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ANALYSIS DIRECTORY OF CANADIAN COMMERCIAL COALS – SUPPLEMENT NO. 3

T.E. TIBBETTS, W.J. MONTGOMERY AND D.K. FAURSCHOU

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ANALYSIS DIRECTORY OF CANADIAN COMMERCIAL COALS - SUPPLEMENT NO. 3

by

T.E. Tibbetts*, W.J. Montgomery** and D.K. Faurschou***

PREFACE

Chemical and physical analyses of thermal and metallurgical coals currently produced by mines in Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia are reported. The evaluations are part of a continuing CANMET project, initiated in 1954, to monitor Canadian commercial coals to assist marketing and resource assessment activities. The coals were sampled by personnel of the Energy Research Laboratories stationed at Point Edward, Nova Scotia and at Clover Bar, Alberta. Most of the sampling was done during 1976 and 1977. Because of limitations on financial and manpower resources the survey was incomplete. To extend coverage and to provide easier reference the number of mines represented was increased by including some analyses from a report covering commercial coals sampled in 1975 (1). Generally, the samples represent production on a specific day of both mine run and prepared coals sampled independently by CANMET staff at operating mines, coal washeries and delivery points.

Coals are identified by the operator and name of mine, seam, coalfield, and location. Information is arranged by province and is intended to provide a ready indication of the quality of commercially available Canadian coals. As such, this document complements the coal industry statistics available in other federal and provincial reports.

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REPERTOIRE D'ANALYSE DES CHARBONS MARCHANDS CANADIENS - SUPPLEMENT N^{O} 3

par

T.E. Tibbetts*, W.J. Montgomery** et D.K. Faurschou***

PREFACE

Le présent rapport décrit les analyses chimiques et physiques des charbons thermiques et métallurgiques provenant des mines de Nouvelle-Ecosse, Nouveau-Brunswick, Saskatchewan, Alberta et Colombie-Britannique. Ces évaluations effectuées en vertu du projet permanent de CANMET introduit en 1954, visent à surveiller les charbons marchands canadiens afin de seconder les activités de mise en marché et d'évaluation de ressources. Les échantillons de charbon ont été prélevés par le personnel des Laboratoires de recherche énergétique à Point Edward en Nouvelle-Ecosse et à Clover Bar en Alberta. La plupart de l'échantillonnage a été effectué en 1976 et 1977. Cette étude n'a pas été achevée à cause du manque de personnel et de restrictions budgétaires. Afin de couvrir un plus vaste territoire et de fournir une référence adéquate, le nombre de mines étudiées a été augmenté en incluant certaines analyses comprises dans un rapport sur les charbons marchands prélevés en 1975 (1). Habituellement, les échantillons représentent la production pendant un jour déterminé de charbon tout-venant et préparé et dont a prélevé séparément le personnel de CANMET dans les mines d'exploitation, les laveries de charbon et les endroits de distribution.

Les charbons sont identifiés par l'opérateur ainsi que le nom de la mine, du gisement, du bassin houiller et l'emplacement. Ces renseignements sont enregistrés par les provinces et ont été conçus pour fournir au besoin les indices révélateurs de la qualité des charbons marchands disponibles au Canada. Comme tel ce rapport vient compléter les statistiques disponibles sur l'industrie du charbon compris dans d'autres rapports provinciaux et fédéraux.

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INTRODUCTION

Complete chemical and physical analytical services are provided by the Energy Research Laboratories of CANMET for departmental and other coal projects, with files going back to 1910. Consequently, industry and other government departments make direct enquiries about the quality of Canadian coals. Most are from current and prospective consumers who need information enabling them to be more selective about the type of coal they use or who want to consider alternative sources of supply, producers and prospective producers who wish to be informed about available products, and government departments who require commercial coal quality information for inventory and regulatory reasons. To meet these needs, Project 3.1.2.1.01 - Quality of Coal and Peat Resources and Reserves - allocates a small budget to update the Analysis Directory of Canadian Commercial Coals. The directory has been updated at irregular intervals since its original issue in 1948 (1, 2, 3). This current supplement covers analyses of coals sampled by CANMET staff in Nova Scotia, New Brunswick, Alberta, and British Columbia in 1976 and 1977. However, financial and manpower limitations during this period resulted in less than complete coverage of the operating mines in Canada. Therefore, in an effort to extend coverage and to provide easier reference, some analyses, principally of Saskatchewan lignite samples collected in 1975, and previously published are included (4, 5).

Separate data sheets provide information not only on the products of operating mines or coal washeries but also on relevant coalfields, seams and mining districts. The information provides a better understanding of variations in coal quality within and between coalfields. The format selected makes it possible to compare information with the statistical data and summaries of coal industry developments which appear in various publications such as the department's annual "Operators' list No. 4, Coal mines in Canada" (6), Energy Policy Report 77-5, 1976, "Assessment of Canada's coal resources and reserves" (7), and with certain other federal and provincial coal reports dealing with production statistics and resource and reserve assessment.

Future presentations of analytical data on commercial coal may involve changes in format and provide more information consistent with developing concepts and the proposed establishment of a national coal inventory for Canada.

Sample collection and preparation were conducted with the cooperation and assistance of mine operators and consumers by staff members of the regional laboratories of CANMET's Energy Research Laboratories at the Point Edward Industrial Park, Sydney, Nova Scotia, and at the Research Council of Alberta, Clover Bar, Edmonton. Normal mining and preparation plant procedures were followed so that the samples would be unbiased.

All samples were obtained in accordance with recognized reliable techniques and were considered representative, in general, of production on a particular day.

In New Brunswick, the sample preparation facilities of the New Brunswick Electric Power Commission were used for partial preparation of samples from the Minto coalfield. Elsewhere, mobile and base facilities of the regional laboratories were used.

The analyses were conducted by qualified personnel at the Point Edward and Ottawa laboratories using standard procedures of the American Society for Testing and Materials (ASTM). Although the results were reliable they should be considered as random independent sample statistics and not necessarily as being typical or representative of production over longer periods; nor should they be related to specific contract specification requirements.

The data comprise chemical and physical information essential for various purposes - considering quality aspects of contract specifications, classifying coal by rank, considering environmental hazards, selecting combustion or conversion processes, and to a limited extent evaluating coal suitability for metallurgical use. The specific data and their usefulness are discussed briefly below.

The proximate analysis includes weight per cent of moisture, ash, volatile matter and fixed carbon contents. For bituminous coals these determinations, together with sulphur content and calorific value, are presented on the basis of as-received moisture; however, for subbituminous

and lignite coals the proximate analysis, sulphur and calorific value are presented on the basis of equilibrium moisture content.

The as-received moisture is the total of the moisture loss determined on air drying under standard conditions and the residual moisture determined as part of the proximate analysis. As such, it can include surface or extraneous moisture of the coal as prepared for delivery or as delivered when care is exercised against moisture gain or loss between the sampling point and the laboratory. On the other hand, the equilibrium moisture approximates the natural bed moisture exclusive of surface moisture, and is essential for classifying low rank coals.

The data on proximate analysis, sulphur and calorific value are essential for establishing contract specifications and prices and for quality control of coal deliveries. The moisture, ash, and sulphur contents and the calorific value are subject to improvement by appropriate coal preparation techniques used to upgrade the coal. The fixed carbon and volatile matter contents, along with the calorific value are essential for classifying coals by rank according to ASTM (Table 1).

The rank of the coal indicates the degree to which the original organic matter has been metamorphosed to form lignite, subbituminous, bituminous and anthracite. Coal rank is important commercially because within wide limits it relates to the potential usage of the coal, subject to considerations related to quality factors such as moisture, ash, sulphur and trace element content.

The ultimate analysis presented on a dry basis includes weight per cent of carbon, hydrogen, sulphur, nitrogen, ash and oxygen contents, the latter obtained by difference from 100%. This elemental analysis is basic to selecting coal for conversion and combustion.

The sulphur and trace mercury contents are important considerations related to power plant emissions and regional or national environmental pollution regulations. As well, sulphur is an unwanted constituent in the manufacture of coke for the metallurgical industry.

Ash fusibility temperatures are determined in a reducing atmosphere, and are considered when selecting combustion equipment to avoid or reduce clinkering and slagging problems.

The mineral content of ash is important in furnace design as well as in the design of electrostatic precipitators. Mineral analysis of coal ash together with ash fusibility temperatures allow the prediction of slag viscosity. Mineral analysis of coal ash can also be used to predict the nature of fireside deposits formed in the boiler and characteristics of the fly ash such as electrical resistivity.

The Hardgrove Grindability Index is an indicator of the energy required to grind a coal to the desired fineness; the lower the index the more energy required.

The ASTM Free Swelling Index (F.S.I.) is an indicator of the swelling and caking characteristics of coal and is particularly relevant to selecting metallurgical coals.

The coal analyses are arranged by province. Each page has a three-line heading stating where possible:

- name of mine operator
- number or name of mine, seam, and coalfield,
- mine location by place name and county or district as appropriate, and province.

For Alberta, the location is also identified by section, township, range, and meridian according to the Alberta Land Survey System.

The sample data are presented, in general, by product for each mine. The sequence of presentation, by sample, is chronological with the most recent data presented first.

The approximate annual coal production of the major mines in Canada, in thousands of tonnes, is shown in Table 2 for 1977. Statistics are arranged by province, coalfield and company. Detailed annual production statistics, a summary of developments in the Canadian coal industry and tabulation of industry and mine operation data may be found in Reference 6. Figure 1 shows principal coal mines in Canada and Fig. 2, 3, 4, 5 and 6 show location of coal mines in Nova Scotia and New Brunswick, Saskatchewan, Alberta, west central Alberta, and southern Alberta and British Columbia, and are excerpted from the 1977 and 1976 issues of Reference 6.

CONVERSION FACTORS

The data in this report are given in the International System of Units (SI) where practicable. This represents a transition of units in the series of directory reports. Relevant conversion factors are tabulated below:

a) SI to conventional units

SI	x	Conversion factor	=	Conventional
^{o}C	x	(1.8 x ^{o}C) + 32	=	^{o}F
kg, kilogram	x	2.204 622 6	=	lb (avoirdupois)
t, tonne (1000 kg)	x	1.102 311	=	t, short ton (2000 lb)
t, tonne (2 204.622 6 lb)	x	0.984 206 5	=	t, long ton (2240 lb)
J, joule	x	0.000 947 8	=	Btu, British thermal units
MJ/kg, megajoule/ kilogram	x	429.923	=	Btu/lb

b) Conventional to SI units

Conventional	x	Conversion factor	=	SI
^{o}F	x	5/9 (^{o}F - 32)	=	^{o}C
lb (avoirdupois)	x	0.453 592 3	=	kg, kilogram
t, short ton (2000 lb)	x	0.907 184 74	=	t, tonne (1000 kg)
t, long ton (2240 lb)	x	1.016 046 908 8	=	t, tonne (2 204.622 6 lb)
Btu, British thermal unit	x	1055.06	=	J, joule
Btu/lb	x	0.002 326	=	MJ/kg, megajoule/ kilogram

COAL ANALYSES - NOVA SCOTIA

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Lingan Mine; Harbour Seam; Sydney Coalfield.

Lingan, Cape Breton County, Nova Scotia.

