

Mines Branch Information Circular IC 254

EVALUATION OF CANADIAN COMMERCIAL COALS:

SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA - 1968

by

T. E. Tibbetts*

ABSTRACT

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

The samples were taken and analysed by the Fuels Research Centre during the year 1968. 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.

Coals from twenty mining operations in the three coal mining provinces of western Canada, namely Saskatchewan, Alberta and British Columbia, are represented; they include lignite, subbituminous and bituminous coals.

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

Direction des mines
Circulaire d'information IC 254

ÉVALUATION DES HOUILLES COMMERCIALES CANADIENNES:
SASKATCHEWAN, ALBERTA ET COLOMBIE-BRITANNIQUE - 1968

par

T. E. Tibbetts*

RÉSUMÉ

L'auteur décrit les résultats d'analyses physiques et chimiques de 53 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.

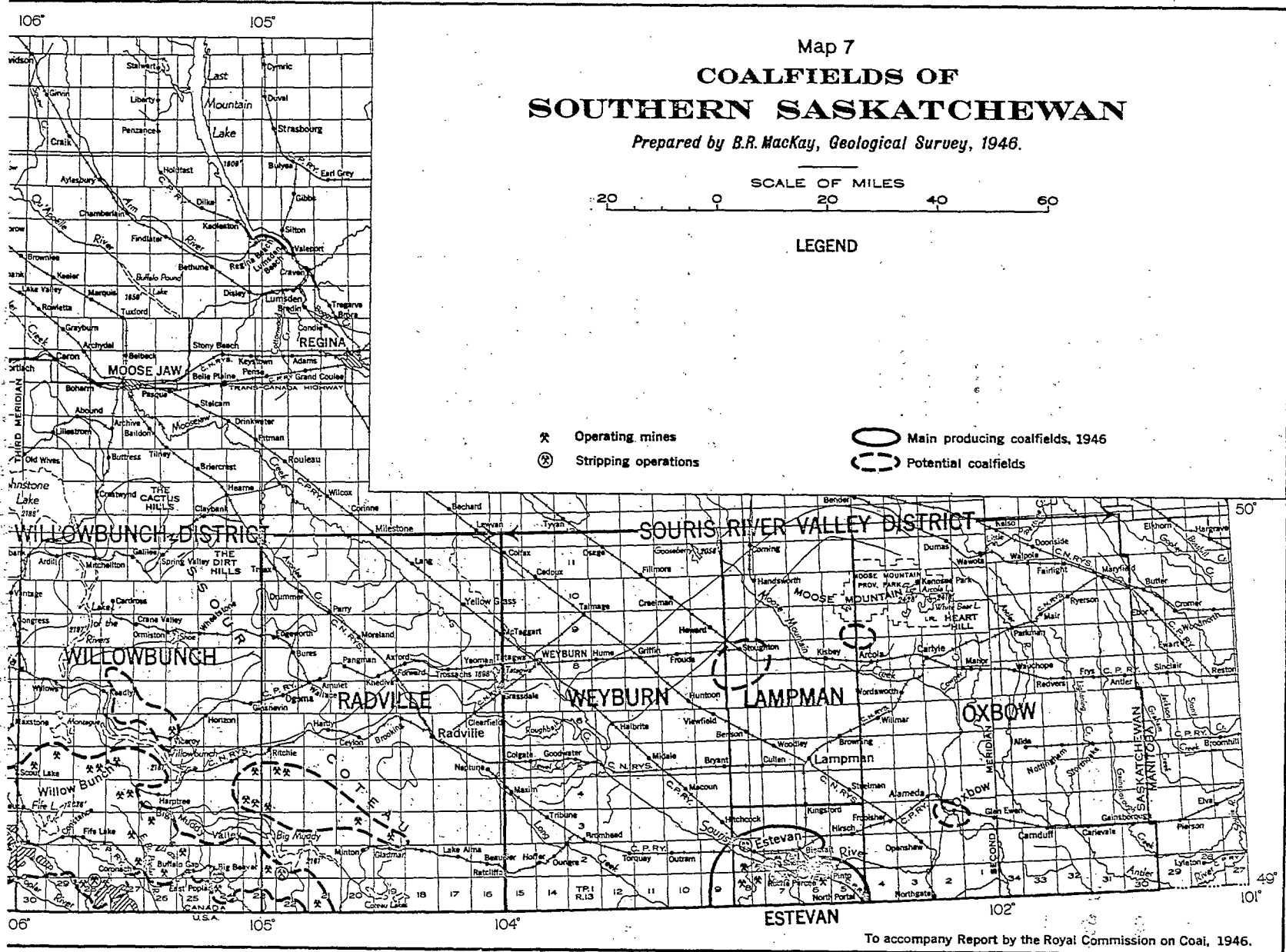
Les échantillons ont été prélevés et analysés en 1968 par le Centre de recherche sur les combustibles. Ils sont représentatifs de la production journalière de la houille préparée commercialement à la mine, ou, dans le cas des échantillons de veines, de la couche de houille où l'extraction était en cours ou projetée.

Les échantillons proviennent de 20 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.

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

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

1
17
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COALFIELDS AND COAL AREAS OF BRITISH COLUMBIA

Prepared by B.R. MacKay, Geological Survey, 1946.

