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# EVALUATION OF CANADIAN COMMERCIAL COALS: SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA - 1975

T.E. Tibbetts  
Coal Resources and Processing Laboratory  
Coal and Peat Resources Evaluation Section

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EVALUATION OF CANADIAN COMMERCIAL COALS:  
SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA - 1975

by  
T.E. Tibbetts\*

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ABSTRACT

The physical and chemical analyses of samples of coals from mining operations in the three coal mining provinces of western Canada, Saskatchewan, Alberta, and British Columbia, are reported. They include lignite, subbituminous and bituminous coals. In addition, the chemical analyses of ash of most of the same coals are reported in a separate section.

The samples were taken and analyzed by the Energy Research Laboratories during the year 1975. They represent the production, on a specified day, of the coals as commercially prepared at the mine.

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\*Head, Coal and Peat Resources Evaluation, Energy Research Laboratories, CANMET, Department of Energy, Mines and Resources, Ottawa, Canada.

EVALUATION DES HOUILLES COMMERCIALES CANADIENNES:  
SASKATCHEWAN, ALBERTA ET COLOMBIE-BRITANNIQUE - 1975

par

T.E. Tibbetts\*

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SOMMAIRE

L'auteur fait ici rapport des résultats d'analyses physiques et chimiques d'échantillons de houilles provenant d'exploitations minières des trois provinces houillères de l'Ouest canadien, la Saskatchewan, l'Alberta et la Colombie-Britannique. Ces échantillons contiennent de la lignite, de la houille grasse et de la houille maigre. De plus, il donne les résultats de l'analyse chimique de la cendre de la plupart de ces charbons dans une section séparée.

Les échantillons ont été prélevés et analysés par les Laboratoires de recherche sur l'énergie pendant l'année 1975. Ils sont représentatifs de la production journalière de la houille préparée commercialement à la mine.

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\*Chef, Evaluation des ressources en charbon et tourbe, Laboratoires de recherche sur l'énergie, CANMET, Ministère de l'Énergie, des Mines et des Ressources, Ottawa, Canada.

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## INTRODUCTION

This publication contains analyses of samples of commercial lignite, subbituminous and bituminous coals produced in Saskatchewan, Alberta and British Columbia during 1975. The samples were collected by the Energy Research Laboratories under the project entitled "Evaluation of Canadian Commercial Coals". All analyses were conducted by the Energy Research Laboratories. Lignite coals from Saskatchewan are reported in Section I on the equilibrium or in situ moisture basis. Subbituminous coals from Alberta are reported on the same basis in Section II. Sections III and IV contain analyses on the "as-received" moisture basis, of bituminous coals from Alberta and British Columbia, respectively. The ultimate analyses on the dry basis and the chemical analyses of ash of selected samples are reported in Section V.

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

Outputs from mines in western Canada were sampled by members of the staff of the Western Regional Laboratory, with assistance of the mine operators. In some instances samples were taken from coal-feeding conveyors to power plants. The gross samples were crushed and reduced in volume before being shipped to Energy Research Laboratories, 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.

The following are definitions of some terms used in this publication:

### Proximate Analysis

- the determination by prescribed methods of moisture, volatile matter, fixed carbon (by difference) and ash.

### Ultimate Analysis

- the determination of carbon and hydrogen in the material, as found in the gaseous products of its complete combustion, the determination of sulphur, nitrogen, and ash in the material as a whole, and the estimation of oxygen by difference.

Equilibrium Moisture of Coal

- the moisture content retained at equilibrium in an atmosphere over a saturated solution of potassium sulphate at 30°C and 96 to 97 per cent relative humidity. When the sample, before such equilibration, contains total moisture at or above the equilibrium moisture, the equilibrium moisture may be considered as equivalent to inherent or in situ moisture, and any excess may be considered as extraneous.

Lignite

- coal having less than 69 per cent fixed carbon on the dry, mineral-matter-free basis and a moist, mineral-matter-free heating value of more than 6,300 and less than 8,300 Btu per pound and does not agglomerate. Moist refers to coal containing its natural inherent moisture but not including visible water on the surface of the coal.

Subbituminous

- coal having less than 69 per cent fixed carbon on the dry, mineral-matter-free basis, or a moist, mineral-matter-free heating value of more than 8,300 and less than 11,500 Btu per pound and does not agglomerate.

Bituminous

- coal having more than 69 and less than 86 per cent fixed carbon on the dry, mineral-matter-free basis, or a moist, mineral-matter-free heating value of more than 10,500 Btu per pound and is commonly agglomerating.

Semi-anthracite

- coal having more than 86 and less than 92 per cent fixed carbon on the dry, mineral-matter-free basis and does not agglomerate.

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
- SPC - Saskatchewan Power Corporation



COAL AREAS AND PRINCIPAL MINES

(with approximate production in 1975 in thousands of short tons)

SASKATCHEWAN

(SOURIS VALLEY DISTRICT)

1. Lignite - Surface Mines

Estevan Area

Manalta Coal Ltd. (Klimax Mine)	. . . . .	800
Manitoba and Saskatchewan Coal Company (Limited) (Boundary Dam Mine)	. . . . .	1,570
Utility Coals Ltd. (Utility Mine)	. . . . .	1,110

Bienfait Area

Manitoba and Saskatchewan Coal Company (Limited) (Bienfait Mine)	. . . . .	440
---	-----------	-----

ALBERTA

1. Subbituminous - Surface Mines

Ardley Area

Sissons Mines Ltd. (No. 809)	. . . . .	12
------------------------------	-----------	----

Camrose Area

Dodds Coal Mining Co. Ltd. (No. 215)	. . . . .	10
--------------------------------------	-----------	----

Castor Area

Manalta Coal Ltd. (Vesta Mine) (No. 1046)	. . . . .	560
Forestburg Collieries Ltd. (No. 1578)	. . . . .	1,100

Edmonton Area

Egg Lake Coal Co. Ltd. (No. 1582)	. . . . .	23
-----------------------------------	-----------	----

Pembina Area

Manalta Coal Ltd. (Whitewood Mine) (No. 1757)	. . . . .	2,480
Manalta Coal Ltd. (Highvale Mine) (No. 1769)	. . . . .	1,935

Sheerness Area

Manalta Coal Ltd. (Roselyn Mine) (No. 443)	. . . . .	250
--	-----------	-----

Westlock Area

North Point Coal Co. Ltd. (No. 1562)	. . . . .	14
--------------------------------------	-----------	----

ALBERTA (Cont'd)

2. Subbituminous - Underground Mines

Drumheller Area		
Century Coals Ltd. (No. 1742)	. . . . .	37
Edmonton Area		
Star-Key Mines Ltd. (No. 1626)	. . . . .	10

3. Bituminous - Surface Mines

Cascade Area		
The Canmore Mines Limited (Walker No. 1)	. . . . .	24
Crowsnest Area		
Coleman Collieries Limited (No. 1695, Tent Mountain)	. . . . .	1,015
Mountain Park Area		
Cardinal River Coals Ltd. (No. 1768)	. . . . .	2,145
Smokey River Area		
McIntyre Mines Limited (No. 9)	. . . . .	2,210

4. Bituminous - Underground Mines

Cascade Area		
The Canmore Mines Limited (Wilson)	. . . . .	118
The Canmore Mines Limited (Riverside No. 4)	. . . . .	64
Crowsnest Area		
Coleman Collieries Limited (Vicary Creek)	. . . . .	223
Mountain Park Area		
McIntyre Mines Limited (No. 2)	. . . . .	885

BRITISH COLUMBIA

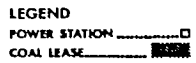
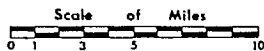
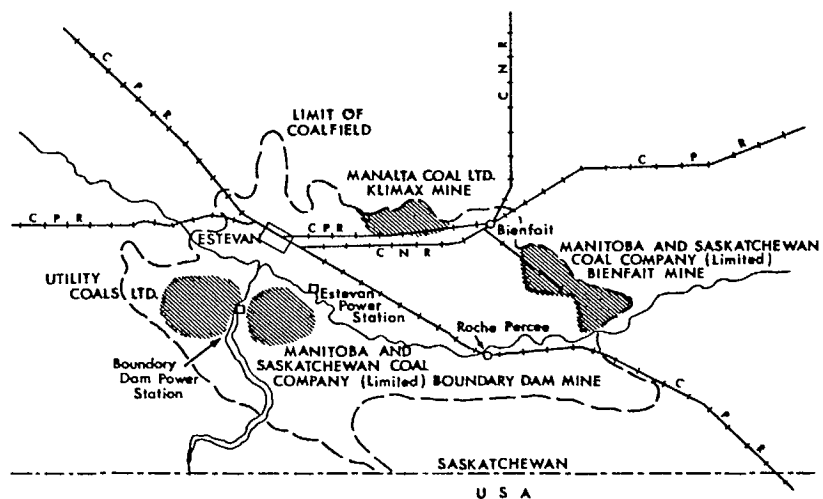
1. Bituminous - Surface Mines

East Kootenay District		
Kaiser Resources Limited (Harmer Ridge)	. . . . .	7,270
Fording Coal Limited (Fording Mine)	. . . . .	4,800
Byron Creek Collieries Limited (Corbin Mine)	. . . . .	373