Sampling Date & Location:	19-5-77 Mine	9-6-76 Mine
Product & Screen Opening (in.):	Mine Run	Slack Minus 2, sq
ERL Laboratory No.	2634-77	2816-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	4.6	2.1
Ash ..... %	7.9	9.9
Volatile Matter ..... %	31.8	33.9
Fixed Carbon ..... %	55.7	54.1
Sulphur (As-received) ..... %	1.9	2.1
Calorific Value (As-rec'd):		
Btu/lb	13,350	12,960
MJ/kg	31.0	30.1
Ultimate Analysis (Dry basis):		
Carbon ..... %	77.5	75.2
Hydrogen ..... %	5.5	4.9
Sulphur ..... %	2.0	2.1
Nitrogen ..... %	1.7	1.6
Ash ..... %	8.3	10.2
Oxygen (By difference) .... %	5.0	6.0
Trace Mercury ..... ppm	0.25	0.22
Ash Fusibility Temperature:		
Initial ..... °F	1990	2130
Spherical ..... °F	2230	2330
Hemispherical ..... °F	2390	2480
Fluid ..... °F	2420	2490
Grindability Index (Hardgrove).	-	58
Free Swelling Index (ASTM)	8	6½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2634-77	37.2	19.6	29.4	-	0.8	0.0	1.9	0.9	2.0	0.7	2.6
2816-76	43.2	24.3	21.3	0.2	1.0	0.5	2.4	1.4	2.6	0.7	2.6

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Lingan Mine; Harbour Seam; Sydney Coalfield.

Lingan, Cape Breton County, Nova Scotia.

Sampling Date & Location:	6-6-77 Coal Preparation Plant,	6-6-77 Victoria Junction
Product & Screen Opening (in.):	Raw Feed	Slack Minus 2, sq
ERL Laboratory No.	2646-77	2645-77
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	7.5	1.6
Ash ..... %	14.2	3.2
Volatile Matter ..... %	31.4	37.8
Fixed Carbon ..... %	46.9	57.4
Sulphur (As-received) ..... %	1.8	1.6
Calorific Value (As-rec'd):		
Btu/lb	11,800	14,610
MJ/kg	27.4	34.0
Ultimate Analysis (Dry basis):		
Carbon ..... %	70.8	82.0
Hydrogen ..... %	4.8	5.2
Sulphur ..... %	2.0	1.6
Nitrogen ..... %	1.6	1.8
Ash ..... %	15.3	3.3
Oxygen (By difference) .... %	5.5	6.1
Trace Mercury ..... ppm	0.23	0.23
Ash Fusibility Temperature:		
Initial ..... °F	2060	1950
Spherical ..... °F	2260	2050
Hemispherical ..... °F	2350	2220
Fluid ..... °F	2460	2450
Grindability Index (Hardgrove).	-	-
Free Swelling Index (ASTM)	8	8

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2646-77	45.6	21.9	19.7	-	0.9	0.0	1.6	1.1	1.9	0.6	3.2
2645-77	24.9	15.2	52.9	-	1.0	0.1	1.3	0.6	1.3	0.6	1.0

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Lingan Mine; Harbour Seam; Sydney Coalfield.

Lingan, Cape Breton County, Nova Scotia.

Sampling Date & Location:	18-5-77 Seaboard Generating Station (NSPC)	10-6-76
Product & Screen Opening (in.):	Slack Minus 2, sq	Slack Minus 2, sq
ERL Laboratory No.	2635-77	2817-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	9.0	2.4
Ash ..... %	4.1	12.7
Volatile Matter ..... %	32.1	31.0
Fixed Carbon ..... %	54.8	53.9
Sulphur (As-received) ..... %	1.8	2.2
Calorific Value (As-rec'd):		
Btu/lb	13,300	12,630
MJ/kg	30.9	29.4
Ultimate Analysis (Dry basis):		
Carbon ..... %	81.3	73.0
Hydrogen ..... %	5.4	4.8
Sulphur ..... %	1.9	2.2
Nitrogen ..... %	1.8	1.6
Ash ..... %	4.5	13.0
Oxygen (By difference) .... %	5.1	5.4
Trace Mercury ..... ppm	0.24	0.23
Ash Fusibility Temperature:		
Initial ..... °F	1990	2100
Spherical ..... °F	2250	2330
Hemispherical ..... °F	2140	2450
Fluid ..... °F	2540	2510
Grindability Index (Hardgrove).	-	58
Free Swelling Index (ASTM)	8½	7½

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2635-77	27.2	16.5	47.1	-	0.9	0.1	1.8	0.6	2.0	0.7	1.4
2817-76	43.2	24.3	21.3	0.2	1.0	0.5	2.4	1.4	2.6	0.7	2.6

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

No. 26 Colliery; Harbour Seam; Sydney Coalfield

Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	6-6-77	17-5-77	6-6-77
	Coal Preparation Plant, Victoria Junction		
Product & Screen Opening (in.):	Raw Feed	Screen Plus 2, sq	Slack Minus 2, sq
ERL Laboratory No.	2643-77	2632/33-77	2642-77
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	8.0	1.4	1.2
Ash ..... %	6.3	5.0	3.2
Volatile Matter ..... %	30.5	35.1	35.0
Fixed Carbon ..... %	55.2	58.5	60.6
Sulphur (As-received) ..... %	0.9	0.6	0.8
Calorific Value (As-rec'd):			
Btu/lb	13,270	14,500	14,760
MJ/kg	30.9	33.7	34.3
Ultimate Analysis (Dry basis):			
Carbon ..... %	80.8	82.2	83.3
Hydrogen ..... %	5.1	5.5	5.2
Sulphur ..... %	1.0	0.6	0.9
Nitrogen ..... %	1.7	1.9	1.8
Ash ..... %	6.8	5.0	3.2
Oxygen (By difference) .... %	4.6	4.8	5.6
Trace Mercury ..... ppm	0.14	0.11	0.11
Ash Fusibility Temperature:			
Initial ..... °F	2060	2010	1990
Spherical ..... °F	2270	2070	2150
Hemispherical ..... °F	2370	2160	2340
Fluid ..... °F	2430	2480	2440
Grindability Index (Hardgrove).	-	67	-
Free Swelling Index (ASTM)	8½	7½	8½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2643-77	45.2	20.4	20.8	-	0.9	0.0	1.7	1.2	2.1	0.8	2.4
2632-77	19.3	10.7	51.6	-	0.9	0.2	2.6	1.3	4.5	0.4	0.5
2642-77	35.0	20.7	33.0	-	1.5	0.0	1.6	0.8	1.9	0.5	1.1

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

No. 26 Colliery; Harbour Seam; Sydney Coalfield.

Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	17-5-57	6-6-77	6-6-77
	Coal Preparation Plant, Victoria Junction		
Product & Screen Opening (in.):	Slack Minus 2, sq	Slack Minus 2, sq.	Slack Minus 2, sq.
ERL Laboratory No.	2633-77	2648-77	2649-77
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	1.5	8.8	8.6
Ash ..... %	12.1	3.0	4.8
Volatile Matter ..... %	31.8	31.8	32.6
Fixed Carbon ..... %	54.6	56.4	54.0
Sulphur (As-received) ..... %	0.8	1.1	1.7
Calorific Value (As-rec'd):			
Btu/lb	13,340	13,590	13,320
MJ/kg	31.0	31.6	31.0
Ultimate Analysis (Dry basis):			
Carbon ..... %	75.9	83.5	79.1
Hydrogen ..... %	6.9	5.5	5.3
Sulphur ..... %	0.8	1.3	1.9
Nitrogen ..... %	1.6	1.9	1.6
Ash ..... %	12.3	3.2	5.2
Oxygen (By difference) .... %	2.5	4.6	6.9
Trace Mercury ..... ppm	0.11	0.15	0.22
Ash Fusibility Temperature:			
Initial ..... °F	2120	1980	2010
Spherical ..... °F	2410	2190	2110
Hemispherical ..... °F	2470	2390	2290
Fluid ..... °F	2550	2520	2530
Grindability Index (Hardgrove).	-	-	-
Free Swelling Index (ASTM)	7	8½	8½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2633-77	53.3	21.7	13.3	-	0.9	0.0	1.3	1.4	1.9	0.6	2.9
2648-77	29.0	18.1	42.5	-	1.0	0.1	1.9	0.8	2.4	0.7	1.3
2649-77	29.1	17.0	42.8	-	0.9	0.1	2.0	0.6	2.7	0.6	1.6

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

No. 26 Colliery; Harbour Seam; Sydney Coalfield

Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	9-11-76	9-11-76	9-11-76
	Sydney Mines Wash Plant		
Product & Screen Opening (in.):	Egg Plus $1\frac{3}{4}$, rd	Nut $1\frac{3}{4}$ to $\frac{1}{2}$, rd	Coarse Slack Minus $1\frac{3}{4}$, rd
ERL Laboratory No.	3163-76	3164-76	3165-76
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	3.0	3.0	6.8
Ash ..... %	2.9	2.8	4.2
Volatile Matter ..... %	31.6	32.3	29.8
Fixed Carbon ..... %	62.5	61.9	59.2
Sulphur (As-received) ..... %	0.8	0.8	0.9
Calorific Value (As-rec'd):			
Btu/lb	14,560	14,540	13,700
MJ/kg	33.9	33.8	31.9
Ultimate Analysis (Dry basis):			
Carbon ..... %	84.5	84.2	83.5
Hydrogen ..... %	5.4	5.3	5.2
Sulphur ..... %	0.8	0.9	0.9
Nitrogen ..... %	1.8	1.8	1.8
Ash ..... %	3.0	2.9	4.6
Oxygen (By difference) .... %	4.5	4.9	4.0
Trace Mercury ..... ppm	0.12		0.11
Ash Fusibility Temperature:			
Initial ..... °F	2070	2070	2080
Spherical ..... °F	2290	2280	2270
Hemispherical ..... °F	2390	2440	2390
Fluid ..... °F	2480	2550	2460
Grindability Index (Hardgrove).	-	-	-
Free Swelling Index (ASTM)	$5\frac{1}{2}$	7	7

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3163-76	36.6	19.8	31.8	0.6	1.7	0.5	2.2	0.4	2.6	0.5	0.6
3164-76	32.5	20.2	25.6	0.5	1.2	0.3	2.2	0.5	3.0	0.5	0.7
3165-76	39.9	21.6	27.1	0.4	1.0	0.2	2.4	1.2	2.6	0.6	2.0

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

No. 26 Colliery; Harbour Seam; Sydney Coalfield

Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	9-11-76 Sydney Mines Wash Plant	9-11-76
Product & Screen Opening (in.):	Pea Minus $\frac{3}{4}$, rd	Fines Minus $\frac{1}{4}$, rd
ERL Laboratory No.	3166-76	3167-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	5.8	4.7
Ash ..... %	2.4	9.2
Volatile Matter ..... %	30.6	28.2
Fixed Carbon ..... %	61.2	57.9
Sulphur (As-received) ..... %	0.8	1.1
Calorific Value (As-rec'd):		
Btu/lb	14,050	13,110
MJ/kg	32.7	30.5
Ultimate Analysis (Dry basis):		
Carbon ..... %	85.5	78.2
Hydrogen ..... %	5.3	4.9
Sulphur ..... %	0.9	1.1
Nitrogen ..... %	1.8	1.6
Ash ..... %	2.6	9.6
Oxygen (By difference) .... %	3.9	4,6
Trace Mercury ..... ppm	0.08	0.22
Ash Fusibility Temperature:		
Initial ..... °F	2090	2110
Spherical ..... °F	2330	2350
Hemispherical ..... °F	2400	2400
Fluid ..... °F	2510	2420
Grindability Index (Hardgrove).	-	-
Free Swelling Index (ASTM)	$6\frac{1}{2}$	$7\frac{1}{2}$

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3166-76	32.3	22.1	26.6	0.3	1.2	0.3	2.6	1.0	3.1	0.6	1.2
3167-76	50.8	22.1	16.6	0.2	1.0	0.1	2.8	1.7	2.8	1.0	3.1

