sampled .....	31-10-72
Weight Sampled (approx.).....tons	-
Size: Mine Designation .....	Channel Sample
Screen Opening .....in.	-
FRC Laboratory No. ....	4952-72

Ultimate Analysis

Carbon .....	%	62.1
Hydrogen .....	%	3.6
Sulphur .....	%	0.3
Nitrogen .....	%	1.4
Ash .....	%	12.0
Oxygen (by difference) .....	%	20.6

Ash Analysis

SiO <sub>2</sub> .....	%	39.3
Al <sub>2</sub> O <sub>3</sub> .....	%	23.3
Fe <sub>2</sub> O <sub>3</sub> .....	%	4.5
TiO <sub>2</sub> .....	%	0.2
P <sub>2</sub> O <sub>5</sub> .....	%	0.6
CaO .....	%	21.4
MgO .....	%	3.9
SO <sub>3</sub> .....	%	6.4
Na <sub>2</sub> O .....	%	0.3
K <sub>2</sub> O .....	%	1.1

Mine Operator ..... FORESTBURG COLLIERIES LTD. - No. 1578  
 Mine Location ..... Forestburg, Castor Area, Alberta  
 Name of Mine or Coal ..... Diplomat Strip Mine

Date Sampled .....	1-11-72	1-11-72	1-11-72
Weight Sampled (approx.).....tons	30	25	35
Size: Mine Designation .....	Nut	Stoker	Slack
Screen Opening .....in.	2 rd to $1\frac{1}{4}$ sq	$1\frac{1}{4}$ sq to $\frac{1}{2}$ s1	Minus $\frac{1}{2}$ s1
FRC Laboratory No. ....	4949-72	4950-72	4951-72

Ultimate Analysis

Carbon .....	68.2	68.1	67.9
Hydrogen .....	4.5	4.1	4.4
Sulphur .....	0.6	0.7	0.7
Nitrogen .....	1.6	1.5	1.6
Ash .....	8.3	8.6	8.5
Oxygen (by difference) .....	16.8	17.0	16.9

Ash Analysis

SiO <sub>2</sub> .....	35.0	34.4	32.3
Al <sub>2</sub> O <sub>3</sub> .....	22.2	22.7	21.1
Fe <sub>2</sub> O <sub>3</sub> .....	5.3	7.3	6.3
TiO <sub>2</sub> .....	0.4	0.4	0.4
P <sub>2</sub> O <sub>5</sub> .....	1.2	1.1	1.2
CaO .....	17.8	15.8	18.8
MgO .....	1.1	1.1	1.2
SO <sub>3</sub> .....	11.4	11.5	11.5
Na <sub>2</sub> O .....	6.5	5.7	6.4
K <sub>2</sub> O .....	0.4	0.6	0.3



Mine Operator ..... MANALTA COAL LTD. - No. 443  
 Mine Location ..... Sheerness, Sheerness Area, Alberta  
 Name of Mine or Coal ..... Roselyn Mine

Date Sampled .....	25-10-72	25-10-72	25-10-72
Weight Sampled (approx.).....tons	15	15	10
Size: Mine Designation .....	Nut	Stoker	Slack
Screen Opening .....in.	3 to 1½ rd	1½ rd to ½ sq	Minus ½ sq
FRC Laboratory No. ....	4944-72	4945-72	4946-72

Ultimate Analysis

Carbon .....	66.2	66.8	64.0
Hydrogen .....	4.3	4.3	4.4
Sulphur .....	0.5	0.5	0.7
Nitrogen .....	1.5	1.5	1.5
Ash .....	8.6	8.7	12.5
Oxygen (by difference) .....	18.9	18.2	16.9