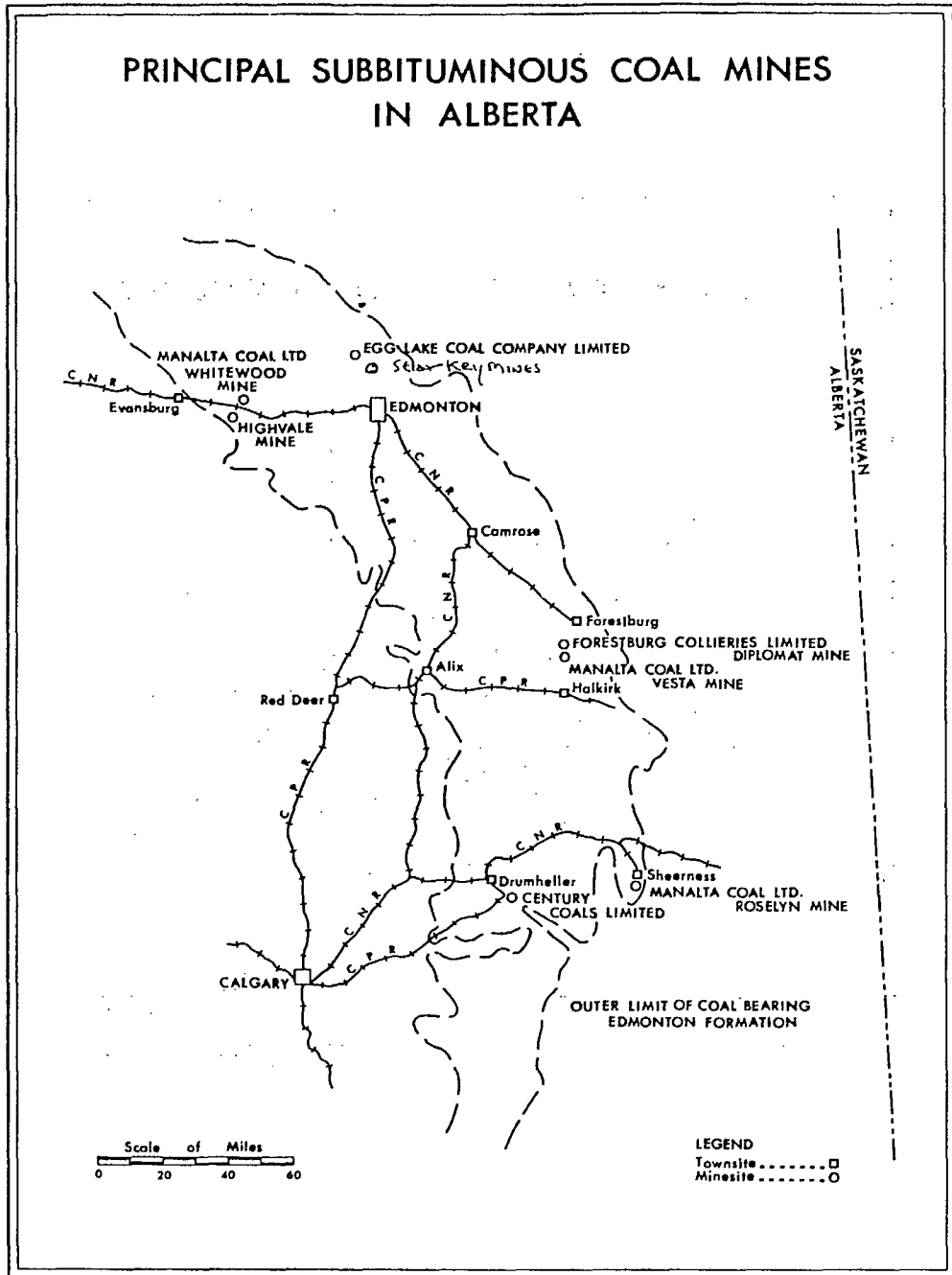
2. Bituminous - Underground Mines

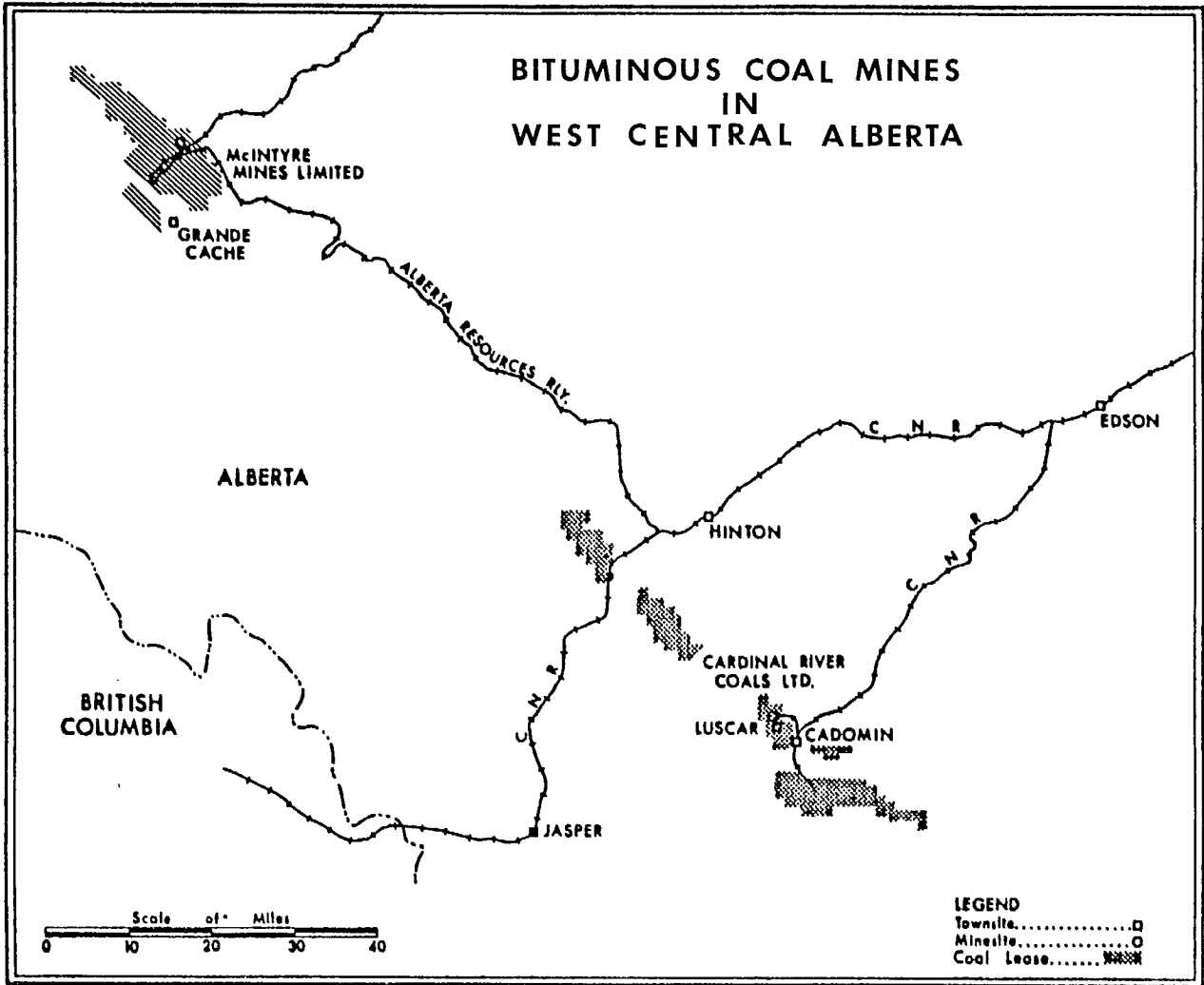
East Kootenay District		
Kaiser Resources Limited (Michel Colliery)	. . . . .	1,240

# LIGNITE COAL MINES IN SASKATCHEWAN

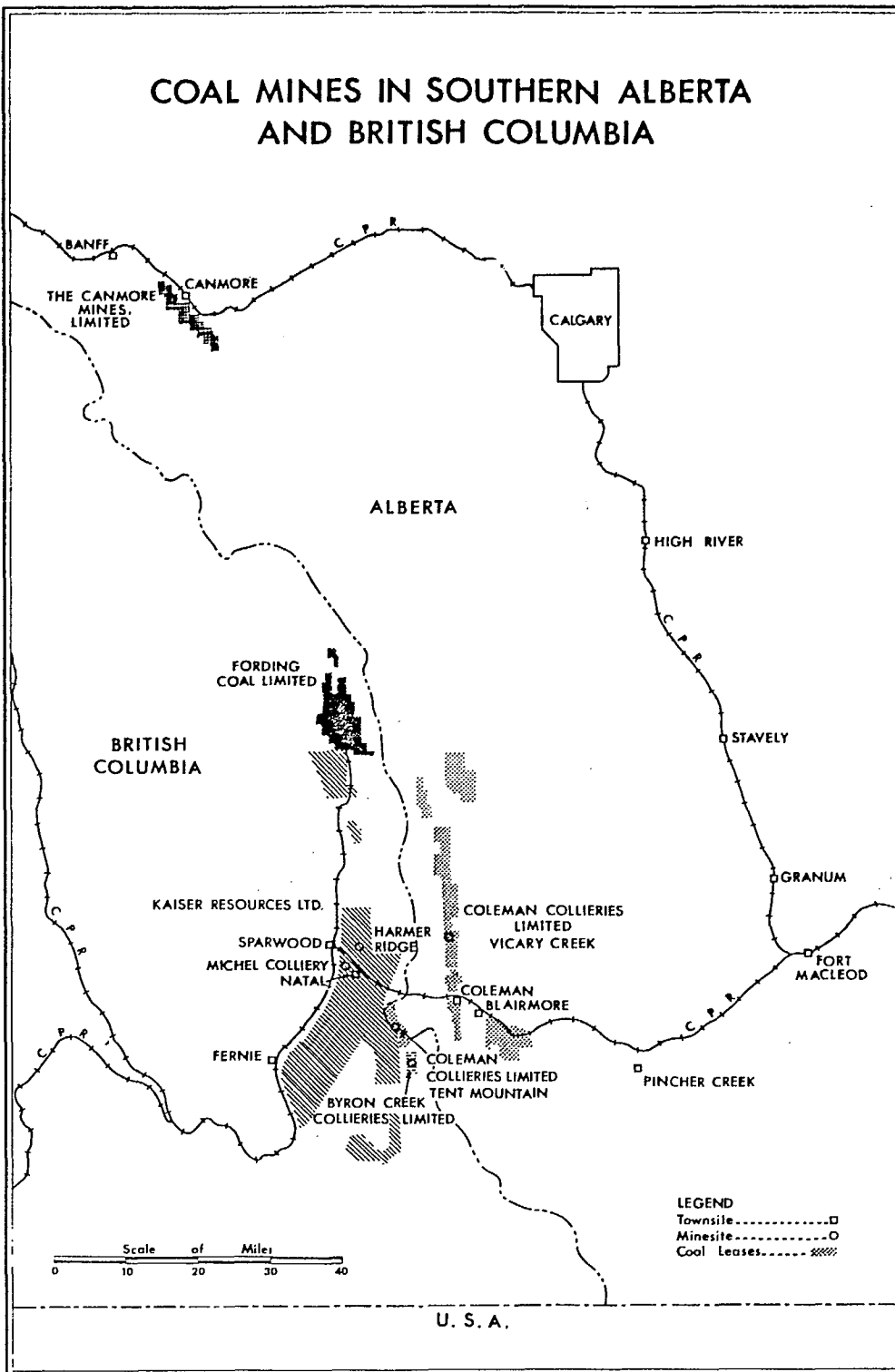


# PRINCIPAL SUBBITUMINOUS COAL MINES IN ALBERTA





# COAL MINES IN SOUTHERN ALBERTA AND BRITISH COLUMBIA



SECTION I

LIGNITE COALS

FROM

SASKATCHEWAN

(Analyses are reported on the Equilibrium Moisture Basis)

Mine Operator .....  
 Mine Location .....  
 Name of Mine or Coal .....