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

No. 26 Colliery; Harbour Seam; Sydney Coalfield

Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	8-6-76 Sydney Mines Wash Plant	8-6-76 Sydney Mines Wash Plant
Product & Screen Opening (in.):	Screen Plus 2, rd	Slack Minus 2, rd
ERL Laboratory No.	2814-76	2815-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	1.1	1.1
Ash ..... %	5.1	14.2
Volatile Matter ..... %	32.5	31.2
Fixed Carbon ..... %	61.3	53.5
Sulphur (As-received) ..... %	1.8	1.8
Calorific Value (As-rec'd):		
Btu/lb	14,410	12,830
MJ/kg	33.5	29.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	81.9	72.4
Hydrogen ..... %	5.3	4.8
Sulphur ..... %	1.8	1.8
Nitrogen ..... %	1.7	1.6
Ash ..... %	5.1	14.4
Oxygen (By difference) .... %	4.2	5.0
Trace Mercury ..... ppm	0.19	0.21
Ash Fusibility Temperature:		
Initial ..... °F	2060	2320
Spherical ..... °F	2150	2470
Hemispherical ..... °F	2300	2540
Fluid ..... °F	2490	2650
Grindability Index (Hardgrove).	-	66
Free Swelling Index (ASTM)	5½	7½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2814-76	29.6	17.8	41.7	0.7	1.2	0.7	2.2	1.2	2.0	0.4	1.1
2815-76	46.6	22.5	14.2	0.2	1.1	0.1	0.8	1.5	0.6	0.6	2.8

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Prince Mine; Harbour Seam; Sydney Coalfield

Point Aconi, Cape Breton County, Nova Scotia

Sampling Date & Location:	30-5-77 Mine	2-11-76 Sydney Mines Wash Plant	28-5-76 Trenton Power Station (NSPC)
Product & Screen Opening (in.):	Mine Run	Mine Run	Slack Minus $1\frac{3}{4}$, sq
ERL Laboratory No.	2636-77	2638-76	2812/13-76
Rank of Coal (ASTM):		High-volatile A bituminous	
Proximate Analysis (As-rec'd):			
Moisture ..... %	5.9	9.0	10.6
Ash ..... %	20.0	14.4	17.1
Volatile Matter ..... %	30.0	29.2	28.0
Fixed Carbon ..... %	44.1	47.4	44.3
Sulphur (As-received) ..... %	4.6	4.3	4.6
Calorific Value (As-rec'd):			
Btu/lb	10,450	10,220	10,220
MJ/kg	24.3	23.8	23.8
Ultimate Analysis (Dry basis):			
Carbon ..... %	62.4	66.9	63.6
Hydrogen ..... %	4.3	4.3	4.4
Sulphur ..... %	4.9	4.8	5.1
Nitrogen ..... %	1.3	1.4	1.3
Ash ..... %	21.3	15.8	19.1
Oxygen (By difference) .... %	5.8	6.8	6.5
Trace Mercury ..... ppm	0.26	0.24	0.23
Ash Fusibility Temperature:			
Initial ..... °F	1990	2020	2160
Spherical ..... °F	2190	2210	2260
Hemispherical ..... °F	2280	2350	2420
Fluid ..... °F	2520	2510	2510
Grindability Index (Hardgrove).	-	-	-
Free Swelling Index (ASTM)	3	$1\frac{1}{2}$	2

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2636-77	43.0	23.6	24.8	-	0.9	0.4	0.7	0.6	0.7	0.3	2.4
2638-76	37.8	22.8	33.6	0.0	0.8	0.6	1.1	0.6	1.1	0.3	2.0
2812-76	40.1	24.8	29.3	1.0	1.0	0.8	1.0	0.9	0.6	0.3	2.0

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Prince Mine/No. 26 Colliery; Harbour Seam; Sydney Coalfield

Point Aconi/Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	1-6-77	1-6-77 Sydney Mines Wash Plant	1-6-77
Product & Screen Opening (in.):	Egg Plus $1\frac{3}{4}$, sq	Nut $1\frac{3}{4}$ to $\frac{1}{4}$, sq	Coarse Slack Minus $1\frac{3}{4}$, sq
ERL Laboratory No.	2637-77	2638-77	2639-77
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	2.6	3.0	6.8
Ash ..... %	6.6	3.9	8.8
Volatile Matter ..... %	33.6	34.6	30.8
Fixed Carbon ..... %	57.2	58.5	53.6
Sulphur (As-received) ..... %	0.7	0.8	2.4
Calorific Value (As-rec'd):			
Btu/lb	13,960	14,410	12,560
MJ/kg	32.5	33.5	29.2
Ultimate Analysis (Dry basis):			
Carbon ..... %	81.5	83.3	75.9
Hydrogen ..... %	5.3	5.4	5.1
Sulphur ..... %	0.8	0.9	2.6
Nitrogen ..... %	1.8	1.8	1.6
Ash ..... %	6.7	4.0	9.4
Oxygen (By difference) .... %	3.9	4.6	5.4
Trace Mercury ..... ppm	0.07	0.07	0.18
Ash Fusibility Temperature:			
Initial ..... °F	2210	2000	1990
Spherical ..... °F	2510	2190	2120
Hemispherical ..... °F	2610	2380	2250
Fluid ..... °F	2700	2440	2470
Grindability Index (Hardgrove).	-	-	-
Free Swelling Index (ASTM)	6	$7\frac{1}{2}$	$7\frac{1}{2}$

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2637-77	54.2	22.5	12.2	-	1.4	0.0	0.6	0.9	0.7	0.5	2.4
2638-77	36.9	22.3	30.0	-	1.4	0.1	1.4	0.8	2.2	0.5	1.2
2639-77	36.1	22.0	31.8	-	0.9	0.2	1.2	0.6	1.9	0.3	1.8

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

Prince Mine/No. 26 Colliery; Harbour Seam; Sydney Coalfield

Point Aconi/Glace Bay, Cape Breton County, Nova Scotia

Sampling Date & Location:	1-6-77 Sydney Mines Wash Plant	1-6-77 Sydney Mines Wash Plant
Product & Screen Opening (in.):	Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq	Fines Minus $\frac{1}{4}$, sq
ERL Laboratory No.	2640-77	2641-77
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	5.6	5.8
Ash ..... %	3.7	11.0
Volatile Matter ..... %	33.5	32.3
Fixed Carbon ..... %	57.2	50.9
Sulphur (As-received) ..... %	1.1	3.4
Calorific Value (As-rec'd):		
Btu/lb	13,960	12,010
MJ/kg	32.5	27.9
Ultimate Analysis (Dry basis):		
Carbon ..... %	82.7	70.9
Hydrogen ..... %	5.4	4.6
Sulphur ..... %	1.1	3.6
Nitrogen ..... %	1.8	1.3
Ash ..... %	3.9	11.7
Oxygen (By difference) .... %	5.1	7.9
Trace Mercury ..... ppm	0.10	0.20
Ash Fusibility Temperature:		
Initial ..... °F	2010	1980
Spherical ..... °F	2080	2140
Hemispherical ..... °F	2240	2250
Fluid ..... °F	2530	2470
Grindability Index (Hardgrove).	-	-
Free Swelling Index (ASTM)	$8\frac{1}{2}$	3

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2640-77	30.4	20.1	39.1	-	0.9	0.2	2.0	1.2	2.1	0.5	1.2
2641-77	37.1	23.8	30.2	-	0.8	0.3	1.0	0.8	1.5	0.3	1.9

NOTES:

CAPE BRETON DEVELOPMENT CORPORATION (DEVCO)

T. Brogan & Sons Construction Ltd.; Bonar Seam; Sydney Coalfield

Point Aconi, Cape Breton County, Nova Scotia

Sampling Date & Location:	14-7-77 Trenton Power Station (NSPC)
Product & Screen Opening (in.):	Mine Run
ERL Laboratory No.	2932-77
Rank of Coal (ASTM):	High-volatile A bituminous
Proximate Analysis (As-rec'd):	
Moisture ..... %	6.8
Ash ..... %	19.7
Volatile Matter ..... %	29.0
Fixed Carbon ..... %	44.5
Sulphur (As-received) ..... %	5.3
Calorific Value (As-rec'd):	
Btu/lb	10,240
MJ/kg	23.8
Ultimate Analysis (Dry basis):	
Carbon ..... %	60.6
Hydrogen ..... %	4.0
Sulphur ..... %	5.7
Nitrogen ..... %	1.3
Ash ..... %	21.1
Oxygen (By difference) .... %	7.3
Trace Mercury ..... ppm	0.12
Ash Fusibility Temperature:	
Initial ..... °F	2010
Spherical ..... °F	2050
Hemispherical ..... °F	2160
Fluid ..... °F	2300
Grindability Index (Hardgrove).	-
Free Swelling Index (ASTM)	-

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2932-77	45.9	15.5	32.6	-	0.6	0.1	0.4	1.2	1.2	0.2	2.0

NOTES:

DRUMMOND COAL COMPANY LIMITED

Drummond Colliery; No. 1. (Scott Pit) Seam; Pictou Coalfield

Westville, Pictou County, Nova Scotia

Sampling Date & Location:	15-7-77 Trenton Power Station (NSPC)	28-5-76 Mine
Product & Screen Opening (in.):	Lump Plus 1½, sq	Lump Plus 1½, sq
ERL Laboratory No.	2928-77	2803-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	2.4	2.3
Ash ..... %	21.9	18.7
Volatile Matter ..... %	25.6	25.3
Fixed Carbon ..... %	50.1	53.7
Sulphur (As-received) ..... %	1.4	1.1
Calorific Value (As-rec'd):		
Btu/lb	10,930	11,530
MJ/kg	25.4	26.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	64.8	67.5
Hydrogen ..... %	3.9	4.0
Sulphur ..... %	1.4	1.1
Nitrogen ..... %	1.7	1.8
Ash ..... %	22.4	19.1
Oxygen (By difference) .... %	5.8	6.5
Trace Mercury ..... ppm	0.15	0.06
Ash Fusibility Temperature:		
Initial ..... °F	2140	2480
Spherical ..... °F	2450	2660
Hemispherical ..... °F	2470	2700 +
Fluid ..... °F	2550	2700 +
Grindability Index (Hardgrove).	-	-
Free Swelling Index (ASTM)	-	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2928-77	54.5	23.7	14.0	-	0.7	0.5	2.4	1.1	2.0	0.2	1.6
2803-76	57.2	28.7	9.3	0.1	1.0	0.7	1.6	1.2	0.6	0.2	1.3

NOTES:

DRUMMOND COAL COMPANY LIMITED

Drummond Colliery; No. 1 (Scott Pit) Seam; Pictou Coalfield

Westville, Pictou County, Nova Scotia

Sampling Date & Location:	15-7-77 Trenton Power Station (NSPC)	26-5-76 Mine
Product & Screen Opening (in.):	Nut Plus $1\frac{1}{2}$ to $\frac{3}{4}$, sq	Nut Plus $1\frac{1}{2}$ to $\frac{3}{4}$, sq
ERL Laboratory No.	2929-77	2806/07-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	2.3	2.6
Ash ..... %	22.4	18.9
Volatile Matter ..... %	25.1	25.8
Fixed Carbon ..... %	50.2	52.7
Sulphur (As-received) ..... %	1.8	1.4
Calorific Value (As-rec'd):		
Btu/lb	10,990	11,480
MJ/kg	25.6	26.7
Ultimate Analysis (Dry basis):		
Carbon ..... %	64.7	68.1
Hydrogen ..... %	3.8	4.2
Sulphur ..... %	1.8	1.6
Nitrogen ..... %	1.7	1.7
Ash ..... %	22.8	19.4
Oxygen (By difference) .... %	5.2	5.0
Trace Mercury ..... ppm	0.11	0.07
Ash Fusibility Temperature:		
Initial ..... °F	2190	2300
Spherical ..... °F	2490	2570
Hemispherical ..... °F	2520	2600
Fluid ..... °F	2580	2700 +
Grindability Index (Hardgrove).	-	56
Free Swelling Index (ASTM)	-	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2929-77	54.7	24.3	14.0	-	0.7	0.3	1.2	1.2	1.5	0.3	1.8
2806-76	25.1	26.5	10.8	0.1	0.9	0.6	2.3	1.7	2.2	0.2	1.3