SCALE OF MILES
0 100 200

Local occurrence ○
Defined boundary — Undefined boundary - - -



TERTIARY COAL AREAS

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

CENTRAL BRITISH COLUMBIA

- 10 SOWNON RIVER COAL AREA
- 11 FORT GEORGE COAL AREA
- 12 FRASER LAKE COAL AREA
- 13 KECHIKO RIVER COAL AREA
- 14 BLACKWATER COAL AREA
- 15 QUESNEL COAL AREA
- 16 COTTENWOOD COAL AREA
- 17 ALEXANDRIA COAL AREA
- 18 ORIFLWOOD CREEK COAL AREA

COAST RANGE DISTRICT

- 19 DELLA CORDA RIVER COAL AREA
- 20 COMSAGANO (COAN RIVER) COAL AREA

NORTHERN BRITISH COLUMBIA (Liard River Drainage Basin)

- 21 COAL RIVER COAL AREA
- 22 NYLAND RIVER COAL AREA
- 23 DEASE RIVER COAL AREA
- 24 HARVID RIVER COAL AREA

GRAHAM ISLAND

- 25 SKONIM POINT COAL AREA

UPPER CRETACEOUS COAL AREAS

- ### VANCOUVER ISLAND
- 26 SQUAMISH COAL AREAS
 - 27 COMOX COAL AREA
 - a CUMBERLAND COAL AREA
 - b TSMILE RIVER COAL AREA
 - c CAMPBELL RIVER COAL AREA

GRAHAM ISLAND

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

LOWER CRETACEOUS COAL AREAS

- ### SOUTHEASTERN BRITISH COLUMBIA COAL DISTRICT
- 32 CROWSNEST COAL AREAS
 - a FERNIE BASIN COAL AREA
 - b CORNIA BASIN COAL AREA
 - c TERT AND TAYLOR MOUNTAIN COAL AREA

NORTHEASTERN BRITISH COLUMBIA COAL DISTRICT

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

CENTRAL BRITISH COLUMBIA COAL DISTRICT (Skeena River Drainage Basin)

- 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 HALFPT-SIGABRI CHIEF RIVERS COAL AREAS
- 41 MIAKNER RIVER COAL AREA

NORTHWESTERN BRITISH COLUMBIA COAL DISTRICT (Atlin District)

- 42 TELKWA RIVER COAL AREAS
- 43 CLARK-FORK COAL AREAS
- 44 DUNSHOLM LAKE COAL AREA
- 45 KATHLIN LAKE COAL AREA
- 46 ZYMOCZY RIVER (COAL CREEK) COAL AREAS
- 47 KISPIDOK RIVER COAL AREA
- 48 GROUNDHOG COAL AREA
- 49 STIKINE RIVER (TUTA RIVER) COAL AREA
- 50 TAKU RIVER COAL AREA
- 51 INKLIN RIVER COAL AREA
- 52 SLOND RIVER COAL AREA
- 53 GRAHAM INLET COAL AREA

COAL AREAS AND PRINCIPAL MINES

(with approximate production in 1968 in thousands of short tons)

SASKATCHEWAN

(SOURIS VALLEY AREA)

Alberta Coal Limited	619
Manitoba and Saskatchewan Coal Company Limited	415
Utility Coals Limited	1,217

ALBERTA

1. Subbituminous

Ardley Area	
John Lynass (No. 1734)	2
Sisson's Mine (No. 809)	21
Brooks Area	
Kleenbirn Collieries Ltd. (No. 1404)	5
Camrose Area	
Burnstad Coal Ltd. (No. 724)	15
Carbon Area	
New Ghost Pine Coal Co. Ltd. (No. 194)	5
Castor Area	
Alberta Coal Ltd. (No. 1046)	222
Forestburg Collieries Ltd. (No. 1578)	405
Stettler Coal Co. Ltd. (No. 1614)	9
Drumheller Area	
Century Coals Limited (No. 1742)	97
Fon Coulee Coals Ltd. (No. 1756)	43
Subway Coal Company (No. 1666)	17
Premier Coal (No. 1759)	-
Edmonton Area	
Egg Lake Coal Co. Ltd. (No. 1582)	10
Star-Key Mines Ltd. (No. 1626)	29
Whitemud Creek Coal Co. Ltd. (No. 1727)	9

Pembina Area		
Alberta Coal Ltd. (No. 1757)		1,928
Ostertag, Charles (No. 1739)		8
Warburg Coal Co. Ltd. (No. 1670)		9
Sheerness Area		
Alberta Coal Ltd. (No. 443)		100
Taber Area		
Henry Miller (Taber Ajax) (No. 1766)		5
Tofield Area		
Dodds Coal Mining Co. Ltd. (No. 215)		10
Westlock Area		
North Point Coal Co. Ltd. (No. 1562)		15
Picardville Coal Co. Ltd. (No. 1523)		-

2. Bituminous

Cascade Area		
The Canmore Mines Ltd. (No. 2)		284
Crowsnest Area		
Coleman Collieries Ltd. (Nos. 1695, 1747, 1760, 1764)		661
Lethbridge Area		
Bridge Mining Corporation Ltd. (No. 1762)		3
Mountain Park Area		
Cardinal River Coals Ltd. (No. 1768)		-
Smokey River Area		
McIntyre Coal Mines Ltd. (No. 1765)		-

BRITISH COLUMBIA

Southeastern Coal District		
Kaiser Resources Limited		890
Central Coal District		
Bulkley Valley Collieries, Limited		13

INTRODUCTION

In order to keep in close touch with any change in coal quality, and to ensure that such changes are significant and not due to improper sampling techniques, the Fuels Research Centre has had members of the staff collecting samples of commercially prepared coals at the mines in eastern and western Canadian coalfields on a more or less continuing basis since 1954. The project (No. 2-2-9), "Survey of Canadian Commercial Coals", is conducted under the direction of the Coal and Peat Resources Evaluation Section and forms the basis of information on Canadian coals published periodically in the "Analysis Directory of Canadian Coals".

All samples collected under this project are in accordance with recognized reliable specifications and for the most part are representative of the production for one day at the mines. Normal production and preparation procedures are followed at the mine during the sampling periods, allowing the samples to be truly representative of the commercially prepared products.