MANALTA COAL LTD.  
 Estevan, Estevan Area, Saskatchewan  
 Klimax Mine. Surface (1)

Date Sampled .....	10-09-75	10-09-75	10-09-75
Weight Sampled (approx.) ..... tons	40	60	100
Size: Mine Designation .....	Booker	Pea	Slack
Screen Opening ..... in.	2 to 1 sq	1 $\frac{1}{4}$ sq to $\frac{3}{8}$ slot	Minus $\frac{3}{8}$ slot
ERL Laboratory No. ....	3317-75	3318-75	3319-75
<b>Proximate Analysis</b>			
Moisture ..... %	28.5	28.5	28.5
Ash ..... %	8.4	9.8	11.4
Volatile Matter ..... %	28.9	27.8	27.4
Fixed Carbon ..... %	34.2	33.9	32.7
Sulphur ..... %	0.4	0.4	0.5
Calorific Value ..... Btu/lb.	7530	7340	7120
<b>Ash Fusibility</b>			
Initial Temp. ....°F	2140	2090	2080
Softening Temp:(a) Spherical ....°F	2210	2160	2130
(b) Hemispherical.°F	2230	2210	2230
Fluid Temp. ....°F	2280	2260	2270
Grindability Index (Hardgrove) .....	56	60	62
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	LIGNITE A		

(1) 9-ft seam, horizontal; overburden 30 to 65 ft. Furrow mining method.



Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Name of Mine or Coal ..... Klimax (South) Mine. Surface<sup>(1)</sup>

Date Sampled ..... 09-09-75

Weight Sampled (approx.) ..... tons 100

Size: Mine Designation ..... Feed to SPC Estevan  
 Generating Station  
 Screen Opening ..... in. Minus  $1\frac{1}{2}$

ERL Laboratory No. .... 3320-75

Proximate Analysis

Moisture ..... % 29.2

Ash ..... % 11.3

Volatile Matter ..... % 27.3

Fixed Carbon ..... % 32.2

Sulphur ..... % 0.4

Calorific Value ..... Btu/lb. 7270

Ash Fusibility

Initial Temp. .... °F 2170

Softening Temp:(a) Spherical .... °F 2230

(b) Hemispherical. °F 2320

Fluid Temp. .... °F 2430

Grindability Index (Hardgrove) ..... 54

Free Swelling Index (ASTM) ..... NA

Classification by Rank (ASTM) ..... LIGNITE A

(1) 9-ft seam, horizontal; overburden 30 to 65 ft. Furrow mining method.

Mine Operator ..... MANITOBA & SASKATCHEWAN COAL CO. (LIMITED)  
 Mine Location ..... Bienfait, Bienfait Area, Saskatchewan  
 Name of Mine or Coal ..... Bienfait Mine: Surface (1)

Date Sampled .....	08-09-75	08-09-75	08-09-75
Weight Sampled (approx.) ..... tons	160	250	200
Size: Mine Designation .....	Booker	1" Minus	2" Minus
Screen Opening ..... in.	2 to 1 sq	Minus 1 sq	Minus 2 sq
ERL Laboratory No. ....	3322-75	3323-75	3324-75
<b>Proximate Analysis</b>			
Moisture ..... %	28.0	28.0	28.0
Ash ..... %	7.2	8.6	9.8
Volatile Matter ..... %	30.7	31.6	29.5
Fixed Carbon ..... %	34.1	31.8	32.7
Sulphur ..... %	0.5	0.4	0.4
Calorific Value ..... Btu/lb.	7880	7680	7450
<b>Ash Fusibility</b>			
Initial Temp. ....°F	2010	2140	2120
Softening Temp:(a) Spherical ....°F	2190	2170	2150
(b) Hemispherical.°F	2210	2200	2210
Fluid Temp. ....°F	2250	2250	2260
Grindability Index (Hardgrove) .....	40	48	48
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	LIGNITE A		

(1) 10-ft seam, horizontal; overburden 50 to 80 ft. Furrow mining method.

Mine Operator ..... MANITOBA AND SASKATCHEWAN COAL CO. (LIMITED)  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Name of Mine or Coal ..... Boundary Dam Mine - Surface (1)

Date Sampled ..... 09-09-75

Weight Sampled (approx.) ..... tons 500

Size: Mine Designation ..... Feed to SPC

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

ERL Laboratory No. .... 3321-75

Proximate Analysis

Moisture ..... % 26.0

Ash ..... % 18.1

Volatile Matter ..... % 26.2

Fixed Carbon ..... % 29.7

Sulphur ..... % 0.6

Calorific Value ..... Btu/lb. 6710

Ash Fusibility

Initial Temp. ....°F 2100

Softening Temp:(a) Spherical ....°F 2290

(b) Hemispherical.°F 2370

Fluid Temp. ....°F 2480

Grindability Index (Hardgrove) ..... 51

Free Swelling Index (ASTM) ..... NA

Classification by Rank (ASTM) ..... LIGNITE A

(1) 3 seams, total thickness 8 ft; dip less than 1°; Overburden 50-150 ft.  
 Strip method mining.

SECTION II

SUBBITUMINOUS COALS

FROM

ALBERTA

(Analyses are reported on the Equilibrium Moisture Basis)

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

Date Sampled .....	22-09-75	22-09-75	22-09-75
Weight Sampled (approx.) ..... tons	80	50	20
Size: Mine Designation .....	Lump	Egg	Nut
Screen Opening ..... in.	12 to $4\frac{1}{2}$ rd	$4\frac{1}{2}$ to 2 rd	2 to $1\frac{3}{8}$ rd
ERL Laboratory No. ....	3366-75	3367-75	3368-75
<b>Proximate Analysis</b>			
Moisture ..... %	15.5	15.5	15.5
Ash ..... %	7.5	9.6	12.6
Volatile Matter ..... %	32.6	34.1	31.0
Fixed Carbon ..... %	44.4	40.8	40.9
Sulphur ..... %	0.5	0.5	0.6
Calorific Value ..... Btu/lb.	9650	9410	8960
<b>Ash Fusibility</b>			
Initial Temp. ....°F	2210	2390	2430
Softening Temp:(a) Spherical ....°F	2310	2450	2530
(b) Hemispherical.°F	2430	2550	2680
Fluid Temp. ....°F	2590	2700+	2700+
Grindability Index (Hardgrove) .....	35	34	37
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	Subbituminous B		

(1) 13-ft seam; horizontal. Overburden 500 ft. Room and pillar mining.

Mine Operator .....	CENTURY COALS LIMITED
Mine Location .....	East Coulee, Drumheller Area, Alberta Sec 6, Tp27; R18, W4.
Name of Mine or Coal .....	Mine No.1742 - Atlas Mine. Underground (1)

Date Sampled .....	22-09-75	22-09-75
Weight Sampled (approx.) ..... tons	40	50
Size: Mine Designation .....	Stoker	Slack
Screen Opening ..... in.	1 $\frac{3}{8}$ to 5 $\frac{5}{8}$ rd	Minus 5 $\frac{5}{8}$ rd
ERL Laboratory No. ....	3369-75	3370-75
<b>Proximate Analysis</b>		
Moisture ..... %	15.5	15.5
Ash ..... %	11.1	10.8
Volatile Matter ..... %	31.4	31.5
Fixed Carbon ..... %	42.0	42.2
Sulphur ..... %	0.5	0.5
Calorific Value ..... Btu/lb.	9210	9220
<b>Ash Fusibility</b>		
Initial Temp. ....°F	2440	2380
Softening Temp:(a) Spherical ....°F	2480	2460
(b) Hemispherical.°F	2620	2550
Fluid Temp. ....°F	2700+	2610
Grindability Index (Hardgrove) .....	36	37
Free Swelling Index (ASTM) .....	NA	NA
Classification by Rank (ASTM) .....	Subbituminous B	

(1) 13-ft seam; horizontal. Overburden 500 ft. Room and pillar mining.

Mine Operator ..... FORESTBURG COLLIERIES LIMITED  
 Mine Location ..... Forestburg, Castor Area, Alberta  
 Sec 6, Tp 41; R15, W4.  
 Name of Mine or Coal ..... Mine No.1578 - Diplomat Mine. Surface (1)

Date Sampled .....	01-10-75	01-10-75	01-10-75
Weight Sampled (approx.) ..... tons	48	30	25
Size: Mine Designation .....	Lump	Egg	Nut
Screen Opening ..... in.	12 to $4\frac{1}{2}$ rd	$4\frac{1}{2}$ to 2 rd	2 rd to $1\frac{1}{4}$ sq
ERL Laboratory No. ....	3379-75	3380-75	3381-75
<b>Proximate Analysis</b>			
Moisture ..... %	20.8	20.8	20.8
Ash ..... %	5.8	5.7	7.8
Volatile Matter ..... %	32.8	32.8	32.6
Fixed Carbon ..... %	40.6	40.7	38.8
Sulphur ..... %	0.3	0.4	0.4
Calorific Value ..... Btu/lb.	9180	9220	8930
<b>Ash Fusibility</b>			
Initial Temp. ....°F	2090	2090	2200
Softening Temp:(a) Spherical ....°F	2150	2180	2310
(b) Hemispherical.°F	2240	2220	2380
Fluid Temp. ....°F	2310	2300	2500
Grindability Index (Hardgrove) .....	35	35	36
Free Swelling Index (ASTM) .....	-	-	-
Classification by Rank (ASTM) .....	Subbituminous B		

(1) One 4- to 6-ft seam; horizontal. Overburden 35 to 55 ft. Furrow mining method.