NOTES:

DRUMMOND COAL COMPANY LIMITED

Drummond Colliery; No. 1 (Scott Pit) Seam; Pictou Coalfield

Westville, Pictou County, Nova Scotia

Sampling Date & Location:	15-7-77 Trenton Power Station (NSPC)	25-5-76 Mine
Product & Screen Opening (in.):	Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq	Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq
ERL Laboratory No.	2930-77	2808/29-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	2.2	2.6
Ash ..... %	22.1	19.9
Volatile Matter ..... %	25.3	24.5
Fixed Carbon ..... %	50.4	53.0
Sulphur (As-received) ..... %	2.2	1.6
Calorific Value (As-rec'd):		
Btu/lb	11,060	11,280
MJ/kg	25.7	26.2
Ultimate Analysis (Dry basis):		
Carbon ..... %	64.4	66.1
Hydrogen ..... %	4.0	3.9
Sulphur ..... %	2.2	1.6
Nitrogen ..... %	1.8	1.8
Ash ..... %	22.6	20.5
Oxygen (By difference) .... %	5.0	6.1
Trace Mercury ..... ppm	0.12	0.07
Ash Fusibility Temperature:		
Initial ..... °F	2170	2320
Spherical ..... °F	2500	2560
Hemispherical ..... °F	2590	2660
Fluid ..... °F	2660	2700 +
Grindability Index (Hardgrove).	-	56
Free Swelling Index (ASTM)	-	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2930-77	53.0	23.8	13.0	-	0.7	0.4	2.3	1.2	2.9	0.4	1.8
2808-76	51.9	26.0	11.0	0.1	0.9	0.7	2.6	1.2	2.5	0.3	1.4

NOTES:

DRUMMOND COAL COMPANY LIMITED

Drummond Colliery; No. 1. (Scott Pit) Seam; Pictou Coalfield

Westville, Pictou County, Nova Scotia

Sampling Date & Location:	15-7-77 Trenton Power Station (NSPC)	26-5-76 Mine
Product & Screen Opening (in.):	Fines Minus $\frac{1}{4}$, sq	Fines Minus $\frac{1}{4}$, sq
Point Edward No.	PE 231-77	
ERL Laboratory No.	2931-77	2810/11-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	2.3	3.2
Ash ..... %	21.1	21.4
Volatile Matter ..... %	24.5	24.3
Fixed Carbon ..... %	52.1	51.1
Sulphur (As-received) ..... %	1.6	1.8
Calorific Value (As-rec'd):		
Btu/lb	11,160	10,960
MJ/kg	26.0	25.5
Ultimate Analysis (Dry basis):		
Carbon ..... %	65.8	64.7
Hydrogen ..... %	4.0	3.9
Sulphur ..... %	1.6	1.8
Nitrogen ..... %	1.8	1.7
Ash ..... %	21.6	22.1
Oxygen (By difference) .... %	5.2	5.8
Trace Mercury ..... ppm	0.11	0.15
Ash Fusibility Temperature:		
Initial ..... °F	2350	2430
Spherical ..... °F	2550	2630
Hemispherical ..... °F	2620	2680
Fluid ..... °F	2650	2700 +
Grindability Index (Hardgrove).	-	59
Free Swelling Index (ASTM)	1	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2931-77	55.0	24.3	12.2	-	0.7	0.3	1.3	0.6	1.5	0.3	1.8
2810-76	53.0	28.1	10.6	0.1	0.9	0.5	2.5	1.4	2.5	0.3	1.4

NOTES:

EVANS COAL MINES LIMITED

Evans Mine; No. 5 Seam; Inverness Coalfield

St. Rose, Inverness County, Nova Scotia

Sampling Date & Location:	12-11-75 Mine	13-05-75 Mine
Product & Screen Opening (in.):	Medium Lump 6 to 3¼, sq	Medium Lump 6 to 3¼, sq
ERL Laboratory No.	2086-76	2901-75
Rank of Coal (ASTM):	High-volatile B bituminous	
Proximate Analysis (Equil.):		
Moisture ..... %	5.5	5.5
Ash ..... %	8.7	7.3
Volatile Matter ..... %	36.2	34.8
Fixed Carbon ..... %	49.6	52.4
Sulphur (Equil.) ..... %	6.1	5.9
Calorific Value (Equil.):		
Btu/lb	11,920	12,140
MJ/kg	27.7	28.2
Ultimate Analysis (Dry basis):		
Carbon ..... %	70.2	72.0
Hydrogen ..... %	4.6	4.9
Sulphur ..... %	6.4	6.2
Nitrogen ..... %	1.4	1.4
Ash ..... %	9.2	7.7
Oxygen (By difference) .... %	8.2	7.8
Trace Mercury ..... ppm	0.10	0.12
Ash Fusibility Temperature:		
Initial ..... °F	1950	1970
Spherical ..... °F	2020	2030
Hemispherical ..... °F	2150	2080
Fluid ..... °F	2290	2320
Grindability Index (Hardgrove).	-	-
Free Swelling Index (ASTM)	1	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2086-76	26.1	12.9	37.2	-	0.6	1.0	5.5	1.2	5.9	3.8	1.3
2901-75	26.8	13.0	39.3	-	1.0	1.6	7.3	0.3	8.1	1.3	0.6

NOTES:

EVANS COAL MINES LIMITED

Evans Mine; No. 5 Seam; Inverness Coalfield

St. Rose, Inverness County, Nova Scotia

Sampling Date & Location:	12-11-75 Mine	13-03-75 Mine
Product & Screen Opening (in.):	Egg $3\frac{1}{4}$ to 2, sq	Egg $3\frac{1}{4}$ to 2, sq
ERL Laboratory No.	2087-76	2902-75
Rank of Coal (ASTM):	High-volatile B bituminous	
Proximate Analysis (Equil.):		
Moisture ..... %	5.6	5.6
Ash ..... %	10.3	9.8
Volatile Matter ..... %	35.8	37.1
Fixed Carbon ..... %	48.3	47.5
Sulphur (Equil.) ..... %	6.2	5.4
Calorific Value (Equil.):		
Btu/lb	11,590	11,760
MJ/kg	27.0	27.4
Ultimate Analysis (Dry basis):		
Carbon ..... %	68.7	68.5
Hydrogen ..... %	4.5	4.5
Sulphur ..... %	6.5	5.7
Nitrogen ..... %	1.4	1.3
Ash ..... %	11.0	10.3
Oxygen (By difference) .... %	7.9	9.7
Trace Mercury ..... ppm	0.10	0.15
Ash Fusibility Temperature:		
Initial ..... °F	1960	1990
Spherical ..... °F	2060	2050
Hemispherical ..... °F	2170	2070
Fluid ..... °F	2260	2340
Grindability Index (Hardgrove).	52	55
Free Swelling Index (ASTM)	1	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2087-76	29.3	13.8	33.9	-	0.6	1.6	7.2	0.8	8.0	3.8	1.2
2902-75	29.9	14.6	37.0	-	0.9	1.0	6.4	0.4	7.1	1.1	1.1

NOTES:

EVANS COAL MINES LIMITED

Evans Mines; No. 5 Seam; Inverness Coalfield

St. Rose, Inverness County, Nova Scotia

Sampling Date & Location:	12-11-75 Mine	13-05-75 Mine
Product & Screen Opening (in.):	Nut 2 to $\frac{3}{4}$, sq	Nut 2 to $\frac{3}{4}$, sq
ERL Laboratory No.	2088-76	2903-75
Rank of Coal (ASTM):	High-volatile B bituminous	
Proximate Analysis (Equil.):		
Moisture ..... %	5.4	5.4
Ash ..... %	14 0	12.0
Volatile Matter ..... %	34.6	36.5
Fixed Carbon ..... %	46.0	46.1
Sulphur (Equil.) ..... %	6.5	6.6
Calorific Value (Equil.):		
Btu/lb	11,180	11,400
MJ/kg	26.0	26.5
Ultimate Analysis (Dry basis):		
Carbon ..... %	65.4	67.2
Hydrogen ..... %	4.4	4.6
Sulphur ..... %	6.9	7.0
Nitrogen ..... %	1.3	1.3
Ash ..... %	14.8	12.7
Oxygen (By difference) .... %	7.2	7.2
Trace Mercury ..... ppm	0.09	0.13
Ash Fusibility Temperature:		
Initial ..... °F	2030	2030
Spherical ..... °F	2120	2090
Hemispherical ..... °F	2210	2190
Fluid ..... °F	2350	2370
Grindability Index (Hardgrove).	51	51
Free Swelling Index (ASTM)	1	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2088-76	29.6	14.5	30.1	-	0.5	1.0	6.8	1.1	8.9	3.8	1.8
2903-75	33.2	17.3	36.0	-	0.7	0.8	4.1	0.6	5.1	1.0	1.6

NOTES:

EVANS COAL MINES LIMITED

Evans Mines; No. 5 Seam; Inverness Coalfield

St. Rose, Inverness County, Nova Scotia

Sampling Date & Location:	12-11-75 Mine	13-5-75 Mine
Product & Screen Opening (in.):	Stoker Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq	Stoker Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq
ERL Laboratory No.	2090-76	2904-75
Rank of Coal (ASTM):	High-volatile B bituminous	
Proximate Analysis (Equil.):		
Moisture ..... %	5.7	5.7
Ash ..... %	11.7	12.8
Volatile Matter ..... %	35.0	35.0
Fixed Carbon ..... %	47.6	46.5
Sulphur (Equil.) ..... %	6.2	7.3
Calorific Value (Equil.):		
Btu/lb	11,400	11,200
MJ/kg	26.5	26.1
Ultimate Analysis (Dry basis):		
Carbon ..... %	67.3	66.0
Hydrogen ..... %	4.4	4.5
Sulphur ..... %	6.6	7.7
Nitrogen ..... %	1.4	1.4
Ash ..... %	12.5	13.6
Oxygen (By difference) .... %	7.8	6.8
Trace Mercury ..... ppm	0.12	0.14
Ash Fusibility Temperature:		
Initial ..... °F	1960	2020
Spherical ..... °F	2060	2070
Hemispherical ..... °F	2210	2240
Fluid ..... °F	2270	2400
Grindability Index (Hardgrove).	51	51
Free Swelling Index (ASTM)	$1\frac{1}{2}$	$1\frac{1}{2}$

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2090-76	29.1	14.0	33.7	-	0.6	1.1	6.4	1.0	7.8	3.7	1.6
2904-75	27.9	16.6	39.5	-	0.6	0.8	4.8	0.6	5.7	0.9	1.4

NOTES:

EVANS COAL MINES LIMITED

Evans Mines; No. 5 Seam; Inverness Coalfield

St. Rose, Inverness County, Nova Scotia

Sampling Date & Location:	12-11-75 Mine	13-05-75 Mine
Product & Screen Opening (in.):	Fines Minus $\frac{1}{4}$, sq	Fines Minus $\frac{1}{4}$, slot
ERL Laboratory No.	2092-76	2905-75
Rank of Coal (ASTM):	High-volatile B bituminous	
Proximate Analysis (Equil.):		
Moisture ..... %	5.5	5.5
Ash ..... %	13.7	16.9
Volatile Matter ..... %	35.9	35.5
Fixed Carbon ..... %	44.9	42.1
Sulphur (Equil.) ..... %	5.7	6.1
Calorific Value (Equil.):		
Btu/lb	11,080	10,450
MJ/kg	25.8	24.3
Ultimate Analysis (Dry basis):		
Carbon ..... %	66.0	62.2
Hydrogen ..... %	4.3	4.1
Sulphur ..... %	6.1	6.4
Nitrogen ..... %	1.3	1.2
Ash ..... %	14.5	17.8
Oxygen (By difference) .... %	7.8	8.3
Trace Mercury ..... ppm	0.10	0.11
Ash Fusibility Temperature:		
Initial ..... °F	2020	2150
Spherical ..... °F	2150	2260
Hemispherical ..... °F	2230	2290
Fluid ..... °F	2270	2360
Grindability Index (Hardgrove).	54	55
Free Swelling Index (ASTM)	$1\frac{1}{2}$	1