Production at mines in western Canada is normally sampled by the staff of the Western Regional Laboratory with assistance from the mine operators. In some instances where the mine was not in commercial production, channel samples were taken to permit some assessment of the potential quality of the commercial coal. This fact is noted where applicable.

In general, the gross samples are crushed and reduced in volume in the field prior to being shipped to Ottawa for analysis. The Western Regional Laboratory has a specially equipped sampling vehicle for this purpose.

This report contains the analyses of commercial coal samples and, for some mines, channel samples collected under this project in Saskatchewan, Alberta and British Columbia during the year 1968. In addition to the analyses of the coals, the chemical analysis of the ash is given for most of the samples. All analyses were conducted by the Fuels Research Centre, substantially by the Solid Fuels Analysis Laboratory.

The analyses of lignite coals from Saskatchewan are reported in Section I on the equilibrium ("in situ") moisture basis. Analyses of sub-bituminous coals from Alberta are reported in Section II, also on the equilibrium moisture basis. Section III contains the analyses on the as-received moisture basis of bituminous coals from Alberta and British Columbia. The chemical analyses of ash are reported for all samples in Section IV.

Registered trade names of coals, when known, are shown in quotations.

SECTION I

LIGNITE COALS

From

SASKATCHEWAN

(Analyses are reported on the Equilibrium Moisture Basis.)

Mine OperatorALBERTA COAL LIMITED (1)
 Mine LocationEstevan, Estevan Area, Saskatchewan
 Name of Mine or Coal**"Battle River"**
 Sampled By: Fuels Research Centre (WFL) Date Sampled: 27 September, 1968

Report of Analyses

Size: Mine Designation	Booker	Pea	Bugdust
Screen Openingin.	2 x 1 1/8 sq	1 1/8 x 1/2 sq	1/2 sq x 0
FRC Laboratory No.	3076-68	3077-68	3078-68
Proximate Analysis			
Moisture %	34.0	33.8	33.3
Ash %	5.7	5.7	6.9
Volatile Matter %	27.4	27.8	27.1
Fixed Carbon %	32.9	32.7	32.7
Sulphur %	0.3	0.3	0.5
Calorific Value.....Btu/lb.	7,330	7,430	7,330
Ash Fusibility			
Initial Temp. °F	1940	1890	1800
Softening Temp.			
Spherical °F	2050	2050	2000
Hemispherical °F	2080	2100	2080
Fluid Temp. °F	2110	2130	2150
Grindability Index (Hardgrove).....	-	62	67
Free Swelling Index (ASTM).....	-	-	-
Classification by Rank (ASTM).....	Lignite A		

(1) Formerly Battle River Coal Company Limited.

Mine Operator MANITOBA AND SASKATCHEWAN COAL COMPANY
 LIMITED
 Mine Location Bienfait, Bienfait Area, Saskatchewan
 Name of Mine or Coal "Soo"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 25 September, 1968

Report of Analyses

Size: Mine Designation	Stove	Booker	Pea	Bugdust
Screen Opening in.	4 x 2 sq	2 x 1½ sq	1½ x ½ sq	½ sq x 0
FRC Laboratory No.	3072-68	3073-68	3074-68	3075-68
Proximate Analysis				
Moisture %	32.9	31.8	31.4	30.7
Ash %	6.4	6.3	6.9	8.2
Volatile Matter %	26.7	27.8	28.1	27.6
Fixed Carbon %	34.0	34.1	33.6	33.5
Sulphur %	0.5	0.4	0.3	0.5
Calorific Value.....Btu/lb.	7,570	7,650	7,620	7,560
Ash Fusibility				
Initial Temp. °F	2050	2030	1890	1880
Softening Temp.				
Spherical °F	2090	2100	2060	1950
Hemispherical °F	2120	2130	2080	1980
Fluid Temp. °F	2170	2170	2130	2000
Grindability Index (Hardgrove).....	-	39	48	56
Free Swelling Index (ASTM).....	-	-	-	-
Classification by Rank (ASTM).....	Lignite A			

Mine Operator UTILITY COALS LIMITED
Mine Location Estevan, Estevan Area, Saskatchewan
Name of Mine or Coal --
Sampled By: Fuels Research Centre (WRL) Date Sampled 26 September, 1968

Report of Analyses

Size: Mine Designation	Mine Run
FRC Laboratory No.	3083-68
Proximate Analysis	
Moisture %	32.4
Ash %	9.8
Volatile Matter %	26.2
Fixed Carbon %	31.6
Sulphur %	0.3
Calorific Value.....Btu/lb.	7060
Ash Fusibility	
Initial Temp. °F	1820
Softening Temp.	
Spherical °F	1930
Hemispherical °F	1950
Fluid Temp. °F	2100
Grindability Index (Hardgrove).....	56
Free Swelling Index (ASTM).....	-
Classification by Rank (ASTM).....	Lignite A

SECTION II

SUBBITUMINOUS COALS
FROM
ALBERTA

(Analyses are reported on the Equilibrium Moisture Basis.)