Mine Operator ..... FORESTBURG COLLIERIES LIMITED  
 Mine Location ..... Forestburg, Castor Area, Alberta  
 Sec 6, Tp41; R15, W4.  
 Name of Mine or Coal ..... Mine No.1578 - Diplomat Mine. Surface<sup>(1)</sup>

Date Sampled .....	01-10-75	01-10-75
Weight Sampled (approx.) ..... tons	40	20
Size: Mine Designation .....	Stoker	Slack
Screen Opening ..... in.	$1\frac{1}{4}$ to $\frac{1}{2}$ slot	Minus $\frac{1}{2}$ slot
ERL Laboratory No. ....	3382-75	3383-75
<b>Proximate Analysis</b>		
Moisture ..... %	20.8	20.8
Ash ..... %	8.2	10.4
Volatile Matter ..... %	31.9	31.3
Fixed Carbon ..... %	39.1	37.5
Sulphur ..... %	0.4	0.4
Calorific Value ..... Btu/lb.	8820	8540
<b>Ash Fusibility</b>		
Initial Temp. ....°F	2290	2220
Softening Temp:(a) Spherical ....°F	2380	2380
(b) Hemispherical.°F	2530	2500
Fluid Temp. ....°F	2550	2550
Grindability Index (Hardgrove) .....	34	35
Free Swelling Index (ASTM) .....	-	-
Classification by Rank (ASTM) .....	Subbituminous B	

(1) One 4-to 6-ft seam; horizontal. Overburden 35 to 55 ft. Furrow mining method.



Mine Operator .....	MANALTA COAL LTD
Mine Location .....	Sheerness, Sheerness Area, Alberta Sec 14, Tp29; R13, W4.
Name of Mine or Coal .....	Mine No.443 - Roselyn Mine. Surface (1)

Date Sampled .....	24-09-75	24-09-75	24-09-75
Weight Sampled (approx.) ..... tons	40	15	100

Size: Mine Designation .....	Lump	Stoker	Minus 4
Screen Opening ..... in.	6 to 4 rd	1- $\frac{1}{2}$ rd to $\frac{1}{4}$ sq	Minus 4 rd

ERL Laboratory No. ....	3371-75	3372-75	3373-75
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Proximate Analysis

Moisture ..... %	22.2	22.2	22.2
Ash ..... %	7.2	12.6	9.0
Volatile Matter ..... %	34.9	31.6	33.2
Fixed Carbon ..... %	35.7	33.6	35.6
Sulphur ..... %	0.4	0.4	0.4
Calorific Value ..... Btu/lb.	8600	7970	8400
Ash Fusibility			
Initial Temp. ....°F	2030	2130	2090
Softening Temp:(a) Spherical ....°F	2090	2370	2250
(b) Hemispherical.°F	2240	2450	2350
Fluid Temp. ....°F	2400	2640	2480
Grindability Index (Hardgrove) .....	36	39	36
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	Subbituminous C		

(1) One 6-ft seam; horizontal. Overburden 25 to 45 ft. Furrow mining method.

Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Halkirk, Castor Area, Alberta  
 Sec 20, Tp40; R15, W4.  
 Name of Mine or Coal ..... Mine No.1046 - Vesta Mine. Surface (1)

Date Sampled .....	29-09-75	29-09-75	29-09-75
Weight Sampled (approx.) ..... tons	40	25	35
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
ERL Laboratory No. ....	3374-75	3375-75	3376-75
Proximate Analysis			
Moisture ..... %	20.5	20.5	20.5
Ash ..... %	6.6	6.5	8.4
Volatile Matter ..... %	33.3	31.8	31.1
Fixed Carbon ..... %	39.6	41.2	40.0
Sulphur ..... %	0.4	0.4	0.4
Calorific Value ..... Btu/lb.	9250	9170	8890
Ash Fusibility			
Initial Temp. ....°F	2070	2110	2030
Softening Temp: (a) Spherical ....°F	2110	2130	2150
(b) Hemispherical.°F	2150	2190	2330
Fluid Temp. ....°F	2270	2280	2380
Grindability Index (Hardgrove) .....	35	36	38
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....		Subbituminous B	

(1) One 6-ft seam; horizontal. Overburden 40 to 60 ft. Furrow mining method.

Mine Operator ..... MANALTA COAL LTD  
 Mine Location ..... Halkirk, Castor Area, Alberta  
 Sec 20, Tp 40; R15, W4.  
 Name of Mine or Coal ..... Mine No.1046 - Vesta Mine (Surface)  
 (cont'd)

Date Sampled .....	29-09-75	29-09-75
Weight Sampled (approx.) ..... tons	60	25

Size: Mine Designation .....	Stoker	Slack
Screen Opening ..... in.	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq

ERL Laboratory No. ....	3377-75	3378-75
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Proximate Analysis

Moisture .....	21.5	21.5
Ash .....	7.4	8.9
Volatile Matter .....	33.5	40.1
Fixed Carbon .....	37.6	29.5
Sulphur .....	0.4	0.4
Calorific Value .....	8950	8640
Ash Fusibility		
Initial Temp. ....°F	1980	2050
Softening Temp:(a) Spherical ....°F	2110	2240
(b) Hemispherical.°F	2350	2400
Fluid Temp. ....°F	2350	2400
Grindability Index (Hardgrove) .....	36	38
Free Swelling Index (ASTM) .....	NA	NA
Classification by Rank (ASTM) .....	Subbituminous B	

Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Sec 14 & 15, Tp53; R4, W5.  
 Name of Mine or Coal ..... Mine No.1757 - Whitewood Mine. Surface (1)

Date Sampled ..... 18-06-75

Weight Sampled (approx.) ..... tons 100,000

Size: Mine Designation ..... Feed to Calgary Power Plant<sup>(2)</sup>

Screen Opening ..... in. Minus  $\frac{3}{4}$

ERL Laboratory No. .... 2990-75

Proximate Analysis

Moisture ..... % 17.7

Ash ..... % 14.5

Volatile Matter ..... % 29.9

Fixed Carbon ..... % 37.9

Sulphur ..... % 0.2

Calorific Value ..... Btu/lb. 8310

Ash Fusibility

Initial Temp. ....°F 2290

Softening Temp:(a) Spherical ....°F 2470

(b) Hemispherical.°F 2650

Fluid Temp. ....°F 2670

Grindability Index (Hardgrove) ..... 44

Free Swelling Index (ASTM) ..... NA

Classification by Rank (ASTM) ..... Subbituminous B

(1) Five seams with total thickness of 25 ft; undulating. Overburden 40 to 85 ft. Furrow mining method.

(2) Sampled from shuttle conveyor stockpile.

Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Sec 29, Tp52; R4, W5.  
 Name of Mine or Coal ..... Mine No.1769 - Highvale Mine. Surface (1)

Date Sampled ..... 18-06-75

Weight Sampled (approx.) ..... tons 250

Size: Mine Designation ..... Feed to Calgary Power Plant

Screen Opening ..... in. Minus 1

ERL Laboratory No. .... 2989-75

Proximate Analysis

Moisture .....	%	20.1
Ash .....	%	11.0
Volatile Matter .....	%	33.2
Fixed Carbon .....	%	35.7
Sulphur .....	%	0.1
Calorific Value .....	Btu/lb.	8570
Ash Fusibility		
Initial Temp. ....	°F	2490
Softening Temp:(a) Spherical ....	°F	2590
(b) Hemispherical.	°F	2650
Fluid Temp. ....	°F	2700+
Grindability Index (Hardgrove) .....		42
Free Swelling Index (ASTM) .....		NA
Classification by Rank (ASTM) .....		Subbituminous B

(1) Four seams with total thickness of 25 ft; horizontal. Overburden 25 to 70 ft.

Mine Operator ..... STAR-KEY MINES LTD.  
 Mine Location ..... St. Albert, Edmonton Area, Alberta  
 Sec 35, Tp 54; R25, W4.  
 Name of Mine or Coal ..... Mine No.1626-Star-Key. Underground (1)

Date Sampled .....	02-10-75	02-10-75	02-10-75
Weight Sampled (approx.) ..... tons	20	15	15
Size: Mine Designation .....	Lump	Stove	Nut
Screen Opening ..... in.	Plus 4½ rd	4½ rd to 2 sq	2 to 1⅛ sq
ERL Laboratory No. ....	3384-75	3385-75	3386-75
<b>Proximate Analysis</b>			
Moisture ..... %	20.0	20.0	20.0
Ash ..... %	8.1	9.0	9.0
Volatile Matter ..... %	34.1	32.7	32.6
Fixed Carbon ..... %	37.8	38.3	38.4
Sulphur ..... %	0.2	0.2	0.2
Calorific Value ..... Btu/lb.	9040	8850	8700
<b>Ash Fusibility</b>			
Initial Temp. ....°F	2270	2350	2450
Softening Temp:(a) Spherical ....°F	2350	2430	2510
(b) Hemispherical.°F	2540	2580	2640
Fluid Temp. ....°F	2590	2600	2700
Grindability Index (Hardgrove) .....	-	-	-
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	Subbituminous B		

(1) Room and pillar mining method.