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2092-76	26.7	14.9	23.1	-	0.4	1.4	13.5	1.6	16.0	3.7	1.6
2905-75	23.3	14.3	17.7	-	0.4	0.4	16.8	0.8	23.4	0.7	1.6

NOTES:

RIVER HEBERT COAL COMPANY LIMITED

Cochrane Mine; Kimberley Seam; Joggins Coalfield

River Hebert, Cumberland County, Nova Scotia

Sampling Date & Location:	7-12-77 Mine	4-8-76 Mine
Product & Screen Opening (in.):	Screen Plus 1½, sq	Screen Plus 1½, sq
ERL Laboratory No.	2924-77	2822-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	1.7	1.6
Ash ..... %	15.5	12.4
Volatile Matter ..... %	34.6	36.2
Fixed Carbon ..... %	48.2	49.8
Sulphur (As-received) ..... %	7.9	8.5
Calorific Value (As-rec'd):		
Btu/lb	11,960	12,450
MJ/kg	27.8	29.0
Ultimate Analysis (Dry basis):		
Carbon ..... %	65.7	68.7
Hydrogen ..... %	4.5	4.6
Sulphur ..... %	8.0	8.7
Nitrogen ..... %	1.6	1.7
Ash ..... %	15.8	12.6
Oxygen (By difference) .... %	4.4	3.7
Trace Mercury ..... ppm	0.57	0.69
Ash Fusibility Temperature:		
Initial ..... °F	1910	2030
Spherical ..... °F	2000	2040
Hemispherical ..... °F	2120	2110
Fluid ..... °F	2360	2180
Grindability Index (Hardgrove).	-	58
Free Swelling Index (ASTM)	-	6

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2924-77	23.8	11.0	52.3	-	0.4	0.9	4.0	0.5	4.3	0.3	1.4
2822-76	14.6	9.0	56.1	0.19	0.5	2.6	6.5	1.3	7.6	0.2	0.5

NOTES:

RIVER HEBERT COAL COMPANY LIMITED

Cochrane Mine; Kimberley Seam; Joggins Coalfield

River Hebert, Cumberland County, Nova Scotia

Sampling Date & Location:	30-11-77	13-7-77	4-8-76
	Harrison Lake Power Station Maccan, NS (NSPC)		
Product & Screen Opening (in.):	Screen Plus 1½, sq	Screen Plus 1½, sq	Screen Plus 1½, sq
ERL Laboratory No.	2107-78	2926-77	2824-76
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	1.5	2.1	1.8
Ash ..... %	24.2	19.5	11.2
Volatile Matter ..... %	30.8	31.3	33.7
Fixed Carbon ..... %	43.5	47.1	53.3
Sulphur (As-received) ..... %	5.9	5.9	8.1
Calorific Value (As-rec'd):			
Btu/lb	10,900	11,320	12,690
MJ/kg	25.4	26.3	29.5
Ultimate Analysis (Dry basis):			
Carbon ..... %	60.8	63.3	69.8
Hydrogen ..... %	4.0	4.4	4.6
Sulphur ..... %	5.6	6.0	8.3
Nitrogen ..... %	1.2	1.4	1.7
Ash ..... %	20.9	19.9	11.4
Oxygen (By difference) .... %	7.5	5.0	4.2
Trace Mercury ..... ppm	0.38	0.29	0.62
Ash Fusibility Temperature:			
Initial ..... °F	2020	1990	2070
Spherical ..... °F	2050	2070	2100
Hemispherical ..... °F	2240	2250	2120
Fluid ..... °F	2310	2290	2270
Grindability Index (Hardgrove).	-	-	55
Free Swelling Index (ASTM)	6	-	5½

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2107-78	36.6	16.8	29.1	-	0.6	0.7	5.4	2.5	6.1	0.4	2.5
2926-77	38.2	16.5	28.8	-	0.6	0.9	4.1	1.3	5.2	0.5	2.7
2824-76	11.9	7.8	58.8	0.2	0.5	2.7	7.8	1.3	6.2	0.2	0.4

NOTES:

RIVER HEBERT COAL COMPANY LIMITED

Cochrane Mine, Kimberley Seam, Joggins Coalfield

River Hebert; Cumberland County; Nova Scotia

Sampling Date & Location:	7-12-77 Mine	4-8-76 Mine
Product & Screen Opening (in.):	Slack Minus $1\frac{1}{2}$, sq	Slack Minus $1\frac{1}{2}$, sq
ERL Laboratory No.	2925-77	2823-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	2.2	1.9
Ash ..... %	22.0	21.2
Volatile Matter ..... %	29.9	29.7
Fixed Carbon ..... %	45.9	47.2
Sulphur (As-received) ..... %	5.4	5.8
Calorific Value (As-rec'd):		
Btu/lb	10,910	11,080
MJ/kg	25.4	25.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	61.4	62.5
Hydrogen ..... %	4.1	4.1
Sulphur ..... %	5.5	5.9
Nitrogen ..... %	1.4	1.4
Ash ..... %	22.4	21.6
Oxygen (By difference) .... %	5.2	4.5
Trace Mercury ..... ppm	0.28	0.29
Ash Fusibility Temperature:		
Initial ..... °F	2000	2100
Spherical ..... °F	2100	2170
Hemispherical ..... °F	2280	2350
Fluid ..... °F	2330	2380
Grindability Index (Hardgrove).	-	56
Free Swelling Index (ASTM)	-	$5\frac{1}{2}$

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2925-77	40.6	17.4	24.3	-	0.6	0.8	4.5	1.6	5.9	0.6	2.9
2823-76	36.6	19.6	26.6	0.2	0.7	1.2	5.1	2.1	4.3	0.5	2.6

NOTES:

RIVER HEBERT COAL COMPANY LIMITED

Cochrane Mine; Kimberley Seam; Joggins Coalfield

River Hebert, Cumberland County, Nova Scotia

Sampling Date & Location:	30-11-77	13-7-77 Harrison Lake Power Plant Maccan, N.S. (NSPC)	4-8-76
Product & Screen Opening (in.):	Slack Minus 1½, sq	Slack Minus 1½, sq	Slack Minus 1½, sq
ERL Laboratory No.	2108-78	2927-77	2825-76
Rank of Coal (ASTM):		High-volatile A bituminous	
Proximate Analysis (As-rec'd):			
Moisture ..... %	1.8	1.9	1.9
Ash ..... %	23.3	14.1	21.6
Volatile Matter ..... %	30.5	34.7	29.0
Fixed Carbon ..... %	44.4	49.3	47.5
Sulphur (As-received) ..... %	5.0	8.0	5.9
Calorific Value (As-rec'd):			
Btu/lb	11,020	12,120	11,060
MJ/kg	25.6	28.2	25.7
Ultimate Analysis (Dry basis):			
Carbon ..... %	62.1	67.1	62.3
Hydrogen ..... %	4.0	4.5	4.1
Sulphur ..... %	5.7	8.1	6.0
Nitrogen ..... %	1.1	1.7	1.4
Ash ..... %	23.1	14.3	22.0
Oxygen (By difference) .... %	4.0	4.3	4.2
Trace Mercury ..... ppm	-	0.62	0.32
Ash Fusibility Temperature:			
Initial ..... °F	2050	1910	2060
Spherical ..... °F	2170	1920	2160
Hemispherical ..... °F	2330	1960	2350
Fluid ..... °F	2390	2060	2400
Grindability Index (Hardgrove).	-	-	58
Free Swelling Index (ASTM)	6	-	5½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2108-78	41.2	19.1	21.9	-	0.6	0.7	5.6	2.3	6.1	0.6	3.1
2927-77	19.3	9.0	55.4	-	0.4	1.1	5.8	0.6	7.6	0.3	0.9
2825-76	37.6	19.8	25.7	0.2	0.7	1.2	4.8	2.1	4.6	0.5	2.6

NOTES:

THORBURN MINING LIMITED

Coal Reclamation Project; Waste Dumps; Pictou Coalfield

Stellarton, Pictou County, Nova Scotia

Sampling Date & Location:	5-8-76	5-8-76 Stellarton Wash Plant	5-8-76
Product & Screen Opening (in.):	Raw feed	Screen Plus $\frac{3}{4}$, sq	Slack Minus $\frac{3}{4}$, sq
ERL Laboratory No.	2821-76	2818-76	2819-76
Rank of Coal (ASTM):		High-volatile A bituminous	
Proximate Analysis (As-rec'd):			
Moisture ..... %	2.6	2.0	3.7
Ash ..... %	41.0	26.4	20.6
Volatile Matter ..... %	23.5	24.6	25.5
Fixed Carbon ..... %	32.9	47.0	50.2
Sulphur (As-received) ..... %	1.1	1.0	1.0
Calorific Value (As-rec'd):			
Btu/lb	-	10,210	10,960
MJ/kg	-	23.7	25.5
Ultimate Analysis (Dry basis):			
Carbon ..... %	-	61.2	65.4
Hydrogen ..... %	-	4.0	4.0
Sulphur ..... %	-	1.0	1.0
Nitrogen ..... %	-	1.5	1.7
Ash ..... %	-	26.9	21.4
Oxygen (By difference) .... %	-	5.4	6.5
Trace Mercury ..... ppm	-	0.05	0.07
Ash Fusibility Temperature:			
Initial ..... °F	-	2500	2480
Spherical ..... °F	-	2700 +	2700
Hemispherical ..... °F	-	2700 +	2700 +
Fluid ..... °F	-	2700 +	2700 +
Grindability Index (Hardgrove).	-	47	58
Free Swelling Index (ASTM)	-	-	-

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2818-76	53.4	31.6	8.1	0.1	0.8	0.3	1.4	1.4	1.6	0.2	2.2
2819-76	56.0	31.5	8.1	0.1	0.9	0.3	1.3	1.4	1.7	0.2	2.1

NOTES:

COAL ANALYSES - NEW BRUNSWICK

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	25-11-77 Grand Lake Power Station (NBEPC)
Product & Screen Opening (in.):	Mixed Screen Plus 4 and $\frac{1}{4}$ to 0, sq
ERL Laboratory No.	2100-78
Rank of Coal (ASTM):	High-volatile A bituminous
Proximate Analysis (As-rec'd):	
Moisture ..... %	2.2
Ash ..... %	20.1
Volatile Matter ..... %	31.2
Fixed Carbon ..... %	46.5
Sulphur (As-received) ..... %	7.7
Calorific Value (As-rec'd):	
Btu/lb	11,550
MJ/kg	26.9
Ultimate Analysis (Dry basis):	
Carbon ..... %	65.1
Hydrogen ..... %	4.2
Sulphur ..... %	7.9
Nitrogen ..... %	0.7
Ash ..... %	20.5
Oxygen (By difference) .... %	1.6
Trace Mercury ..... ppm	0.56
Ash Fusibility Temperature:	
Initial ..... °F	1890
Spherical ..... °F	1940
Hemispherical ..... °F	2070
Fluid ..... °F	2180
Grindability Index (Hardgrove).	-
Free Swelling Index (ASTM)	$6\frac{1}{2}$

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2100-78	33.6	13.6	41.6	-	0.5	0.6	3.2	1.1	3.2	0.1	2.1

NOTES:

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	24-11-77 Dragline #4500	24-11-77 Dragline #7400W	30-7-76 Wash Plant, Midlands
Product & Screen Opening (in.):	Mine Run	Mine Run	Mine Run
ERL Laboratory No.	2098-78	2099-78	2830-76
Rank of Coal (ASTM):	High-volatile A bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	1.4	0.9	0.7
Ash ..... %	19.0	15.3	17.5
Volatile Matter ..... %	32.1	31.8	34.4
Fixed Carbon ..... %	47.5	52.0	47.4
Sulphur (As-received) ..... %	9.4	6.1	8.1
Calorific Value (As-rec'd):			
Btu/lb	12,020	12,680	12,280
MJ/kg	28.0	29.5	28.6
Ultimate Analysis (Dry basis):			
Carbon ..... %	64.7	68.5	66.4
Hydrogen ..... %	4.2	4.4	4.5
Sulphur ..... %	9.6	6.2	8.1
Nitrogen ..... %	0.7	0.7	0.8
Ash ..... %	19.5	15.2	17.6
Oxygen (By difference) .... %	1.3	5.0	2.6
Trace Mercury ..... ppm	0.63	0.41	0.70
Ash Fusibility Temperature:			
Initial ..... °F	1920	1850	1990
Spherical ..... °F	1960	1890	2020
Hemispherical ..... °F	1980	1900	2040
Fluid ..... °F	2230	2080	2110
Grindability Index (Hardgrove).	-	-	59
Free Swelling Index (ASTM)	5½	5½	5

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2098-78	25.6	9.6	57.0	-	0.5	0.9	2.0	0.1	1.8	0.0	1.2
2099-78	32.4	12.1	44.6	-	0.5	1.1	3.3	0.3	2.3	0.1	1.5
2830-76	29.1	11.8	44.8	0.3	0.7	2.3	4.6	1.0	4.3	0.1	0.8

NOTES:

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	22-11-77 Wash Plant, Midlands	30-7-76
Product & Screen Opening (in.):	Screen Plus 4, sq	Screen Plus 4, sq
ERL Laboratory No.	2093-78	2831-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	0.6	0.7
Ash ..... %	24.0	19.6
Volatile Matter ..... %	31.8	32.9
Fixed Carbon ..... %	43.6	46.8
Sulphur (As-received) ..... %	10.7	9.6
Calorific Value (As-rec'd):		
Btu/lb	11,180	11,920
MJ/kg	26.0	27.7
Ultimate Analysis (Dry basis):		
Carbon ..... %	58.4	65.2
Hydrogen ..... %	3.8	4.2
Sulphur ..... %	10.7	9.6
Nitrogen ..... %	0.8	0.8
Ash ..... %	23.9	19.8
Oxygen (By difference) .... %	2.4	0.4
Trace Mercury ..... ppm	1.23	0.53
Ash Fusibility Temperature:		
Initial ..... °F	2050	1900
Spherical ..... °F	2100	1960
Hemispherical ..... °F	2120	2000
Fluid ..... °F	2310	2150
Grindability Index (Hardgrove).	-	70
Free Swelling Index (ASTM)	6	5

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2093-78	29.3	8.0	48.5	-	0.4	1.2	7.5	0.2	8.0	0.1	0.6
2831-76	21.2	8.7	47.7	0.7	0.5	3.4	9.5	1.0	8.3	0.1	0.3

NOTES:

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	22-11-77 Wash Plant, Midlands	30-7-76
Product & Screen Opening (in.):	Nut $2\frac{1}{2}$ to $\frac{3}{4}$, sq	Nut $2\frac{1}{2}$ to $\frac{3}{4}$, sq
ERL Laboratory No.	2094-78	2832/33-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	0.8	2.1
Ash ..... %	16.4	16.4
Volatile Matter ..... %	33.5	34.5
Fixed Carbon ..... %	49.3	47.0
Sulphur (As-received) ..... %	8.6	7.9
Calorific Value (As-rec'd):		
Btu/lb	12,450	12,420
MJ/kg	29.0	28.9
Ultimate Analysis (Dry basis):		
Carbon ..... %	64.8	67.9
Hydrogen ..... %	4.1	4.6
Sulphur ..... %	8.6	8.1
Nitrogen ..... %	0.6	0.9
Ash ..... %	16.5	16.7
Oxygen (By difference) .... %	5.4	1.8
Trace Mercury ..... ppm	0.73	0.44
Ash Fusibility Temperature:		
Initial ..... °F	2030	1980
Spherical ..... °F	2110	2020
Hemispherical ..... °F	2120	2060
Fluid ..... °F	2350	2170
Grindability Index (Hardgrove).	-	57
Free Swelling Index (ASTM)	6	5

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2094-78	24.6	8.5	56.7	-	0.4	1.3	3.8	0.0	2.8	0.1	0.6
2832-76	28.2	11.3	47.8	0.2	0.8	2.4	4.0	0.6	2.4	0.1	0.4

NOTES:

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	22-11-77 Wash Plant,	30-7-76 Midlands
Product & Screen Opening (in.):	Stoker Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq	Stoker Pea $\frac{3}{4}$ to $\frac{1}{4}$, sq
ERL Laboratory No.	2095-78	2834/35-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	0.7	2.5
Ash ..... %	15.4	14.0
Volatile Matter ..... %	34.2	34.2
Fixed Carbon ..... %	49.7	49.3
Sulphur (As-received) ..... %	7.1	7.7
Calorific Value (As-rec'd):		
Btu/lb	12,700	12,800
MJ/kg	29.5	29.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	69.3	70.5
Hydrogen ..... %	4.5	4.7
Sulphur ..... %	7.1	7.9
Nitrogen ..... %	0.6	1.0
Ash ..... %	15.3	14.4
Oxygen (By difference) .... %	3.2	1.5
Trace Mercury ..... ppm	0.59	0.52
Ash Fusibility Temperature:		
Initial ..... °F	1900	2010
Spherical ..... °F	1940	2030
Hemispherical ..... °F	1960	2130
Fluid ..... °F	2190	2200
Grindability Index (Hardgrove).	-	58
Free Swelling Index (ASTM)	$6\frac{1}{2}$	6

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2095-78	24.6	8.3	55.0	-	0.5	1.3	4.4	0.3	3.5	0.1	0.5
2834-76	26.4	11.1	52.2	0.2	0.7	2.9	4.2	0.8	2.4	0.1	0.6

NOTES:

N.B. COAL LIMITED

Dragline Operations; Minto/Chipman Areas; Minto Coalfield

Minto, Sunbury/Queens Counties, New Brunswick

Sampling Date & Location:	22-11-77 Wash Plant,	30-7-76 Midlands
Product & Screen Opening (in.):	Fines Minus $\frac{1}{4}$, sq	Fines Minus $\frac{1}{4}$, sq
ERL Laboratory No.	2096-78	2836/37-76
Rank of Coal (ASTM):	High-volatile A bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	1.3	8.2
Ash ..... %	18.2	16.8
Volatile Matter ..... %	31.8	27.8
Fixed Carbon ..... %	48.7	47.2
Sulphur (As-received) ..... %	7.4	8.1
Calorific Value (As-rec'd):		
Btu/lb	11,860	11,200
MJ/kg	27.6	26.1
Ultimate Analysis (Dry basis):		
Carbon ..... %	66.5	67.3
Hydrogen ..... %	4.3	4.5
Sulphur ..... %	7.5	8.8
Nitrogen ..... %	0.7	0.9
Ash ..... %	18.2	18.3
Oxygen (By difference) .... %	2.8	0.2
Trace Mercury ..... ppm	0.54	0.52
Ash Fusibility Temperature:		
Initial ..... °F	1920	2000
Spherical ..... °F	1960	2030
Hemispherical ..... °F	1980	2130
Fluid ..... °F	2210	2300
Grindability Index (Hardgrove).	-	60
Free Swelling Index (ASTM)	6½	5½

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2096-78	26.3	10.5	47.0	-	0.5	0.8	5.6	0.7	5.4	0.1	1.3
2836-76	29.6	11.4	48.5	0.2	0.7	2.6	4.6	0.9	3.0	0.1	0.9

NOTES:

COAL ANALYSES - SASKATCHEWAN

MANALTA COAL LIMITED

Klimax Mine; Estevan Seam; Ravenscrag Formation

Estevan, Estevan Area, Saskatchewan

Sampling Date & Location:	10-9-75	10-9-75 Mine Screen Plant	10-9-75
Product & Screen Opening (in.):	Booker 2 to 1, sq	Pea $1\frac{1}{4}$ sq to 3/8,slot	Slack Minus 3/8,slot
ERL Laboratory No.	3317-75	3318-75	3319-75
Rank of Coal (ASTM):		Lignite A	
Proximate Analysis (Equil.):			
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 (Equil.) ..... %	0.4	0.4	0.5
Calorific Value (Equil.):			
Btu/lb	7,530	7,340	7,120
MJ/kg	17.5	17.1	16.6
Ultimate Analysis (Dry basis):			
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
Trace Mercury ..... ppm	-	-	-
Ash Fusibility Temperature:			
Initial ..... °F	2140	2090	2080
Spherical ..... °F	2210	2160	2130
Hemispherical ..... °F	2230	2210	2230
Fluid ..... °F	2280	2260	2270
Grindability Index (Hardgrove).	56	60	62
Free Swelling Index (ASTM)	NA	NA	NA

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3317-75	30.0	22.2	3.4	-	1.3	0.7	18.8	4.1	11.2	8.1	0.2
3318-75	35.3	22.3	3.0	-	1.5	0.7	16.5	3.8	9.6	7.1	0.2
3319-75	38.0	22.1	3.9	-	1.9	0.5	14.8	3.5	9.2	6.0	0.2

NOTES:

MANALTA COAL LIMITED

Klimax (South) Mine; Estevan Seam; Ravenscrag Formation

Estevan, Estevan Area, Saskatchewan

Sampling Date & Location:	09-09-75 Estevan Generating Station
Product & Screen Opening (in.):	Feed Minus $1\frac{1}{2}$, sq
ERL Laboratory No.	3320-75
Rank of Coal (ASTM):	Lignite A
Proximate Analysis (Equil.):	
Moisture ..... %	29.2
Ash ..... %	11.3
Volatile Matter ..... %	27.3
Fixed Carbon ..... %	32.2
Sulphur (Equil.) ..... %	0.4
Calorific Value (Equil.):	
Btu/lb	7,270
MJ/kg	16.9
Ultimate Analysis (Dry basis):	
Carbon ..... %	60.7
Hydrogen ..... %	3.9
Sulphur ..... %	0.5
Nitrogen ..... %	1.1
Ash ..... %	16.0
Oxygen (By difference) .... %	17.8
Trace Mercury ..... ppm	-
Ash Fusibility Temperature:	
Initial ..... °F	2170
Spherical ..... °F	2230
Hemispherical ..... °F	2320
Fluid ..... °F	2430
Grindability Index (Hardgrove).	54
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3320-75	39.3	24.6	4.3		1.7	0.4	14.6	3.9	7.7	3.8	0.2

NOTES:

MANITOBA & SASKATCHEWAN COAL COMPANY (LIMITED)

Bienfait Mine; Taylorton & Estevan Seams; Ravenscrag Formation

Bienfait, Bienfait Area, Saskatchewan

Sampling Date & Location:	8-9-75 Mine	8-9-75 Screen Plant	8-9-75 Screen Plant
Product & Screen Opening (in.):	Booker 2 to 1,sq	- Minus 1,sq	- Minus 2,sq
ERL Laboratory No.	3322-75	3323-75	3324-75
Rank of Coal (ASTM):		Lignite A	
Proximate Analysis (Equil.):			
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 (Equil.) ..... %	0.5	0.4	0.4
Calorific Value (Equil.):			
Btu/lb	7,880	7,680	7,450
MJ/kg	18.3	17.9	17.3
Ultimate Analysis (Dry basis):			
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
Trace Mercury ..... ppm	-	-	-
Ash Fusibility Temperature:			
Initial ..... °F	2010	2140	2120
Spherical ..... °F	2190	2170	2150
Hemispherical ..... °F	2210	2200	2210
Fluid ..... °F	2250	2250	2260
Grindability Index (Hardgrove).	40	48	48
Free Swelling Index (ASTM)	NA	NA	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3322-75	28.4	20.2	6.3		1.2	0.6	17.1	4.5	11.1	10.0	0.3
3323-75	34.2	20.6	5.6		0.8	0.4	18.5	4.0	10.9	5.2	0.2
3324-75	38.5	21.5	5.2		1.2	0.5	13.5	3.3	8.5	7.0	0.3