Mine OperatorALBERTA COAL LIMITED - No. 1046 (1)
 Mine LocationHalkirk, Castor Area, Alberta
 Name of Mine or CoalCordel Mine: "Vesta" "Sterling" "Victory"
 "Blue Flame"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 5 November, 1968

Report of Analyses

Size: Mine Designation	Lump	Egg	Nut
Screen Openingin.	+4½ sq	4½ x 2 sq	2 x 1½ sq
FRC Laboratory No.	2214-69	2215-69	2216-69
Proximate Analysis			
Moisture %	25.2	25.2	25.3
Ash %	6.2	6.9	6.9
Volatile Matter %	28.6	28.2	28.6
Fixed Carbon %	40.0	39.7	39.2
Sulphur %	0.3	0.4	0.4
Calorific Value.....Btu/lb.	8,900	8,730	8,700
Ash Fusibility			
Initial Temp. °F	1850	1750	1840
Softening Temp.			
Spherical °F	1920	1850	1890
Hemispherical °F	1990	1930	1940
Fluid Temp. °F	2030	2060	2110
Grindability Index (Hardgrove).....	-	-	30
Free Swelling Index (ASTM).....	-	-	-
Classification by Rank (ASTM).....	Subbituminous C		

(1) Formerly Battle River Coal Company Limited.

Mine OperatorALBERTA COAL LIMITED - No. 1046 (1)
 Mine LocationHalkirk, Castor Area, Alberta
 Name of Mine or CoalCordel Mine; "Vesta" "Sterling" "Victory"
 "Blue Flame"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 5 November, 1968

Report of Analyses

Size: Mine Designation	Stoker	Slack
Screen Openingin.	1½ x 5/8 sq	5/8 sq x 0
FRC Laboratory No.	2217-69	2218-69
Proximate Analysis		
Moisture %	25.2	25.1
Ash %	7.1	9.2
Volatile Matter %	28.2	27.9
Fixed Carbon %	39.5	37.8
Sulphur %	0.4	0.5
Calorific Value.....Btu/lb.	8,730	8,420
Ash Fusibility		
Initial Temp. °F	1850	1910
Softening Temp.		
Spherical °F	1930	2020
Hemispherical °F	2000	2120
Fluid Temp. °F	2060	2220
Grindability Index (Hardgrove).....	-	-
Free Swelling Index (ASTM).....	-	-
Classification by Rank (ASTM).....	Subbituminous C	

(1) Formerly Battle River Coal Company Limited .

Mine Operator ALBERTA COAL LIMITED - No. 1757
 Mine Location Wabamun, Pembina Area, Alberta
 Name of Mine or Coal "Whitewood"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 18 November, 1968

Report of Analyses

Size: Mine Designation	Feed to Power Plant
FRC Laboratory No.	2228-69
Proximate Analysis	
Moisture %	21.5+
Ash %	13.3
Volatile Matter %	25.2
Fixed Carbon %	40.0
Sulphur %	0.3
Calorific Value.....Btu/lb.	8,120
Ash Fusibility	
Initial Temp. °F	2170
Softening Temp.	
Spherical °F	2260
Hemispherical °F	2340
Fluid Temp. °F	2380
Grindability Index (Hardgrove).....	58
Free Swelling Index (ASTM).....	-
Classification by Rank (ASTM).....	Subbituminous B

+ As Received :

Mine OperatorALBERTA COAL LIMITED - No. 443(1)
 Mine LocationSheerness, Sheerness Area, Alberta
 Name of Mine or Coal "Roselyn" "Berry Creek" "Volcano"
 Sampled By: Fuels Research Centre (WPL) Date Sampled: 17 October, 1968

Report of Analyses

Size: Mine Designation	Egg	Nut	Stoker	Slack
Screen Openingin.	4½ x 2rd	2rd x 1½ sq	1½ x 5/8sq	5/8sq x 0
FRC Laboratory No.	3118-68	3119-68	3120-68	3121-68
Proximate Analysis				
Moisture %	26.2	25.8	25.8	25.4
Ash %	6.0	6.5	6.3	7.3
Volatile Matter %	30.4	30.7	28.4	29.4
Fixed Carbon %	37.4	37.0	39.5	37.9
Sulphur %	0.2	0.3	0.3	0.3
Calorific Value.....Btu/lb.	8,380	8,320	8,450	8,420
Ash Fusibility				
Initial Temp. °F	1950	1920	1810	1820
Softening Temp.				
Spherical °F	1980	1970	1930	1910
Hemispherical °F	2000	1990	1950	1930
Fluid Temp. °F	2060	2010	1980	1970
Grindability Index (Hardgrove).....	-	33	32	36
Free Swelling Index (ASTM).....	-	-	-	-
Classification by Rank (ASTM).....		Subbituminous C		

(1) Formerly Battle River Coal Company Limited.

Mine Operator BURNSTAD COAL LIMITED - No. 724
 Mine Location Ohaton, Camrose Area, Alberta
 Name of Mine or Coal "Burnstad".
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 13 November, 1968

Report of Analyses

Designation	Channel Sample
FRC Laboratory No.	2226-69
Proximate Analysis Moisture % Ash % Volatile Matter % Fixed Carbon % Sulphur % Calorific Value.....Btu/lb. Ash Fusibility Initial Temp. °F Softening Temp. Spherical °F Hemispherical °F Fluid Temp. °F Grindability Index (Hardgrove)..... Free Swelling Index (ASTM)..... Classification by Rank (ASTM).....	21.2 6.0 30.2 42.6 0.5 8,910 1850 1980 2200 2300 41 - Subbituminous B

Mine OperatorCENTURY COALS LIMITED - NO. 1742 (1)
 Mine LocationEast Coulee, Drumheller Area, Alberta
 Name of Mine or CoalAtlas Mine: "Atlas" "Commander" "New Wild
 Fire" "New Murray" "Western Gem" "Hy-Grade"
 Sampled By: Fuels Research Centre (WRL) "Purity Hard" Date Sampled: 16 October, 1968