Mine Operator ..... STAR-KEY MINES LTD.  
 Mine Location ..... St. Albert, Edmonton Area, Alberta  
 Sec 35, Tp 54; R25, W4  
 Name of Mine or Coal ..... Mine No.1626-Star-Key. Underground  
 (cont'd)

Date Sampled .....	02-10-75	02-10-75
Weight Sampled (approx.) ..... tons	15	60

Size: Mine Designation .....	Stoker	Slack
Screen Opening ..... in.	$1\frac{1}{8}$ to $\frac{3}{8}$ sq	Minus $\frac{3}{8}$ sq

ERL Laboratory No. ....	3387-75	3388-75
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Proximate Analysis

Moisture ..... %	20.0	20.0
Ash ..... %	10.3	12.8
Volatile Matter ..... %	32.5	30.5
Fixed Carbon ..... %	37.2	36.7
Sulphur ..... %	0.3	0.3
Calorific Value ..... Btu/lb.	8710	83

Ash Fusibility

Initial Temp. ....°F	2400	2400
Softening Temp:(a) Spherical ....°F	2480	2500
(b) Hemispherical.°F	2600	2580
Fluid Temp. ....°F	2700+	2620

Grindability Index (Hardgrove) .....	-	-
Free Swelling Index (ASTM) .....	NA	NA
Classification by Rank (ASTM) .....	Subbituminous B	





SECTION III

BITUMINOUS COALS

FROM

ALBERTA

(Analyses are reported on "As-Received" Moisture Basis)

Mine Operator ..... THE CANMORE MINES LIMITED  
 Mine Location ..... Canmore, Cascade Area, Alberta  
 Tp 24; R10, W5.  
 Name of Mine or Coal ..... Mine No.2-Wilson Mine. Underground (1)(2)

Date Sampled .....	26-06-75	26-06-75	26-06-75
Weight Sampled (approx.) .....tons	30	40	100
Size: Mine Designation .....	Cobble	Stoker	Slack
Screen Opening .....in.	5 to 1 sq	1 $\frac{1}{4}$ to $\frac{1}{4}$ sq	Minus $\frac{1}{4}$ sq
FRC Laboratory No. ....	2985-75	2986-75	2987-75
Proximate Analysis			
Moisture .....%	1.2	4.5	8.9
Ash .....%	6.6	7.1	7.4
Volatile Matter .....%	31.8	11.1	10.6
Fixed Carbon .....%	60.4	77.3	73.1
Sulphur .....%	0.8	0.8	0.8
Calorific Value .....Btu/lb.	14,290	13,690	12,970
Ash Fusibility			
Initial Temp. ....°F	2700+	2660	2530
Softening Temp: (a) Spherical .....°F	2700+	2700+	2700+
(b) Hemispherical.....°F	2700+	2700+	2700+
Fluid Temp. ....°F	2700+	2700+	2700+
Grindability Index (Hardgrove) .....	62	64	65
Free Swelling Index (ASTM) .....	NA	NA	NA
Classification by Rank (ASTM) .....	Semi-anthracite		

(1) Two seams 12 ft thick; 25° dip. Overburden up to 1000 ft. Room and pillar method mining.

(2) Samples collected at preparation plant which consists of jigs and hydrocyclones. Capacity 235 tph.

Mine Operator ..... THE CANMORE MINES LIMITED  
 Mine Location ..... Canmore, Cascade Area, Alberta.  
 Name of Mine or Coal ..... Mine No.2-Riverside No.4 Mine. Underground

Date Sampled .....	26-06-75
Weight Sampled (approx.) .....tons	100
Size: Mine Designation .....	One Product <sup>(1)</sup>
Screen Opening .....in.	Minus $1\frac{1}{4}$ sq
FRC Laboratory No. ....	2988-75
Proximate Analysis	
Moisture .....%	7.4
Ash .....%	12.0
Volatile Matter .....%	11.2
Fixed Carbon .....%	69.4
Sulphur .....%	0.8
Calorific Value .....Btu/lb.	12,400
Ash Fusibility	
Initial Temp. ....°F	2330
Softening Temp: (a) Spherical .....°F	2670
(b) Hemispherical.....°F	2700+
Fluid Temp. ....°F	2700+
Grindability Index (Hardgrove) .....	-
Free Swelling Index (ASTM) .....	NA
Classification by Rank (ASTM) .....	Semi-anthracite

(1) Sampled clean coal product from preparation plant.

Mine Operator ..... CARDINAL RIVER COALS LTD.  
 Mine Location ..... Hinton, Mountain Park Area, Alberta  
 Sec 15,16,22, Tp47; R24, W5.  
 Name of Mine or Coal ..... Mine No. 1768-- Cardinal River Mine. Surface<sup>(1)</sup>

Date Sampled .....	08-07-75
Weight Sampled (approx.) .....tons	500
Size: Mine Designation .....	Clean Coal Product <sup>(2)</sup>
Screen Opening .....in.	Minus 2 sq
FRC Laboratory No. ....	3119-75
Proximate Analysis	
Moisture .....%	3.0
Ash .....%	9.1
Volatile Matter .....%	24.3
Fixed Carbon .....%	63.6
Sulphur .....%	0.4
Calorific Value .....Btu/lb.	13,500
Ash Fusibility	
Initial Temp. ....°F	2460
Softening Temp: (a) Spherical .....°F	2700+
(b) Hemispherical.....°F	2700+
Fluid Temp. ....°F	2700+
Grindability Index (Hardgrove) .....	79
Free Swelling Index (ASTM) .....	5½
Classification by Rank (ASTM) .....	Medium Volatile Bituminous

(1) One 35-to 40-ft thick seam; highly folded. Overburden variable. Terrace mining method.

(2) Sample collected at preparation plant consisting of heavy media and froth flotation systems and cross flow dryer, capacity of 450 tph. The dryer was not in operation during the sample collection.

Mine Operator ..... COLEMAN COLLIERIES LIMITED  
 Mine Location ..... Coleman, Crowsnest Area, Alberta  
 Name of Mine or Coal ..... No. 1747-Vicary Creek. Underground (1)  
 No. 1695-Tent Mountain. Surface (2)

Date Sampled .....	25-06-75	25-06-75
Weight Sampled (approx.) .....tons	1200	900
Size: Mine Designation .....	Clean Coal Product <sup>(3)</sup>	Clean Coal Product <sup>(3)</sup>
Screen Opening .....in.	Minus 2 sq	Minus 2 sq
ERL Laboratory No. ....	2983-75	2984-75
Proximate Analysis		
Moisture .....%	1.2	5.4
Ash .....%	11.4	11.4
Volatile Matter .....%	26.0	24.1
Fixed Carbon .....%	61.4	59.1
Sulphur .....%	0.5	0.4
Calorific Value .....Btu/lb.	13,250	12,650
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) .....	76	75
Free Swelling Index (ASTM) .....	4½	3½
Classification by Rank (ASTM) .....	Medium Volatile Bituminous	-

- (1) One 24-ft seam; 35° to 45° dip. Overburden 0 to 800 ft. Room and pillar mining.
- (2) Two seams 20 to 70 ft thick; synclinal structure dip. Overburden 30 to 250 ft. Terraced bench method mining.
- (3) Sampled at preparation plant consisting of 3-cell Baum type jig and Deister tables. Capacity 300-350 tph.

Mine Operator ..... MCINTYRE MINES LIMITED  
 Mine Location ..... Grand Cache, Smoky River Area, Alberta  
 Name of Mine or Coal ..... Mine Nos. 1765 & 1771 - McIntyre No. 9.  
 Surface (1)

Date Sampled ..... 08-07-75  
 Weight Sampled (approx.) ..... tons 1800

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

ERL Laboratory No. .... 3118-75

Proximate Analysis

Moisture .....	%	0.6
Ash .....	%	8.4
Volatile Matter .....	%	19.0
Fixed Carbon .....	%	72.0
Sulphur .....	%	0.5
Calorific Value .....	Btu/lb.	14,220
Ash Fusibility		
Initial Temp. ....	°F	2430
Softening Temp:(a) Spherical ....	°F	2700+
(b) Hemispherical.	°F	2700+
Fluid Temp. ....	°F	2700+
Grindability Index (Hardgrove) .....		93
Free Swelling Index (ASTM) .....		5½
Classification by Rank (ASTM) .....		Low Volatile Bituminous

(1) One 20-ft seam; 0 to 30° dip. Overburden 0 to 1800 ft. Open pit mining method.

(2) Sampled at preparation plant consisting of dense media cyclones and froth flotation, capacity 650 tph.

SECTION IV

BITUMINOUS COALS

FROM

BRITISH COLUMBIA

Mine Operator ..... FORDING COAL LTD.  
 Mine Location ..... Fording River Valley, East Kootenay,  
 British Columbia.  
 Name of Mine or Coal ..... Fording Mine. Surface<sup>(1)</sup>

Date Sampled ..... 24-06-75  
 Weight Sampled (approx.) ..... tons 30,000

Size: Mine Designation ..... Clean Coal Product<sup>(2)</sup>  
 Screen Opening ..... in. Minus  $1\frac{1}{2}$  sq

ERL Laboratory No. .... 2980-75

Proximate Analysis

Moisture ..... % 11.4  
 Ash ..... % 9.5  
 Volatile Matter ..... % 19.2  
 Fixed Carbon ..... % 59.9  
 Sulphur ..... % 0.3  
 Calorific Value ..... Btu/lb. 12,170

Ash Fusibility

Initial Temp. ....°F 2680  
 Softening Temp:(a) Spherical ....°F 2700+  
 (b) Hemispherical.°F 2700+  
 Fluid Temp. ....°F 2700+

Grindability Index (Hardgrove) ..... 87  
 Free Swelling Index (ASTM) ..... 4

Classification by Rank (ASTM) ..... Medium Volatile Bituminous

(1) Eleven seams with total thickness of 7 to 70 ft; 20° to 25° dip. Overburden 50 to 200 ft. Open pit method mining.  
 (2) Samples were taken when loading a train from the stockpile. Coal was cleaned in preparation plant consisting of heavy media cyclone and flotation. Capacity 850 tph.



Mine Operator ..... KAISER RESOURCES LTD.  
 Mine Location ..... Michel and Sparwood, East Kootenay District,  
 British Columbia.  
 Name of Mine or Coal ..... Michel Colliery-Michel. Underground<sup>(1)</sup>  
 Balmer Strip Mine-Sparwood. Surface<sup>(2)</sup>

Date Sampled .....	24-06-75	24-06-75
Weight Sampled (approx.) ..... tons	2000	600

Size: Mine Designation .....	Clean Coal Product <sup>(3)</sup>	Oxidized Coal
Screen Opening ..... in.	Minus 1 $\frac{1}{2}$ sq	Minus $\frac{1}{2}$ sq

ERL Laboratory No. ....	2981-75	2982-75
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Proximate Analysis

Moisture .....	6.1	7.6
Ash .....	9.4	15.9
Volatile Matter .....	19.0	20.4
Fixed Carbon .....	65.5	56.1
Sulphur .....	0.3	0.3
Calorific Value .....	13,220	11,280
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	91
Free Swelling Index (ASTM) .....	6 $\frac{1}{2}$	1
Classification by Rank (ASTM) .....	Medium Volatile Bituminous	
Trace Mercury .....	ppm	

- (1) One 40-to 50-ft seam; 10° to 60° dip. Overburden 500 to 1500 ft. Hydraulic and room and pillar methods mining.  
 (2) One 8-to 50-ft seam; 18° to 30° dip. Overburden up to 400 ft. Open pit terracing method mining.  
 (3) Sampled at the Elkview preparation plant equipped with heavy media cyclones and flotation units. Capacity 1,400 tph.