NOTES:

MANITOBA & SASKATCHEWAN COAL COMPANY (LIMITED)

Boundary Dam Mine; Estevan Seam; Ravenscrag Formation

Estevan, Estevan Area, Saskatchewan

Sampling Date & Location:	09-09-75 Mine-site Power Plant
Product & Screen Opening (in.):	Feed Minus 1½, sq
ERL Laboratory No.	3321-75
Rank of Coal (ASTM):	Lignite A
Proximate Analysis (Equil.):	
Moisture ..... %	26.0
Ash ..... %	18.1
Volatile Matter ..... %	26.2
Fixed Carbon ..... %	29.7
Sulphur (Equil.) ..... %	0.6
Calorific Value (Equil.):	
Btu/lb	6,710
MJ/kg	15.6
Ultimate Analysis (Dry basis):	
Carbon ..... %	54.1
Hydrogen ..... %	3.6
Sulphur ..... %	0.9
Nitrogen ..... %	0.1
Ash ..... %	24.5
Oxygen (By difference) .... %	16.8
Trace Mercury ..... ppm	
Ash Fusibility Temperature:	
Initial ..... °F	2100
Spherical ..... °F	2290
Hemispherical ..... °F	2370
Fluid ..... °F	2480
Grindability Index (Hardgrove).	51
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3321-75	49.5	20.7	6.6		1.0	0.2	7.0	2.2	6.2	4.7	1.3

NOTES:

COAL ANALYSES - ALBERTA (Subbituminous)

CENTURY COALS LIMITED

Mine No. 1742 (Atlas); No. 1 & 2 Seams; Drumheller Coalfield (CF26)

East Coulee, Drumheller Area, Plains Region, Alberta

Sec 6, Tp27; R18,W4

Sampling Date & Location:	2-11-76	2-11-76 Mine Screen Plant	2-11-76
Product & Screen Opening (in.):	Lump 12 to 4½, rd	Egg 4½ to 2, rd	Nut 2 to 1 3/8, rd
ERL Laboratory No.	3172-76	3173-76	3174-76
Rank of Coal (ASTM):		Subbituminous B	
Proximate Analysis (Equil.):			
Moisture ..... %	20.1	18.6	17.6
Ash ..... %	7.4	9.0	8.8
Volatile Matter ..... %	30.4	29.9	30.2
Fixed Carbon ..... %	42.1	42.5	43.4
Sulphur (Equil.) ..... %	0.4	0.5	0.4
Calorific Value (Equil.):			
Btu/lb	9,120	9,060	9,200
MJ/kg	21.2	21.1	21.4
Ultimate Analysis (Dry basis):			
Carbon ..... %	67.8	65.8	66.1
Hydrogen ..... %	4.2	4.2	4.2
Sulphur ..... %	0.6	0.6	0.6
Nitrogen ..... %	1.6	1.6	1.4
Ash ..... %	9.2	11.1	10.7
Oxygen (By difference) .... %	16.6	16.7	17.0
Trace Mercury ..... ppm	0.03	0.05	0.04
Ash Fusibility Temperature:			
Initial ..... °F	2190	2200	2200
Spherical ..... °F	2270	2340	2300
Hemispherical ..... °F	2360	2450	2370
Fluid ..... °F	2420	2570	2480
Grindability Index (Hardgrove).	33	33	34
Free Swelling Index (ASTM)	NA	NA	NA

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3172-76	41.7	25.5	4.8	0.1	0.9	2.2	10.0	1.4	7.0	5.2	1.1
3173-76	43.8	25.6	6.2	0.1	0.7	1.6	8.2	1.3	7.8	4.3	1.2
3174-76	43.4	26.0	6.4	0.2	0.8	1.8	8.9	1.3	6.5	4.5	1.1

NOTES:

CENTURY COALS LIMITED

Mine No. 1742 (Atlas); No. 1 & 2 Seams; Drumheller Coalfield (CF26)

East Coulee, Drumheller Area, Plains Region, Alberta

Sec 6, Tp27; R18,W4

Sampling Date & Location:	2-11-76 Mine Screen Plant	2-11-76 Mine Screen Plant
Product & Screen Opening (in.):	Stoker 1 3/8 to 5/8 rd	Slack Minus 5/8 rd
ERL Laboratory No.	3175-76	3175-76
Rank of Coal (ASTM):	Subbituminous B	
Proximate Analysis (Equil.):		
Moisture ..... %	18.7	18.9
Ash ..... %	8.7	8.8
Volatile Matter ..... %	31.1	29.5
Fixed Carbon ..... %	41.5	42.8
Sulphur (Equil.) ..... %	0.4	0.4
Calorific Value (Equil.):		
Btu/lb	9,140	9,010
MJ/kg	21.3	21.0
Ultimate Analysis (Dry basis):		
Carbon ..... %	66.4	66.2
Hydrogen ..... %	4.2	4.1
Sulphur ..... %	0.5	0.6
Nitrogen ..... %	1.5	1.5
Ash ..... %	10.7	10.9
Oxygen (By difference) .... %	16.7	16.7
Trace Mercury ..... ppm	0.05	0.04
Ash Fusibility Temperature:		
Initial ..... °F	2240	2170
Spherical ..... °F	2370	2360
Hemispherical ..... °F	2450	2480
Fluid ..... °F	2480	2500
Grindability Index (Hardgrove).	35	34
Free Swelling Index (ASTM)	NA	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3175-76	44.7	26.8	5.4	0.1	0.7	1.7	8.2	1.3	6.4	4.4	1.1
3176-76	42.9	26.4	5.4	0.1	0.8	1.5	9.4	1.3	7.2	4.5	1.0

NOTES:

FORESTBURG COLLIERIES LIMITED

Mine No. 1578 (Diplomat); #2 & 3 Seams; Battle River Coalfield (CF22)

Forestburg, Castor Area, Plains Region, Alberta

Sec 6, Tp41; R15, W4

Sampling Date & Location:	25/26-10-76 Mine Screen Plant	25/26-10-76 Mine Screen Plant	25/26-10-76 Mine Screen Plant
Product & Screen Opening (in.):	Lump 12 to 4½, sq	Egg 4½ to 2, sq	Nut 2 to 1½, sq
ERL Laboratory No.	3186-76	3187-76	3188-76
Rank of Coal (ASTM):	Subbituminous C		
Proximate Analysis (Equil.):			
Moisture ..... %	24.4	24.3	24.1
Ash ..... %	5.8	6.2	6.9
Volatile Matter ..... %	30.0	30.4	30.0
Fixed Carbon ..... %	39.8	39.1	39.0
Sulphur (Equil.) ..... %	0.4	0.4	0.4
Calorific Value (Equil.):			
Btu/lb	8,720	8,700	8,660
MJ/kg	20.3	20.2	20.1
Ultimate Analysis (Dry basis):			
Carbon ..... %	68.4	67.7	67.7
Hydrogen ..... %	4.2	4.4	4.3
Sulphur ..... %	0.5	0.5	0.5
Nitrogen ..... %	1.5	1.5	1.5
Ash ..... %	7.6	8.2	9.0
Oxygen (By difference) .... %	17.8	17.7	17.0
Trace Mercury ..... ppm	0.4	0.4	0.4
Ash Fusibility Temperature:			
Initial ..... °F	1990	2010	2030
Spherical ..... °F	2050	2100	2140
Hemispherical ..... °F	2170	2230	2320
Fluid ..... °F	2300	2280	2350
Grindability Index (Hardgrove).	32	32	32
Free Swelling Index (ASTM)	NA	NA	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3186-76	36.4	18.3	5.4	0.0	0.7	1.2	21.3	2.2	10.5	2.3	0.3
3187-76	37.4	19.0	4.8	0.0	0.7	1.1	19.8	2.2	10.2	2.2	0.3
3188-76	38.4	18.4	4.5	0.0	0.6	1.0	18.4	1.9	10.5	2.1	0.4

NOTES:

FORESTBURG COLLIERIES LIMITED

Mine No. 1578 (Diplomat); #2 & 3 Seams; Battle River Coalfield (CF22)

Forestburg, Castor Area, Plains Region, Alberta

Sec 6, Tp41; R15, W4

Sampling Date & Location:	25/26-10-76 Mine	25/26-10-76 Screen Plant
Product & Screen Opening (in.):	Stoker $1\frac{1}{2}$ to $\frac{1}{2}$, sq	Slack Minus $\frac{1}{2}$, sq
ERL Laboratory No.	3189-76	3190-76
Rank of Coal (ASTM):	Subbituminous C	
Proximate Analysis (Equil.):		
Moisture ..... %	24.6	24.6
Ash ..... %	6.5	7.1
Volatile Matter ..... %	29.9	29.8
Fixed Carbon ..... %	39.0	38.5
Sulphur (Equil.) ..... %	0.4	0.4
Calorific Value (Equil.):		
Btu/lb	8,620	8,520
MJ/kg	20.1	19.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	67.2	67.2
Hydrogen ..... %	4.4	4.3
Sulphur ..... %	0.5	0.5
Nitrogen ..... %	1.5	1.5
Ash ..... %	8.6	8.7
Oxygen (By difference) .... %	17.8	17.8
Trace Mercury ..... ppm	0.02	0.02
Ash Fusibility Temperature:		
Initial ..... °F	2010	2010
Spherical ..... °F	2120	2120
Hemispherical ..... °F	2250	2280
Fluid ..... °F	2370	2370
Grindability Index (Hardgrove).	33	35
Free Swelling Index (ASTM)	NA	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3189-76	40.4	18.7	4.3	0.0	0.6	1.1	18.0	2.0	9.7	2.2	0.4
3190-76	39.3	17.7	4.6	0.0	0.7	1.1	17.3	1.7	10.3	2.1	0.4

NOTES:

MANALTA COAL LIMITED

Mine No. 1046(Vesta); No. 2 & 3 Seams; Battle River Coalfield (CF22)

Halkirk, Castor Area, Plains Region, Alberta

Sec 20, Tp40, R15, W4

Sampling Date & Location:	26-10-76 Battle River Power Station Sask. Power Corp.
Product & Screen Opening (in.):	Feed Minus $\frac{3}{4}$, sq
ERL Laboratory No.	3185-76
Rank of Coal (ASTM):	Subbituminous C
Proximate Analysis (Equil.):	
Moisture ..... %	22.8
Ash ..... %	8.4
Volatile Matter ..... %	29.3
Fixed Carbon ..... %	39.5
Sulphur (Equil.) ..... %	0.3
Calorific Value (Equil.):	
Btu/lb	8,480
MJ/kg	19.7
Ultimate Analysis (Dry basis):	
Carbon ..... %	65.1
Hydrogen ..... %	4.2
Sulphur ..... %	0.4
Nitrogen ..... %	1.5
Ash ..... %	10.9
Oxygen (By difference) .... %	17.9
Trace Mercury ..... ppm	0.03
Ash Fusibility Temperature:	
Initial ..... °F	2050
Spherical ..... °F	2170
Hemispherical ..... °F	2250
Fluid ..... °F	2340
Grindability Index (Hardgrove).	36
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3185-76	43.5	22.9	4.5	0.1	0.6	1.3	11.8	0.7	6.6	4.9	1.4

NOTES:

MANALTA COAL LIMITED

Mine No. 1578 (Diplomat); No. 2 & 3 Seams; Battle River Coalfield (CF22)