Report of Analyses

Size: Mine Designation	Lump	Egg	Nut	Stoker	Slack
Screen Opening in.	4½rd	4½ x 2rd	2 x 1½ rd	1½x5/8rd	5/8rd x0
FRC Laboratory No.	3124-68	3125-68	3126-68	3127-68	3128-68
Proximate Analysis					
Moisture %	17.9	18.7	17.5	18.3	18.7
Ash %	7.2	7.7	10.0	8.9	10.9
Volatile Matter %	30.5	30.4	31.0	29.5	29.1
Fixed Carbon %	44.4	43.2	41.5	43.3	41.3
Sulphur %	0.3	0.3	0.4	0.3	0.5
Calorific Value.....Btu/lb.	9,700	9,460	9,340	9,330	9,090
Ash Fusibility					
Initial Temp. °F	1860	1940	2170	1820	2160
Softening Temp.					
Spherical °F	1980	2050	2250	2020	2250
Hemispherical °F	2050	2100	2270	2080	2280
Fluid Temp. °F	2180	2230	2390	2200	2380
Grindability Index (Hardgrove).....	-	-	38	38	38
Free Swelling Index (ASTM).....	-	-	-	-	-
Classification by Rank (ASTM).....	Subbituminous B				

(1) Formerly Charter Coals Ltd.

Mine OperatorDODDS COAL MINING CO. LTD. - No. 215 (1)

Mine LocationRyley, Tofield Area, Alberta

Name of Mine or Coal "Red Flame"

Sampled By: Fuels Research Centre (WEL)

Date Sampled: 13 November, 1968

Report of Analyses

Designation	Channel Sample East Pit
FRC Laboratory No.	2225-69
Proximate Analysis	
Moisture %	22.0
Ash %	8.2
Volatile Matter %	27.9
Fixed Carbon %	41.9
Sulphur %	0.4
Calorific Value.....Btu/lb.	8,960
Ash Fusibility	
Initial Temp. °F	2150
Softening Temp.	
Spherical °F	2220
Hemispherical °F	2340
Fluid Temp. °F	2400
Grindability Index (Hardgrove).....	41
Free Swelling Index (ASTM).....	-
Classification by Rank (ASTM).....	Subbituminous B

(1) Formerly Jet Construction Limited.

Mine Operator FORESTBURG COLLIERIES LIMITED - No. 1578
 Mine Location Forestburg, Castor Area, Alberta
 Name of Mine or Coal "Diplomat" "Ambassador"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 6 November, 1968

Report of Analyses

Size: Mine Designation	Lump	Egg	Nut
Screen Openingin.	+ 4½ sq	4½ x 2 sq	2 x 1 sq
FRC Laboratory No.	2220-69	2221-69	2222-69
Proximate Analysis			
Moisture %	24.5	24.1	24.2
Ash %	5.6	5.1	5.7
Volatile Matter %	29.3	29.2	29.8
Fixed Carbon %	40.6	41.6	40.3
Sulphur %	0.4	0.4	0.4
Calorific Value.....Btu/lb.	8800	9070	8910
Ash Fusibility			
Initial Temp. °F	1850	1850	1740
Softening Temp.			
Spherical °F	1900	1900	1850
Hemispherical °F	1930	1940	1880
Fluid Temp. °F	1980	1950	1920
Grindability Index (Hardgrove).....	-	-	30
Free Swelling Index (ASTM).....	-	-	-
Classification by Rank (ASTM).....	Subbituminous B		

Mine Operator FORESTBURG COLLIERIES LIMITED - No. 1578
 Mine Location Forestburg, Castor Area, Alberta
 Name of Mine or Coal "Diplomat" "Ambassador"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 6 November, 1968

Report of Analyses

Size: Mine Designation	Stoker	Slack
Screen Openingin.	1 x ½ sq	½ sq x 0
FRC Laboratory No.	2223-69	2224-69
Proximate Analysis		
Moisture %	24.7	23.9
Ash %	5.4	6.1
Volatile Matter %	27.0	28.9
Fixed Carbon %	42.9	41.1
Sulphur %	0.5	0.4
Calorific Value.....Btu/lb.	9040	8840
Ash Fusibility		
Initial Temp. °F	1700	1880
Softening Temp.		
Spherical °F	1800	1920
Hemispherical °F	1870	2000
Fluid Temp. °F	1930	2010
Grindability Index (Hardgrove).....	30	32
Free Swelling Index (ASTM).....	-	-
Classification by Rank (ASTM).....	Subbituminous B	

Mine OperatorKLEENBIRN COLLIERIES LIMITED - NO. 1404

Mine LocationBow City, Brooks Area, Alberta

Name of Mine or Coal "Birnwell"

Sampled By: Fuels Research Centre (WRL)

Date Sampled: 2 October, 1968

Report of Analyses

Size: Mine Designation	Lump	Nut	Stoker	Slack
. Screen Openingin.	+2 sq	2 x 1½ sq	1½ sq x 5/16 sl	5/16 sl x 0
FRC Laboratory No.	3079-68	3080-68	3081-68	3082-68
Proximate Analysis				
Moisture %	16.0	16.7	16.5	16.2
Ash %	9.3	11.7	11.7	12.1
Volatile Matter %	31.5	29.5	30.7	30.2
Fixed Carbon %	43.2	42.1	41.1	41.5
Sulphur %	0.7	0.7	0.8	0.7
Calorific Value.....Btu/lb.	9,740	9,340	9,340	9,290
Ash Fusibility				
Initial Temp. °F	2020	2070	2050	1990
Softening Temp.				
Spherical °F	2130	2180	2140	2120
Hemispherical °F	2160	2200	2180	2160
Fluid Temp. °F	2360	2370	2370	2210
Grindability Index (Hardgrove).....	-	34	36	36
Free Swelling Index (ASTM).....	-	-	-	-
Classification by Rank (ASTM).....	Subbituminous A			