SECTION V-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. Surface

Date Sampled .....	10-09-75	10-09-75	10-09-75
Weight Sampled (approx) .....tons.	40	60	100
Size: Mine Designation .....	Booker	Pea	Slack
Screen Opening .....in.	2 to 1 sq	1 $\frac{1}{4}$ sq to $\frac{3}{8}$ slot	Minus $\frac{3}{8}$ slot
ERL Laboratory No. ....	3317-75	3318-75	3319-75
<u>Ultimate Analysis</u>			
Carbon .....	63.3	61.8	60.8
Hydrogen .....	3.9	4.1	4.0
Sulphur .....	0.5	0.6	0.7
Nitrogen .....	1.1	0.1	0.1
Ash .....	11.8	13.7	15.9
Oxygen (by difference) .....	19.4	19.7	18.5
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	30.0	35.3	38.0
Al <sub>2</sub> O <sub>3</sub> .....	22.2	22.3	22.1
Fe <sub>2</sub> O <sub>3</sub> .....	3.4	3.0	3.9
TiO <sub>2</sub> .....	1.3	1.5	1.9
P <sub>2</sub> O <sub>5</sub> .....	0.7	0.7	0.5
CaO .....	18.8	16.5	14.8
MgO .....	4.1	3.8	3.5
SO <sub>3</sub> .....	11.2	9.6	9.2
Na <sub>2</sub> O .....	8.1	7.1	6.0
K <sub>2</sub> O .....	0.2	0.2	0.2

Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Name of Mine or Coal ..... Klimax (South) Mine. Surface

Date Sampled ..... 09-09-75  
 Weight Sampled (approx) ..... tons.. 100

Size: Mine Designation ..... Feed to SPC Estevan  
 Generating Station  
 Screen Opening .....in. Minus  $1\frac{1}{2}$

ERL Laboratory No. .... 3320-75

Ultimate Analysis

Carbon .....% 60.7  
 Hydrogen .....% 3.9  
 Sulphur .....% 0.5  
 Nitrogen .....% 1.1  
 Ash .....% 16.0  
 Oxygen (by difference) .....% 17.8

Ash Analysis

SiO<sub>2</sub> .....% 39.3  
 Al<sub>2</sub>O<sub>3</sub> .....% 24.6  
 Fe<sub>2</sub>O<sub>3</sub> .....% 4.3  
 TiO<sub>2</sub> .....% 1.7  
 P<sub>2</sub>O<sub>5</sub> .....% 0.4  
 CaO .....% 14.6  
 MgO .....% 3.9  
 SO<sub>3</sub> .....% 7.7  
 Na<sub>2</sub>O .....% 3.8  
 K<sub>2</sub>O .....% 0.2

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

Date Sampled .....	08-09-75	08-09-75	08-09-75
Weight Sampled (approx) ..... tons.	160	250	200
Size: Mine Designation .....	Booker	1" Minus	2" Minus
Screen Opening ..... in.	2 to 1 sq	Minus 1 sq	Minus 2 sq
ERL Laboratory No. ....	3322-75	3323-75	3324-75
<u>Ultimate Analysis</u>			
Carbon .....	65.2	64.7	62.1
Hydrogen .....	4.4	4.4	4.2
Sulphur .....	0.7	0.5	0.6
Nitrogen .....	1.2	1.2	0.1
Ash .....	10.0	11.9	13.6
Oxygen (by difference) .....	18.5	17.3	19.4
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	28.4	34.2	38.5
Al <sub>2</sub> O <sub>3</sub> .....	20.2	20.6	21.5
Fe <sub>2</sub> O <sub>3</sub> .....	6.3	5.6	5.2
TiO <sub>2</sub> .....	1.2	0.8	1.2
P <sub>2</sub> O <sub>5</sub> .....	0.6	0.4	0.5
CaO .....	17.1	18.5	13.5
MgO .....	4.5	4.0	3.3
SO <sub>3</sub> .....	11.1	10.9	8.5
Na <sub>2</sub> O .....	10.0	5.2	7.0
K <sub>2</sub> O .....	0.3	0.2	0.3

Mine Operator ..... MANITOBA AND SASKATCHEWAN COAL CO. (LIMITED)  
 Mine Location ..... Estevan, Estevan Area, Saskatchewan  
 Name of Mine or Coal ..... Boundary Dam Mine. Surface

Date Sampled .....	09-09-75
Weight Sampled (approx) ..... tons..	500
Size: Mine Designation .....	Feed to SPC
Screen Opening .....in.	Minus $1\frac{1}{2}$
ERL Laboratory No. ....	3321-75
<u>Ultimate Analysis</u>	
Carbon .....	54.1
Hydrogen .....	3.6
Sulphur .....	0.9
Nitrogen .....	0.1
Ash .....	24.5
Oxygen (by difference) .....	16.8
<u>Ash Analysis</u>	
SiO <sub>2</sub> .....	49.5
Al <sub>2</sub> O <sub>3</sub> .....	20.7
Fe <sub>2</sub> O <sub>3</sub> .....	6.6
TiO <sub>2</sub> .....	1.0
P <sub>2</sub> O <sub>5</sub> .....	0.2
CaO .....	7.0
MgO .....	2.2
SO <sub>3</sub> .....	6.2
Na <sub>2</sub> O .....	4.7
K <sub>2</sub> O .....	1.3

B. ALBERTA

Mine Operator ..... THE CANMORE MINES LIMITED  
 Mine Location ..... Canmore, Cascade Area, Alberta  
 Tp 24; R10, W5.  
 Name of Mine or Coal ..... Mine No.2-Wilson Mine. Underground

Date Sampled .....	26-06-75	26-06-75	26-06-75
Weight Sampled (approx) .....tons.	30	40	100
Size: Mine Designation .....	Cobble	Stoker	Slack
Screen Opening .....in.	5 to 1 sq	1/4 to 1/4 sq	Minus 1/4 sq
ERL Laboratory No. ....	2985-75	2986-75	2987-75
<u>Ultimate Analysis</u>			
Carbon .....	84.5	84.2	83.1
Hydrogen .....	3.8	3.7	3.8
Sulphur .....	0.8	0.9	0.9
Nitrogen .....	1.5	1.6	1.6
Ash .....	6.7	7.5	8.1
Oxygen (by difference) .....	2.7	2.1	2.5
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	53.5	54.6	56.4
Al <sub>2</sub> O <sub>3</sub> .....	33.0	32.6	29.5
Fe <sub>2</sub> O <sub>3</sub> .....	7.2	4.0	3.6
TiO <sub>2</sub> .....	1.5	1.3	1.7
P <sub>2</sub> O <sub>5</sub> .....	0.9	0.8	0.9
CaO .....	0.5	0.3	1.3
MgO .....	0.7	0.6	0.8
SO <sub>3</sub> .....	1.4	1.4	2.1
Na <sub>2</sub> O .....	0.3	0.3	0.4
K <sub>2</sub> O .....	0.5	1.0	1.8



Mine Operator ..... THE CANMORE MINES LIMITED  
 Mine Location ..... Canmore, Cascade Area, Alberta  
 Name of Mine or Coal ..... Mine No.2-Riverside No.4 Mine.  
 Underground.

Date Sampled ..... 26-06-75  
 Weight Sampled (approx) ..... tons. 100

Size: Mine Designation ..... One Product  
 Screen Opening ..... in. Minus  $1\frac{1}{4}$  sq

ERL Laboratory No. .... 2988-75

Ultimate Analysis

Carbon ..... % 78.7  
 Hydrogen ..... % 3.7  
 Sulphur ..... % 0.8  
 Nitrogen ..... % 1.6  
 Ash ..... % 13.0  
 Oxygen (by difference) ..... % 2.0

Ash Analysis

SiO<sub>2</sub> ..... % 63.7  
 Al<sub>2</sub>O<sub>3</sub> ..... % 21.0  
 Fe<sub>2</sub>O<sub>3</sub> ..... % 5.9  
 TiO<sub>2</sub> ..... % 1.1  
 P<sub>2</sub>O<sub>5</sub> ..... % 0.7  
 CaO ..... % 1.7  
 MgO ..... % 1.0  
 SO<sub>3</sub> ..... % 1.9  
 Na<sub>2</sub>O ..... % 0.3  
 K<sub>2</sub>O ..... % 2.5

Mine Operator ..... CARDINAL RIVER COALS LTD.  
 Mine Location ..... Hinton, Mountain Park Area, Alberta  
 Sec 15,16,22, Tp47; R24, W5.  
 Name of Mine or Coal ..... Mine No. 1768 -Cardinal River Mine. Surface

Date Sampled .....	08-07-75
Weight Sampled (approx) .....tons.	500
Size: Mine Designation .....	Clean Coal Product
Screen Opening .....in.	Minus 2 sq
ERL Laboratory No. ....	3119-75
<u>Ultimate Analysis</u>	
Carbon .....	80.6 %
Hydrogen .....	4.6 %
Sulphur .....	0.4 %
Nitrogen .....	1.2 %
Ash .....	9.4 %
Oxygen (by difference) .....	3.8 %
<u>Ash Analysis</u>	
SiO <sub>2</sub> .....	53.5 %
Al <sub>2</sub> O <sub>3</sub> .....	27.3 %
Fe <sub>2</sub> O <sub>3</sub> .....	4.4 %
TiO <sub>2</sub> .....	1.7 %
P <sub>2</sub> O <sub>5</sub> .....	0.6 %
CaO .....	5.2 %
MgO .....	1.2 %
SO <sub>3</sub> .....	4.2 %
Na <sub>2</sub> O .....	1.2 %
K <sub>2</sub> O .....	0.5 %

Mine Operator .....	CENTURY COALS LIMITED
Mine Location .....	East Coulee, Drumheller Area, Alberta Sec 6, Tp27; R18, W4
Name of Mine or Coal .....	Mine No.1742 - Atlas Mine. Underground

Date Sampled .....	22-09-75	22-09-75	22-09-75
Weight Sampled (approx) ..... tons..	80	50	20
Size: Mine Designation .....	Lump	Egg	Nut
Screen Opening .....in.	12 to 4½ rd	4½ to 2 rd	2 to 1⅜ rd
ERL Laboratory No. ....	3366-75	3367-75	3368-75
<u>Ultimate Analysis</u>			
Carbon .....	66.3	65.3	61.8
Hydrogen .....	4.6	4.5	4.3
Sulphur .....	0.6	0.6	0.7
Nitrogen .....	1.6	1.5	1.5
Ash .....	8.9	11.4	15.0
Oxygen (by difference) .....	18.0	16.7	16.7
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	42.8	47.1	52.3
Al <sub>2</sub> O <sub>3</sub> .....	25.5	27.3	27.6
Fe <sub>2</sub> O <sub>3</sub> .....	4.6	3.3	3.0
TiO <sub>2</sub> .....	1.3	0.5	1.0
P <sub>2</sub> O <sub>5</sub> .....	2.6	0.9	0.7
CaO .....	10.1	7.6	5.9
MgO .....	1.0	0.9	1.0
SO <sub>3</sub> .....	5.7	4.4	3.1
Na <sub>2</sub> O .....	5.6	4.9	3.8
K <sub>2</sub> O .....	1.2	1.7	1.3