Ash Analysis

SiO <sub>2</sub> .....	28.7	30.5	40.2
Al <sub>2</sub> O <sub>3</sub> .....	19.0	19.7	18.1
Fe <sub>2</sub> O <sub>3</sub> .....	16.0	15.7	11.8
TiO <sub>2</sub> .....	0.3	0.5	0.3
P <sub>2</sub> O <sub>5</sub> .....	0.4	0.5	0.4
CaO .....	17.8	17.2	12.3
MgO .....	1.8	1.3	1.4
SO <sub>3</sub> .....	11.0	10.9	9.7
Na <sub>2</sub> O .....	3.2	3.0	2.5
K <sub>2</sub> O .....	0.4	0.3	0.8

Mine Operator ..... MANALTA COAL LTD. - No. 1046  
 Mine Location ..... Halkirk, Castor Area, Alberta  
 Name of Mine or Coal ..... Vesta Mine

Date Sampled .....	26-10-72	26-10-72	26-10-72
Weight Sampled (approx.)..... tons	60	70	35
Size: Mine Designation .....	Nut	Stoker	Slack
Screen Opening .....in.	2 to 1 sq	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq
FRC Laboratory No. ....	4939-72	4940-72	4941-72

Ultimate Analysis

Carbon .....	68.5	67.9	65.8
Hydrogen .....	4.3	4.5	4.3
Sulphur .....	0.6	0.5	0.6
Nitrogen .....	1.6	1.5	1.5
Ash .....	8.8	9.1	11.3
Oxygen (by difference) .....	16.2	16.5	16.5

Ash Analysis

SiO <sub>2</sub> .....	35.9	37.1	43.8
Al <sub>2</sub> O <sub>3</sub> .....	23.7	24.4	26.4
Fe <sub>2</sub> O <sub>3</sub> .....	5.0	5.1	4.5
TiO <sub>2</sub> .....	0.4	0.4	0.2
P <sub>2</sub> O <sub>5</sub> .....	0.9	0.8	0.7
CaO .....	15.8	15.4	12.1
MgO .....	1.1	1.1	1.0
SO <sub>3</sub> .....	9.4	8.6	7.0
Na <sub>2</sub> O .....	6.1	5.9	4.9
K <sub>2</sub> O .....	0.4	0.4	0.7

Mine Operator ..... MANALTA COAL LTD. - No. 1769  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Name of Mine or Coal ..... Highvale Mine

Date Sampled .....	10-10-72
Weight Sampled (approx.).....tons	100
Size: Mine Designation .....	Feed to Power Plant Coal
Screen Opening .....in.	Minus $\frac{3}{4}$
FRC Laboratory No. ....	4228-72

Ultimate Analysis

Carbon .....	%	61.4
Hydrogen .....	%	3.5
Sulphur .....	%	0.3
Nitrogen .....	%	0.9
Ash .....	%	16.7
Oxygen (by difference) .....	%	17.2

Ash Analysis

SiO <sub>2</sub> .....	%	49.8
Al <sub>2</sub> O <sub>3</sub> .....	%	27.8
Fe <sub>2</sub> O <sub>3</sub> .....	%	3.8
TiO <sub>2</sub> .....	%	0.6
P <sub>2</sub> O <sub>5</sub> .....	%	0.2
CaO .....	%	12.6
MgO .....	%	1.0
SO <sub>3</sub> .....	%	2.7
Na <sub>2</sub> O .....	%	1.7
K <sub>2</sub> O .....	%	0.5

Mine Operator ..... MANALTA COAL LTD. - No. 1757  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Name of Mine or Coal ..... Whitewood Mine

Date Sampled ..... 10-10-72  
 Weight Sampled (approx.).....tons 1000

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

FRC Laboratory No. .... 4227-72

Ultimate Analysis

Carbon .....	%	63.6
Hydrogen .....	%	3.7
Sulphur .....	%	0.2
Nitrogen .....	%	0.9
Ash .....	%	13.5
Oxygen (by difference) .....	%	18.1