Mine Operator NORTH POINT COAL COMPANY LTD. - No. 1562
 Mine Location Thorhild, Westlock Area, Alberta
 Name of Mine or Coal "North Point"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 14 November, 1968

Report of Analyses

Designation	Channel Sample
FRC Laboratory No.	2227-69
Proximate Analysis Moisture % Ash % Volatile Matter % Fixed Carbon % Sulphur % Calorific Value.....Btu/lb. Ash Fusibility Initial Temp. °F Softening Temp. Spherical °F Hemispherical °F Fluid Temp. °F Grindability Index (Hardgrove)..... Free Swelling Index (ASTM)..... Classification by Rank (ASTM).....	23.3 5.9 30.7 40.1 0.3 8,700 1940 2000 2040 2060 44 - Subbituminous C

Mine Operator **SISSON'S MINE - No. 809**
 Mine Location **Alix, Ardley Area, Alberta**
 Name of Mine or Coal **"Sisson's"**
 Sampled By: **Fuels Research Centre (WRL)** Date Sampled: **4 November, 1968.**

Report of Analyses

Designation	West Pit	East Pit
	Channel 1	Channel 2
FRC Laboratory No.	2212-69	2213-69
Proximate Analysis		
Moisture %	19.2	18.9
Ash %	9.2	11.5
Volatile Matter %	27.2	27.0
Fixed Carbon %	44.4	42.6
Sulphur %	0.4	0.5
Calorific Value.....Btu/lb.	9,080	8,930
Ash Fusibility		
Initial Temp. °F	1990	1980
Softening Temp.		
Spherical °F	2020	2250
Hemispherical °F	2280	2450
Fluid Temp. °F	2340	2540
Grindability Index (Hardgrove).....	43	43
Free Swelling Index (ASTM).....	-	-
Classification by Rank (ASTM).....	Subbituminous B	

Mine Operator STETTLER COAL COMPANY LIMITED - No. 1614
 Mine Location Halkirk, Castor Area, Alberta
 Name of Mine or Coal "All-Fire"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 6 November, 1968

Report of Analyses

Designation	Channel Sample
FRC Laboratory No.	2219-69
Proximate Analysis	
Moisture %	25.0
Ash %	7.3
Volatile Matter %	29.4
Fixed Carbon %	38.3
Sulphur %	0.4
Calorific Value.....Btu/lb.	8,680
Ash Fusibility	
Initial Temp. °F	2030
Softening Temp.	
Spherical °F	2080
Hemispherical °F	2180
Fluid Temp. °F	2280
Grindability Index (Hardgrove).....	32
Free Swelling Index (ASTM).....	-
Classification by Rank (ASTM).....	Subbituminous C

Mine Operator SUBWAY COAL COMPANY - No. 1666

Mine Location Rosedale, Drumheller Area, Alberta

Name of Mine or Coal "Subway"

Sampled By: Fuels Research Centre (W.C.)

Date Sampled: 16 October, 1968

Report of Analyses

Designation	Channel Sample	
	#1 Upper Seam	#2 Lower Seam
FRC Laboratory No.	3122-68	3123-68
Proximate Analysis		
Moisture %	15.7	15.9
Ash %	16.5	11.2
Volatile Matter %	29.3	28.5
Fixed Carbon %	38.5	44.3
Sulphur %	1.0	0.7
Calorific Value.....Btu/lb.	8,860	9,610
Ash Fusibility		
Initial Temp. °F	2050	1870
Softening Temp.		
Spherical °F	2120	2100
Hemispherical °F	2210	2270
Fluid Temp. °F	2380	2450
Grindability Index (Hardgrove).....	38	38
Free Swelling Index (ASTM).....	-	-
Classification by Rank (ASTM).....	Subbituminous A	

SECTION III

BITUMINOUS COALS

FROM

ALBERTA AND BRITISH COLUMBIA

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

Mine Operator THE CANMORE MINES LIMITED - No. 2
 Mine Location Canmore, Cascade Area, Alberta
 Name of Mine or Coal "Canmore" *
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 3 October, 1968

Report of Analyses

Size: Mine Designation	Cobble	Stove	Chestnut
Screen Openingin.	5 x 3 sl	3 x 2 sl	2 sl x 1½ rd
FRC Laboratory No.	3084-68	3085-68	3086-68
Proximate Analysis			
Moisture %	1.6	2.1	3.3
Ash %	4.4	7.8	9.0
Volatile Matter %	11.2	11.8	10.8
Fixed Carbon %	82.8	78.3	76.9
Sulphur %	0.7	0.7	0.7
Calorific Value.....Btu/lb.	14,600	13,960	13, 570
Ash Fusibility			
Initial Temp. °F	2550+	2460+	2460+
Softening Temp.			
Spherical °F	2550+	2460+	2460+
Hemispherical °F	2550+	2460+	2460+
Fluid Temp. °F	2550+	2460+	2460+
Grindability Index (Hardgrove).....	-	-	63
Free Swelling Index (ASTM).....	N.A.	N.A.	N.A.
Classification by Rank (ASTM).....	Semianthracite		

* Wilson Seam .