Mine Operator ..... CENTURY COALS LIMITED  
 Mine Location ..... East Coulee, Drumheller Area, Alberta  
 Sec 6, Tp27; R18, W4  
 Name of Mine or Coal ..... Mine No.1742 - Atlas Mine. Underground  
 (cont'd)

Date Sampled .....	22-09-75	22-09-75
Weight Sampled (approx) ..... tons..	40	50
Size: Mine Designation .....	Stoker	Slack
Screen Opening .....in.	$1\frac{3}{8}$ to $\frac{5}{8}$ rd	Minus $\frac{5}{8}$ rd
ERL Laboratory No. ....	3369-75	3370-75
<u>Ultimate Analysis</u>		
Carbon .....	66.2	64.1
Hydrogen .....	4.5	4.4
Sulphur .....	0.6	0.6
Nitrogen .....	1.5	1.4
Ash .....	13.2	12.7
Oxygen (by difference) .....	13.9	16.8
<u>Ash Analysis</u>		
SiO <sub>2</sub> .....	50.8	48.2
Al <sub>2</sub> O <sub>3</sub> .....	27.5	26.8
Fe <sub>2</sub> O <sub>3</sub> .....	3.4	4.0
TiO <sub>2</sub> .....	0.8	0.8
P <sub>2</sub> O <sub>5</sub> .....	0.8	0.7
CaO .....	6.4	7.6
MgO .....	0.9	0.9
SO <sub>3</sub> .....	3.6	4.6
Na <sub>2</sub> O .....	4.2	4.3
K <sub>2</sub> O .....	1.5	1.3

Mine Operator ..... COLEMAN COLLIERIES LIMITED  
 Mine Location ..... Coleman, Crowsnest Area, Alberta  
 Sec 19, Tp9; R4, W5; Sec 12, Tp7; R6, W6.  
 Name of Mine or Coal ..... No.1747-Vicary Creek. Underground  
 No.1695-Tent Mountain. Surface

Date Sampled .....	25-05-75	25-06-75
Weight Sampled (approx) ..... tons..	1200	900
Size: Mine Designation .....	Clean Coal Product	Clean Coal Product
Screen Opening .....in.	Minus 2 sq	Minus 2 sq
ERL Laboratory No. ....	2983-75	2984-75
<u>Ultimate Analysis</u>		
Carbon .....	77.3	76.7
Hydrogen .....	4.3	4.3
Sulphur .....	0.5	0.4
Nitrogen .....	1.3	1.3
Ash .....	11.5	12.0
Oxygen (by difference) .....	5.1	5.3
<u>Ash Analysis</u>		
SiO <sub>2</sub> .....	52.5	52.4
Al <sub>2</sub> O <sub>3</sub> .....	33.1	33.5
Fe <sub>2</sub> O <sub>3</sub> .....	2.2	1.7
TiO <sub>2</sub> .....	2.3	2.4
P <sub>2</sub> O <sub>5</sub> .....	1.6	1.4
CaO .....	4.3	3.7
MgO .....	1.0	1.0
SO <sub>3</sub> .....	3.4	3.1
Na <sub>2</sub> O .....	0.3	0.3
K <sub>2</sub> O .....	0.6	0.9

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

Date Sampled .....	01-10-75	01-10-75	01-10-75
Weight Sampled (approx) ..... tons..	48	30	25
Size: Mine Designation .....	Lump	Egg	Nut
Screen Opening .....in.	12 to 4 $\frac{1}{2}$ rd	4 $\frac{1}{2}$ to 2 rd	2 rd to 1 $\frac{1}{4}$ sq
ERL Laboratory No. ....	3379-75	3380-75	3381-75
<u>Ultimate Analysis</u>			
Carbon .....	67.7	68.5	66.5
Hydrogen .....	4.6	4.5	4.4
Sulphur .....	0.4	0.5	0.5
Nitrogen .....	0.1	1.4	1.5
Ash .....	7.3	7.2	9.9
Oxygen (by difference) .....	19.9	17.9	17.2
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	31.6	32.7	42.7
Al <sub>2</sub> O <sub>3</sub> .....	21.5	20.2	22.8
Fe <sub>2</sub> O <sub>3</sub> .....	6.0	6.0	5.0
TiO <sub>2</sub> .....	0.4	0.4	0.3
P <sub>2</sub> O <sub>5</sub> .....	0.9	0.8	0.9
CaO .....	20.6	20.9	14.6
MgO .....	2.2	2.3	1.7
SO <sub>3</sub> .....	12.0	11.9	7.8
Na <sub>2</sub> O .....	2.8	2.6	2.2
K <sub>2</sub> O .....	0.2	0.3	0.6

Mine Operator .....	FORESTBURG COLLIERIES LIMITED
Mine Location .....	Forestburg, Castor Area, Alberta Sec 6, Tp41; R15, W4.
Name of Mine or Coal .....	Mine No.1578 - Diplomat Mine. Surface

Date Sampled .....	01-10-75	01-10-75
Weight Sampled (approx) ..... tons..	40	20
Size: Mine Designation .....	Stoker	Slack
Screen Opening .....in.	$\frac{1}{4}$ to $\frac{1}{2}$ slot	Minus $\frac{1}{2}$ slot
ERL Laboratory No. ....	3382-75	3383-75
<u>Ultimate Analysis</u>		
Carbon .....	65.8	63.6
Hydrogen .....	4.5	4.3
Sulphur .....	0.5	0.6
Nitrogen .....	1.3	1.5
Ash .....	10.3	13.2
Oxygen (by difference) .....	17.6	16.8
<u>Ash Analysis</u>		
SiO <sub>2</sub> .....	42.2	45.9
Al <sub>2</sub> O <sub>3</sub> .....	24.7	23.5
Fe <sub>2</sub> O <sub>3</sub> .....	4.4	5.7
TiO <sub>2</sub> .....	0.3	0.4
P <sub>2</sub> O <sub>5</sub> .....	0.7	0.6
CaO .....	14.2	11.9
MgO .....	1.7	1.6
SO <sub>3</sub> .....	7.8	7.4
Na <sub>2</sub> O .....	2.2	2.0
K <sub>2</sub> O .....	0.7	0.8

Mine Operator ..... MANALTA COAL LTD  
 Mine Location ..... Sheerness, Sheerness Area, Alberta  
 Sec 14, Tp29; R13, W4.  
 Name of Mine or Coal ..... Mine No.443 - Roselyn Mine. Surface

Date Sampled .....	24-09-75	24-09-75	24-09-75
Weight Sampled (approx) ..... tons..	40	15	100
Size: Mine Designation .....	Lump	Stoker	-
Screen Opening .....in.	Plus 4 yd	1 $\frac{1}{2}$ rd to $\frac{1}{4}$ sq	Minus 4 rd
ERL Laboratory No. ....	3371-75	3372-75	3373-75
<u>Ultimate Analysis</u>			
Carbon .....	66.4	60.9	64.7
Hydrogen .....	4.4	3.9	4.2
Sulphur .....	0.5	0.6	0.5
Nitrogen .....	1.5	0.1	0.1
Ash .....	9.3	16.2	11.6
Oxygen (by difference) .....	17.9	18.3	18.9
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	29.4	46.3	42.8
Al <sub>2</sub> O <sub>3</sub> .....	16.8	23.0	19.9
Fe <sub>2</sub> O <sub>3</sub> .....	21.5	8.4	10.4
TiO <sub>2</sub> .....	1.0	0.3	0.6
P <sub>2</sub> O <sub>5</sub> .....	0.7	0.3	0.5
CaO .....	14.6	9.4	12.5
MgO .....	1.8	1.3	1.6
SO <sub>3</sub> .....	11.3	7.0	8.3
Na <sub>2</sub> O .....	2.2	1.8	1.9
K <sub>2</sub> O .....	0.9	1.4	1.0



Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Halkirk, Castor Area, Alberta  
 Sec 20, Tp40; R15, W4.  
 Name of Mine or Coal ..... Mine No. 1046 - Vesta Mine. Surface.

Date Sampled .....	29-09-75	29-09-75	29-09-75
Weight Sampled (approx) ..... tons..	40	25	35
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
ERL Laboratory No. ....	3374-75	3375-75	3376-75
<u>Ultimate Analysis</u>			
Carbon .....	68.0	67.4	65.8
Hydrogen .....	4.5	4.5	4.4
Sulphur .....	0.5	0.5	0.5
Nitrogen .....	0.1	0.1	1.5
Ash .....	8.2	8.1	10.5
Oxygen (by difference) .....	18.7	19.4	17.3
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	35.6	32.9	42.8
Al <sub>2</sub> O <sub>3</sub> .....	21.6	22.0	23.0
Fe <sub>2</sub> O <sub>3</sub> .....	6.7	6.3	5.6
TiO <sub>2</sub> .....	0.6	0.3	0.3
P <sub>2</sub> O <sub>5</sub> .....	1.0	1.2	0.9
CaO .....	16.5	16.5	12.9
MgO .....	1.0	1.2	1.3
SO <sub>3</sub> .....	9.5	9.9	7.1
Na <sub>2</sub> O .....	7.0	7.6	5.5
K <sub>2</sub> O .....	0.4	0.4	0.7

Mine Operator .....	MANALTA COAL LTD.
Mine Location .....	Halkirk, Castor Area, Alberta Sec 20, Tp40; R15, W4.
Name of Mine or Coal .....	Mine No.1046 - Vesta Mine. Surface (cont'd)