Ash Analysis

SiO <sub>2</sub> .....	%	49.7
Al <sub>2</sub> O <sub>3</sub> .....	%	25.0
Fe <sub>2</sub> O <sub>3</sub> .....	%	4.1
TiO <sub>2</sub> .....	%	0.6
P <sub>2</sub> O <sub>5</sub> .....	%	0.1
CaO .....	%	14.8
MgO .....	%	2.0
SO <sub>3</sub> .....	%	3.6
Na <sub>2</sub> O .....	%	1.0
K <sub>2</sub> O .....	%	0.3

Mine Operator ..... McINTYRE PORCUPINE MINES LTD. - No. 1765, No. 1771  
 Mine Location ..... Grand Cache, Smoky River Area, Alberta  
 Name of Mine or Coal ..... McIntyre Mine

Date Sampled .....	27-9-72
Weight Sampled (approx.).....tons	150

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

FRC Laboratory No. ....	4153-72
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<u>Ultimate Analysis</u>	
Carbon .....	85.3
Hydrogen .....	4.4
Sulphur .....	0.5
Nitrogen .....	1.3
Ash .....	6.1
Oxygen (by difference) .....	2.4

<u>Ash Analysis</u>	
SiO <sub>2</sub> .....	49.6
Al <sub>2</sub> O <sub>3</sub> .....	32.2
Fe <sub>2</sub> O <sub>3</sub> .....	5.2
TiO <sub>2</sub> .....	1.1
P <sub>2</sub> O <sub>5</sub> .....	1.9
CaO .....	5.0
MgO .....	0.8
SO <sub>3</sub> .....	2.7
Na <sub>2</sub> O .....	2.0
K <sub>2</sub> O .....	0.3

C. BRITISH COLUMBIA

Mine Operator ..... FORDING COAL LTD.  
 Mine Location ..... Elkford, British Columbia  
 Name of Mine or Coal ..... Clode and Greenhill Pits

Date Sampled .....	3-10-72
Weight Sampled (approx.).....tons	-

Size: Mine Designation .....	Clean Coal Product
Screen Opening .....in.	-

FRC Laboratory No. ....	4932-72
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Ultimate Analysis

Carbon .....	81.6
Hydrogen .....	4.6
Sulphur .....	0.5
Nitrogen .....	1.4
Ash .....	8.4
Oxygen (by difference) .....	3.5

Ash Analysis

SiO <sub>2</sub> .....	56.1
Al <sub>2</sub> O <sub>3</sub> .....	32.2
Fe <sub>2</sub> O <sub>3</sub> .....	5.5
TiO <sub>2</sub> .....	1.6
P <sub>2</sub> O <sub>5</sub> .....	1.5
CaO .....	1.7
MgO .....	0.5
SO <sub>3</sub> .....	0.5
Na <sub>2</sub> O .....	0.3
K <sub>2</sub> O .....	1.1

Mine Operator ..... KAISER RESOURCES LTD.  
 Mine Location ..... Michel-Natal, East Kootenay District,  
 British Columbia.  
 Name of Mine or Coal ..... Harner Strip and South Balmer Hydraulic Mines

Date Sampled .....	2-10-72
Weight Sampled (approx.).....tons	2000

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

FRC Laboratory No. ....	4152-72
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Ultimate Analysis

Carbon .....	80.7
Hydrogen .....	4.4
Sulphur .....	0.4
Nitrogen .....	1.1
Ash .....	9.3
Oxygen (by difference) .....	4.1

Ash Analysis

SiO <sub>2</sub> .....	58.1
Al <sub>2</sub> O <sub>3</sub> .....	32.8
Fe <sub>2</sub> O <sub>3</sub> .....	3.3
TiO <sub>2</sub> .....	1.5
P <sub>2</sub> O <sub>5</sub> .....	0.8
CaO .....	2.2
MgO .....	0.6
SO <sub>3</sub> .....	0.9
Na <sub>2</sub> O .....	0.1
K <sub>2</sub> O .....	0.4