Mine Operator THE CANMORE MINES LIMITED - No. 2
 Mine Location Canmore, Cascade Area, Alberta
 Name of Mine or Coal "Canmore" *
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 3 October, 1968

Report of Analyses

Size: Mine Designation	Stoker	Buckwheat	Slack
Screen Openingin.	1½ rd x 5/8 sq	9/16 x 5/16 sq	¼ sq x 0
FRC Laboratory No.	3087-68	3088-68	3089-68
Proximate Analysis			
Moisture %	3.9	4.9	8.2
Ash %	7.4	5.6	7.3
Volatile Matter %	11.5	11.1	10.5
Fixed Carbon %	77.2	78.4	74.0
Sulphur %	0.7	0.7	0.7
Calorific Value.....Btu/lb.	13,700	13,870	13,100
Ash Fusibility			
Initial Temp. °F	2550+	2580+	2580+
Softening Temp.			
Spherical °F	2550+	2580+	2580+
Hemispherical °F	2550+	2580+	2580+
Fluid Temp. °F	2550+	2580+	2580+
Grindability Index (Hardgrove).....	62	68	91
Free Swelling Index (ASTM).....	N.A.	N.A.	N.A.
Classification by Rank (ASTM).....	Semianthracite		

* Wilson Seam

Mine Operator COLEMAN COLLIERIES LIMITED - No. 1747
 Mine Location Coleman, Crowsnest Area, Alberta
 Name of Mine or Coal Vicary Creek Mine: "Vicary Creek"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 8 October, 1968

Report of Analyses

Size: Mine Designation	Export Coal	Export Coal
Screen Openingin.	2 rd x 1/4 sq	1/4 sq x 0
FRC Laboratory No.	3133-68	3134-68
Proximate Analysis		
Moisture %	1.8	3.1
Ash %	8.4	9.4
Volatile Matter %	22.8	21.7
Fixed Carbon %	67.0	65.8
Sulphur %	0.8	0.4
Calorific Value.....Btu/lb.	13,780	13,450
Ash Fusibility		
Initial Temp. °F	2350	2600+
Softening Temp.		
Spherical °F	2520	2600+
Hemispherical °F	2600+	2600+
Fluid Temp. °F	2600+	2600+
Grindability Index (Hardgrove).....	72	96
Free Swelling Index (ASTM).....	6	6
Classification by Rank (ASTM).....	Medium Volatile Bituminous	

Mine OperatorCOLEMAN COLLIERIES LIMITED - No. 1695
 Mine LocationColeman, Crowsnest Area, Alberta
 Name of Mine or CoalTent Mountain; "Coleman"
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 8 October, 1968

Report of Analyses

Size: Mine Designation	Stoker
Screen Openingin.	1½ x ½ sq
FRC Laboratory No.	3135-68
Proximate Analysis	
Moisture %	4.3
Ash %	10.6
Volatile Matter %	22.8
Fixed Carbon %	62.3
Sulphur %	0.4
Calorific Value.....Btu/lb.	12,980
Ash Fusibility	
Initial Temp. °F	2600+
Softening Temp.	
Spherical °F	2600+
Hemispherical °F	2600+
Fluid Temp. °F	2600+
Grindability Index (Hardgrove).....	72
Free Swelling Index (ASTM).....	3
Classification by Rank (ASTM).....	Medium Volatile Bituminous

Mine Operator KAISER RESOURCES LIMITED
 Mine Location Michel, East Kootenay District,
 British Columbia
 Name of Mine or Coal Michel Colliery, Balmer Seam
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 8-9 October, 1968

Report of Analyses

Size: Mine Designation	Cobble	Stoker	Export
Screen Opening in.	7 sl x 1 5/8 rd	1 5/8 x 3/8 rd	2 rd x 0
FRC Laboratory No.	3129-68	3130-68	3131-68
Proximate Analysis			
Moisture %	2.0	1.9	1.8
Ash %	13.3	11.5	8.7
Volatile Matter %	18.4	18.1	19.4
Fixed Carbon %	66.3	68.5	70.1
Sulphur %	0.2	0.2	0.3
Calorific Value..... Btu/lb.	13,120	13,440	13,900
Ash Fusibility			
Initial Temp. °F	2350	2530	2500
Softening Temp.			
Spherical °F	2570	2600+	2600+
Hemispherical °F	2570+	2600+	2600+
Fluid Temp. °F	2570+	2600+	2600+
Grindability Index (Hardgrove).....	-	103	98
Free Swelling Index (ASTM).....	2½	2½	7½
Classification by Rank (ASTM).....	Low Volatile Bituminous		

Mine OperatorKAISER RESOURCES LIMITED
 Mine LocationMichel, East Kootenay District, British Columbia
 Name of Mine or CoalUpper C #3 Strip
 Sampled By: Fuels Research Centre (WRL) Date Sampled: 8-9 October, 1968

Report of Analyses

Size: Mine Designation	Slack
. Screen Openingin.	2 rd x 0
FRC Laboratory No.	3132-68
Proximate Analysis	
Moisture %	5.1
Ash %	7.4
Volatile Matter %	26.2
Fixed Carbon %	61.3
Sulphur %	0.3
Calorific Value.....Btu/lb.	13,490
Ash Fusibility	
Initial Temp. °F	2350
Softening Temp.	
Spherical °F	2600
Hemispherical °F	2600+
Fluid Temp. °F	2600+
Grindability Index (Hardgrove).....	102
Free Swelling Index (ASTM).....	8½
Classification by Rank (ASTM).....	Medium Volatile Bituminous

SECTION IV - CHEMICAL ANALYSES OF ASH

A - SASKATCHEWAN

B - ALBERTA AND BRITISH COLUMBIA

(Size designation is according to terminology at the mine.
For screen openings refer to Sections on General Analyses
I to III.)