Date Sampled .....	29-09-75	29-09-75
Weight Sampled (approx) ..... tons..	60	25
Size: Mine Designation .....	Stoker	Slack
Screen Opening .....in.	1 to $\frac{5}{8}$ sq	Minus $\frac{5}{8}$ sq
ERL Laboratory No. ....	3377-75	3378-75
<u>Ultimate Analysis</u>		
Carbon .....	67.5	65.3
Hydrogen .....	4.4	4.4
Sulphur .....	0.5	0.4
Nitrogen .....	1.5	1.4
Ash .....	9.5	11.4
Oxygen (by difference) .....	16.6	17.1
<u>Ash Analysis</u>		
SiO <sub>2</sub> .....	38.0	41.7
Al <sub>2</sub> O <sub>3</sub> .....	22.9	23.8
Fe <sub>2</sub> O <sub>3</sub> .....	6.1	5.7
TiO <sub>2</sub> .....	0.4	0.3
P <sub>2</sub> O <sub>5</sub> .....	0.9	0.7
CaO .....	12.7	11.3
MgO .....	1.0	1.0
SO <sub>3</sub> .....	9.1	7.2
Na <sub>2</sub> O .....	6.4	5.5
K <sub>2</sub> O .....	0.6	0.8

Mine Operator ..... MANALTA COAL LTD.  
 Mine Location ..... Wabamun, Pembina Area, Alberta  
 Sec 14 & 15, Tp53; R4, W5.  
 Name of Mine or Coal ..... Mine No.1757 - Whitewood Mine Surface

Date Sampled ..... 18-06-75  
 Weight Sampled (approx) ..... tons.. 100,000

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

ERL Laboratory No. .... 2990-75

Ultimate Analysis

Carbon .....% 61.0  
 Hydrogen .....% 3.8  
 Sulphur .....% 0.2  
 Nitrogen .....% 0.9  
 Ash .....% 17.6  
 Oxygen (by difference) .....% 16.5

Ash Analysis

SiO<sub>2</sub> .....% 57.3  
 Al<sub>2</sub>O<sub>3</sub> .....% 21.0  
 Fe<sub>2</sub>O<sub>3</sub> .....% 4.0  
 TiO<sub>2</sub> .....% 0.4  
 P<sub>2</sub>O<sub>5</sub> .....% 0.2  
 CaO .....% 11.5  
 MgO .....% 1.6  
 SO<sub>3</sub> .....% 3.3  
 Na<sub>2</sub>O .....% 0.2  
 K<sub>2</sub>O .....% 0.5

Mine Operator .....	MANALTA COAL LTD.
Mine Location .....	Wabamun, Pembina Area, Alberta Sec 29, Tp52; R4, W5.
Name of Mine or Coal .....	Mine No.1769 - Highvale Mine. Surface.

Date Sampled .....	18-06-75
Weight Sampled (approx) ..... tons..	250

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

ERL Laboratory No. ....	2989-75
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Ultimate Analysis

Carbon .....	%	65.4
Hydrogen .....	%	4.0
Sulphur .....	%	0.2
Nitrogen .....	%	0.8
Ash .....	%	13.8
Oxygen (by difference) .....	%	15.8

Ash Analysis

SiO <sub>2</sub> .....	%	44.9
Al <sub>2</sub> O <sub>3</sub> .....	%	30.0
Fe <sub>2</sub> O <sub>3</sub> .....	%	4.3
TiO <sub>2</sub> .....	%	0.5
P <sub>2</sub> O <sub>5</sub> .....	%	0.1
CaO .....	%	13.6
MgO .....	%	0.9
SO <sub>3</sub> .....	%	4.0
Na <sub>2</sub> O .....	%	1.9
K <sub>2</sub> O .....	%	0.4

Mine Operator ..... MCINTYRE MINES LTD.  
Mine Location ..... Grand Cache, Smoky River Area, Alberta  
Name of Mine or Coal ..... Mine Nos. 1765&1771 - McIntyre No.9  
Mine. Surface.

Date Sampled ..... 08-07-75  
Weight Sampled (approx) ..... tons.. 1800

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

ERL Laboratory No. .... 3118-75

Ultimate Analysis

Carbon .....% 82.4  
Hydrogen .....% 4.4  
Sulphur .....% 0.5  
Nitrogen .....% 1.3  
Ash .....% 8.5  
Oxygen (by difference) .....% 2.9

Ash Analysis

SiO<sub>2</sub> .....% 53.0  
Al<sub>2</sub>O<sub>3</sub> .....% 27.0  
Fe<sub>2</sub>O<sub>3</sub> .....% 4.6  
TiO<sub>2</sub> .....% 1.9  
P<sub>2</sub>O<sub>5</sub> .....% 1.6  
CaO .....% 5.4  
MgO .....% 0.9  
SO<sub>3</sub> .....% 3.1  
Na<sub>2</sub>O .....% 1.0  
K<sub>2</sub>O .....% 0.7

Mine Operator .....  
 Mine Location .....  
 Name of Mine or Coal .....

STAR KEY MINES LTD.  
 St. Albert, Edmonton Area, Alberta  
 Sec 35, Tp54; R25, W4.  
 Mine No.1626-Star-Key. Underground.

Date Sampled .....	02-10-75	02-10-75	02-10-75
Weight Sampled (approx) ..... tons..	20	15	15
Size: Mine Designation .....	Lump	Stove	Nut
Screen Opening .....in.	Plus $4\frac{1}{2}$ rd	$4\frac{1}{2}$ rd to 2 sq	2 to $1\frac{1}{8}$ sq
ERL Laboratory No. ....	3384-75	3385-75	3386-75
<u>Ultimate Analysis</u>			
Carbon .....	66.6	65.9	64.7
Hydrogen .....	4.2	4.1	4.2
Sulphur .....	0.3	0.3	0.3
Nitrogen .....	0.3	0.1	1.2
Ash .....	10.2	11.3	11.3
Oxygen (by difference) .....	18.4	18.3	18.3
<u>Ash Analysis</u>			
SiO <sub>2</sub> .....	43.7	43.7	45.9
Al <sub>2</sub> O <sub>3</sub> .....	26.7	27.5	28.8
Fe <sub>2</sub> O <sub>3</sub> .....	4.6	3.8	3.7
TiO <sub>2</sub> .....	0.4	0.4	0.3
P <sub>2</sub> O <sub>5</sub> .....	1.0	0.8	0.6
CaO .....	12.3	11.8	9.9
MgO .....	0.7	0.7	0.8
SO <sub>3</sub> .....	4.9	4.4	4.0
Na <sub>2</sub> O .....	4.6	4.8	4.3
K <sub>2</sub> O .....	0.6	0.7	0.7

Mine Operator ..... STAR-KEY MINES LTD.  
 Mine Location ..... St. Albert, Edmonton Area, Alberta  
 Name of Mine or Coal ..... Sec 35, Tp54; R25, W4  
 Mine No.1626-Star-Key. Underground  
 (cont'd)

Date Sampled .....	02-10-75	02-10-75
Weight Sampled (approx) ..... tons..	15	60
Size: Mine Designation .....	Stoker	Slack
Screen Opening .....in.	$1\frac{1}{8}$ to $\frac{3}{8}$ sq	Minus $\frac{3}{8}$ sq
ERL Laboratory No. ....	3387-75	3388-75
<u>Ultimate Analysis</u>		
Carbon .....	64.7	62.4
Hydrogen .....	4.1	4.0
Sulphur .....	0.4	0.4
Nitrogen .....	0.3	1.3
Ash .....	12.9	16.0
Oxygen (by difference) .....	17.6	15.9
<u>Ash Analysis</u>		
SiO <sub>2</sub> .....	46.4	45.9
Al <sub>2</sub> O <sub>3</sub> .....	27.9	26.8
Fe <sub>2</sub> O <sub>3</sub> .....	3.6	4.6
TiO <sub>2</sub> .....	0.4	0.5
P <sub>2</sub> O <sub>5</sub> .....	0.7	0.6
CaO .....	9.7	9.8
MgO .....	0.8	0.8
SO <sub>3</sub> .....	4.3	5.0
Na <sub>2</sub> O .....	4.3	3.7
K <sub>2</sub> O .....	0.7	0.7

Mine Operator ..... C. BRITISH COLUMBIA FORDING COAL LIMITED  
 Mine Location ..... Fording River Valley, East Kootenay, BC.  
 Name of Mine or Coal ..... Fording Mine. Surface

Date Sampled ..... 24-06-75  
 Weight Sampled (approx) ..... tons.. 30,000

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

ERL Laboratory No. .... 2980-75

Ultimate Analysis

Carbon .....% 78.9  
 Hydrogen .....% 4.3  
 Sulphur .....% 0.4  
 Nitrogen .....% 1.2  
 Ash .....% 10.7  
 Oxygen (by difference) .....% 4.5

Ash Analysis

SiO<sub>2</sub> .....% 54.6  
 Al<sub>2</sub>O<sub>3</sub> .....% 32.5  
 Fe<sub>2</sub>O<sub>3</sub> .....% 4.2  
 TiO<sub>2</sub> .....% 2.1  
 P<sub>2</sub>O<sub>5</sub> .....% 1.7  
 CaO .....% 2.3  
 MgO .....% 0.4  
 SO<sub>3</sub> .....% 0.5  
 Na<sub>2</sub>O .....% 0.1  
 K<sub>2</sub>O .....% 0.9



Mine Operator .....	KAISER RESOURCES LTD.
Mine Location .....	Michel Natal, East Kootenay District British Columbia
Name of Mine or Coal .....	Michel Colliery-Michel. Underground Balmer Strip Mine-Sparwood. Surface

Date Sampled .....	24-06-75	24-06-75
Weight Sampled (approx) ..... tons..	2000	600

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

ERL Laboratory No. ....	2981-75	2982-75
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Ultimate Analysis

Carbon .....	80.6	71.2
Hydrogen .....	4.3	3.8
Sulphur .....	0.3	0.3
Nitrogen .....	1.2	1.0
Ash .....	10.0	17.2
Oxygen (by difference) .....	3.6	6.5

Ash Analysis

SiO <sub>2</sub> .....	67.1	61.6
Al <sub>2</sub> O <sub>3</sub> .....	28.3	29.0
Fe <sub>2</sub> O <sub>3</sub> .....	1.5	1.5
TiO <sub>2</sub> .....	1.9	1.8
P <sub>2</sub> O <sub>5</sub> .....	0.8	0.7
CaO .....	1.9	2.1
MgO .....	0.4	0.5
SO <sub>3</sub> .....	0.7	0.9
Na <sub>2</sub> O .....	0.1	0.1
K <sub>2</sub> O .....	0.7	0.8

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