A - SASKATCHEWAN

Size Ash Constituents (Per Cent)

	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O
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Alberta Coal Limited

Booker	20.4	19.4	4.3	0.5	0.9	27.4	5.6	13.8	7.4	0.3
Pea	22.1	20.1	4.5	0.5	0.9	27.6	5.5	12.6	7.0	0.4
Bugdust	21.6	18.7	6.7	0.4	0.8	23.7	5.1	16.7	5.5	0.3

Manitoba & Saskatchewan Coal Company Limited

Stove	25.5	20.0	7.3	0.5	0.6	20.4	5.2	14.6	6.4	0.3
Booker	25.8	22.1	5.9	0.5	0.5	21.7	5.5	12.0	7.6	0.4
Pea	30.0	21.5	5.3	0.6	0.5	20.2	5.0	11.1	7.4	0.2
Bugdust	30.8	21.2	5.2	0.6	0.2	18.2	4.7	11.2	5.7	0.4

Utility Coals Limited

Mine Run	38.8	22.3	4.8	0.9	0.2	16.1	5.6	8.7	2.2	0.4
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B - ALBERTA AND BRITISH COLUMBIA

Size	Ash Constituents (Per Cent)									
	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O
<u>The Canmore Mines Limited - Mine No. 2</u>										
Cobble	53.1	33.0	6.9	0.8	0.9	0.9	2.3	1.5	0.3	0.6
Stove	53.6	32.0	7.2	0.9	0.9	0.7	2.5	2.4	0.3	1.0
Chestnut	57.1	31.1	5.2	0.7	0.5	0.6	1.7	1.1	0.3	1.3
Stoker	54.8	36.0	2.5	0.9	0.9	0.4	1.6	0.8	0.3	1.1
Buckwheat	56.7	33.8	3.8	0.8	0.8	0.5	0.4	1.2	0.4	0.9
Slack	56.8	35.5	2.4	1.2	0.9	0.7	0.6	0.9	0.5	1.2
<u>Kaiser Resources Limited</u>										
Cobble	53.0	30.9	1.7	1.4	1.5	6.7	1.0	4.4	0.3	0.6
Stoker	55.0	31.8	2.2	1.3	1.4	4.2	1.1	3.3	0.2	0.5
Export	54.3	31.5	2.8	1.2	1.3	3.9	1.2	3.3	0.3	0.6
<u>Coleman Collieries Limited</u>										
<u>Mine No. 1747</u>										
Export	39.4	36.5	10.2	1.5	3.5	5.2	0.6	2.6	0.5	0.7
Export	48.6	37.6	3.5	2.0	2.3	2.8	0.4	1.3	0.2	0.4
<u>Mine No. 1695</u>										
Stoker	51.7	35.3	3.7	1.4	1.9	3.3	1.0	2.4	0.2	0.4
<u>Alberta Coal Limited</u>										
<u>Mine No. 443</u>										
Egg	21.0	18.3	20.0	0.3	0.7	18.3	3.1	14.1	1.9	0.1
Nut	23.6	19.4	19.2	0.4	0.6	18.0	3.9	13.6	1.4	0.3
Stoker	24.1	19.2	17.8	0.5	0.7	16.9	3.3	15.5	1.4	0.3
Slack	22.5	18.8	19.4	0.4	0.6	15.9	3.4	16.3	1.4	0.3
<u>Mine No. 1046</u>										
Lump	33.4	23.4	5.3	1.2	0.2	17.5	1.7	10.0	5.7	0.7
Egg	39.4	21.8	4.7	1.4	0.3	15.4	1.3	8.9	5.8	0.6
Nut	38.4	25.3	5.5	0.5	0.7	14.7	1.5	8.6	5.3	0.3
Stoker	35.8	25.9	5.7	0.5	0.7	14.8	1.4	9.4	5.3	0.4
Slack	41.5	26.7	6.1	0.7	0.5	10.9	1.2	8.4	4.1	0.4
<u>Century Coals Limited - Mine No. 1742</u>										
Lump	35.8	27.2	7.2	0.2	3.1	10.6	2.1	8.5	5.8	0.6
Egg	38.1	29.5	6.0	0.6	1.8	9.6	1.8	7.6	5.5	0.7
Nut	44.9	32.0	3.6	0.4	1.0	7.1	1.5	5.4	4.5	1.0
Stoker	41.0	27.9	7.9	0.4	1.0	8.1	1.8	7.6	4.6	0.9
Slack	42.1	30.9	5.7	0.6	1.0	7.2	1.6	7.6	3.6	1.1

(Alberta and British Columbia, Cont'd) -

Size

Ash Constituents (Per Cent)

SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O
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Forestburg Collieries Limited - Mine No. 1578

Lump	30.1	21.5	6.4	0.7	1.5	18.3	2.1	12.3	6.2	0.1
Egg	28.9	21.4	7.4	0.8	1.6	17.8	2.1	15.0	5.5	0.0
Nut	33.8	23.4	5.9	0.7	1.2	16.4	1.8	11.9	4.9	0.0
Stoker	31.3	23.2	6.3	0.7	1.4	17.2	2.0	12.6	4.9	0.1

Kleenbirn Collieries Limited - Mine No. 1404

Lump	38.2	30.0	3.9	0.6	3.1	10.2	1.6	8.0	4.6	0.6
Nut	43.8	28.2	4.7	0.6	2.4	8.4	1.7	6.9	3.8	0.7
Stoker	43.5	27.0	5.0	0.7	2.4	8.2	2.6	7.7	3.8	0.9
Slack	42.1	25.5	4.9	0.7	2.0	9.4	2.4	9.4	3.7	1.0

Sisson's Mine - Mine No. 809

West Pit	50.8	16.2	3.4	0.5	0.1	14.4	1.8	11.6	0.5	0.7
East Pit	64.6	9.3	3.0	1.2	0.1	12.3	1.6	6.4	0.4	0.4

Subway Coal Company - Mine No. 1666

Upper Seam	55.2	22.8	6.8	0.4	0.2	4.4	1.7	5.9	2.0	0.7
Lower Seam	56.6	19.4	4.9	0.7	0.5	5.7	1.3	7.4	2.1	1.6

TET:ip