Forestburg, Castor Area, Plains Region, Alberta
Sec 6, Tp41, R15, W4

Sampling Date & Location:	20-10-76 Battle River Power Station Sask. Power Corp.
Product & Screen Opening (in.):	Feed Minus $\frac{3}{4}$, sq
ERL Laboratory No.	3186-76
Rank of Coal (ASTM):	Subbituminous C
Proximate Analysis (Equil.):	
Moisture ..... %	22.9
Ash ..... %	9.4
Volatile Matter ..... %	28.6
Fixed Carbon ..... %	39.1
Sulphur (Equil.) ..... %	0.4
Calorific Value (Equil.):	
Btu/lb	8,320
MJ/kg	19.4
Ultimate Analysis (Dry basis):	
Carbon ..... %	64.6
Hydrogen ..... %	4.1
Sulphur ..... %	0.5
Nitrogen ..... %	1.5
Ash ..... %	12.2
Oxygen (By difference) .... %	17.1
Trace Mercury ..... ppm	0.04
Ash Fusibility Temperature:	
Initial ..... °F	2030
Spherical ..... °F	2100
Hemispherical ..... °F	2260
Fluid ..... °F	2340
Grindability Index (Hardgrove).	35
Free Swelling Index (ASTM)	NA

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3186-76	50.8	16.5	5.3	0.1	0.7	0.7	12.0	2.2	7.6	1.7	0.8

NOTES:

MANALTA COAL LIMITED

Mine No. 1757 (Whitewood); No. 3 Seam; Wabamun Coalfield (CF39)

Wabamun, Pembina Area, Plains Region, Alberta
Sec 29, Tp52, R4, W5

Sampling Date & Location:	9-6-76 Conveyor to Stockpile
Product & Screen Opening (in.):	Feed for Calgary Power Limited Minus $1\frac{1}{2}$, sq
ERL Laboratory No.	3050-76
Rank of Coal (ASTM):	Subbituminous B
Proximate Analysis (Equil.):	
Moisture ..... %	20.2
Ash ..... %	11.1
Volatile Matter ..... %	25.8
Fixed Carbon ..... %	42.9
Sulphur (Equil.) ..... %	0.2
Calorific Value (Equil.):	
Btu/lb	8,350
MJ/kg	19.4
Ultimate Analysis (Dry basis):	
Carbon ..... %	62.5
Hydrogen ..... %	3.7
Sulphur ..... %	0.3
Nitrogen ..... %	0.8
Ash ..... %	14.8
Oxygen (By difference) .... %	17.9
Trace Mercury ..... ppm	0.44
Ash Fusibility Temperature:	
Initial ..... °F	2250
Spherical ..... °F	2400
Hemispherical ..... °F	2490
Fluid ..... °F	2620
Grindability Index (Hardgrove).	47
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3050-76	48.9	24.6	5.9	0.2	0.9	1.0	14.4	2.6	5.3	0.2	0.5

NOTES:

MANALTA COAL LIMITED

Mine No. 1769 (Highvale); No. 1, 2 & 4 Seam; Wabamun Coalfield (CF39)

Seba Beach, Pembina Area, Plains Region, Alberta
Sec 29, Tp52, R4, W5

Sampling Date & Location:	9-9-76 Conveyor to Stockpile
Product & Screen Opening (in.):	Feed for Calgary Power Limited Minus $1\frac{1}{2}$, sq
ERL Laboratory No.	3051-76
Rank of Coal (ASTM):	Subbituminous B
Proximate Analysis (Equil.):	
Moisture ..... %	20.0
Ash ..... %	13.6
Volatile Matter ..... %	26.2
Fixed Carbon ..... %	40.2
Sulphur (Equil.) ..... %	0.2
Calorific Value (Equil.):	
Btu/lb	8,210
MJ/kg	19.1
Ultimate Analysis (Dry basis):	
Carbon ..... %	61.6
Hydrogen ..... %	3.7
Sulphur ..... %	0.2
Nitrogen ..... %	0.1
Ash ..... %	16.9
Oxygen (By difference) .... %	17.5
Trace Mercury ..... ppm	0.07
Ash Fusibility Temperature:	
Initial ..... °F	2400
Spherical ..... °F	2480
Hemispherical ..... °F	2530
Fluid ..... °F	2700 +
Grindability Index (Hardgrove).	44
Free Swelling Index (ASTM)	NA

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3051-76	51.7	27.5	3.8	0.1	1.0	0.5	11.2	1.3	3.1	2.1	0.3

NOTES:

MANALTA COAL LIMITED

Mine No. 443 (Roselyn); No. 3 Seam ; Sheerness Coalfield (CF37)

Sheerness, Sheerness Area, Plains Region, Alberta
Sec 20, Tp40, R15, W4

Sampling Date & Location:	3-11-76 Mine
Product & Screen Opening (in.):	Thermal coal for Saskatchewan Power Corp. Minus 8", sq
ERL Laboratory No.	3169-76
Rank of Coal (ASTM):	Subbituminous C
Proximate Analysis (Equil.):	
Moisture ..... %	25.0
Ash ..... %	10.7
Volatile Matter ..... %	28.2
Fixed Carbon ..... %	36.1
Sulphur (Equil.) ..... %	0.4
Calorific Value (Equil.):	
Btu/lb	7,710
MJ/kg	17.9
Ultimate Analysis (Dry basis):	
Carbon ..... %	62.6
Hydrogen ..... %	3.7
Sulphur ..... %	0.5
Nitrogen ..... %	1.4
Ash ..... %	14.2
Oxygen (By difference) .... %	17.6
Trace Mercury ..... ppm	0.04
Ash Fusibility Temperature:	
Initial ..... °F	2030
Spherical ..... °F	2160
Hemispherical ..... °F	2260
Fluid ..... °F	2330
Grindability Index (Hardgrove).	39
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3169-76	45.7	15.3	12.5	0.6	0.7	0.3	11.9	1.8	8.5	1.7	1.1

NOTES:

COAL ANALYSES - ALBERTA (Bituminous)

THE CANMORE MINES LIMITED

Mine No. 1775 (Riverside, Wilson & No. 3 Mines); Cascade Coalfield (CF44)

Canmore, Cascade Area, Mountain Region, Alberta
Sec 1, Tp24; R10, W5

Sampling Date & Location:	7/8-6-77	7/8-6-77	7/8-6-77
		Coal Preparation Plant	
Product & Screen Opening (in.):	Clean Coal Minus 1¼, sq	Cobble Minus 4, sq	Stoker 1¼ to ¼, sq
ERL Laboratory No.	2943-77	2944-77	2945-77
Rank of Coal (ASTM):		Semi-anthracite	
Proximate Analysis (As-rec'd):			
Moisture ..... %	7.4	4.6	4.8
Ash ..... %	10.0	5.9	14.4
Volatile Matter ..... %	11.4	11.4	11.1
Fixed Carbon ..... %	71.2	78.1	69.7
Sulphur (As-received) ..... %	0.7	0.8	0.7
Calorific Value (As-rec'd):			
Btu/lb	12,730	14,530	12,360
MJ/kg	29.6	33.8	28.7
Ultimate Analysis (Dry basis):			
Carbon ..... %	81.6	85.2	77.2
Hydrogen ..... %	3.7	3.8	3.5
Sulphur ..... %	0.8	0.8	0.7
Nitrogen ..... %	1.6	1.5	1.4
Ash ..... %	10.8	6.2	15.1
Oxygen (By difference) .... %	1.5	2.5	2.1
Trace Mercury ..... ppm	0.07	0.03	0.06
Ash Fusibility Temperature:			
Initial ..... °F	2610	2700 +	2530
Spherical ..... °F	2700 +	2700 +	2700 +
Hemispherical ..... °F	2700 +	2700 +	2700 +
Fluid ..... °F	2700 +	2700 +	2700 +
Grindability Index (Hardgrove).	82	70	76
Free Swelling Index (ASTM)	NA	NA	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2943-77	62.7	26.0	2.8	-	1.6	0.9	1.2	0.8	1.0	0.2	1.9
2944-77	59.1	30.0	4.9	-	1.7	1.6	1.1	0.6	1.2	0.3	0.5
2945-77	65.3	24.8	3.3	-	1.4	0.9	1.0	0.7	0.9	0.2	2.0

NOTES:

THE CANMORE MINES LIMITED

Mine No. 1775 (Riverside, Wilson & No. 3 Mines); Cascade Coalfield (CF44)

Canmore, Cascade Area, Mountain Region, Alberta
Sec 1, Tp24; R10, W5

Sampling Date & Location:	1-11-76 Stockpile
Product & Screen Opening (in.):	Clean Coal Minus 1¼, sq
ERL Laboratory No.	3170-76
Rank of Coal (ASTM):	Semi-anthracite
Proximate Analysis (As-rec'd):	
Moisture ..... %	5.6
Ash ..... %	20.0
Volatile Matter ..... %	18.0
Fixed Carbon ..... %	56.4
Sulphur (As-received) ..... %	0.7
Calorific Value (As-rec'd):	
Btu/lb	11,200
MJ/kg	26.1
Ultimate Analysis (Dry basis):	
Carbon ..... %	70.4
Hydrogen ..... %	3.3
Sulphur ..... %	0.7
Nitrogen ..... %	1.4
Ash ..... %	21.2
Oxygen (By difference) .... %	3.0
Trace Mercury ..... ppm	0.17
Ash Fusibility Temperature:	
Initial ..... °F	2260
Spherical ..... °F	2570
Hemispherical ..... °F	2690
Fluid ..... °F	2700 +
Grindability Index (Hardgrove).	87
Free Swelling Index (ASTM)	NA

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
3170-76	66.6	21.9	3.8	0.0	1.2	1.0	1.9	1.3	2.0	0.3	3.2

NOTES:

CARDINAL RIVER COALS LIMITED

Mine No. 1768 (Cardinal River); Jewell Seam; Mountain Park Coalfield (CF49)

Hinton, Mountain Park Area, Mountain Region, Alberta

Sec 15, 16, 22; Tp47, R24, W5

Sampling Date & Location:	12-6-77 Stockpile	8-9-76 Conveyor to Silo
Product & Screen Opening (in.):	Clean Coal Minus $1\frac{1}{2}$, sq	Clean Coal Minus $1\frac{1}{2}$, sq
ERL Laboratory No.	2947-77	3052-76
Rank of Coal (ASTM):	Medium volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	5.3	4.6
Ash ..... %	9.2	8.6
Volatile Matter ..... %	26.2	20.2
Fixed Carbon ..... %	59.3	66.6
Sulphur (As-received) ..... %	0.2	0.2
Calorific Value (As-rec'd):		
Btu/lb	13,190	13,490
MJ/kg	30.7	31.4
Ultimate Analysis (Dry basis):		
Carbon ..... %	79.7	81.7
Hydrogen ..... %	4.6	4.4
Sulphur ..... %	0.3	0.2
Nitrogen ..... %	1.1	1.2
Ash ..... %	9.7	8.9
Oxygen (By difference) .... %	4.6	3.6
Trace Mercury ..... ppm	0.05	0.17
Ash Fusibility Temperature:		
Initial ..... °F	2390	2380
Spherical ..... °F	2570	2460
Hemispherical ..... °F	2630	2570
Fluid ..... °F	2700 +	2700 +
Grindability Index (Hardgrove).	76	79
Free Swelling Index (ASTM)	6	-

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2947-77	51.8	26.0	3.8	-	1.4	0.7	5.8	1.4	4.8	1.2	0.4
3052-76	50.5	29.9	5.1	0.0	1.5	0.7	6.4	1.6	5.0	1.3	0.3

NOTES:

COLEMAN COLLIERIES LIMITED

Mine No. 1695 (Tent Mountain); No. 4 & 7 Seams; Tent Mountain Coalfield (CF56)

Coleman, Crowsnest Areas, Mountain Region, Alberta

Sec 12, Tp7; R6, W6

Sampling Date & Location:	5-6-77 Coal Preparation Plant	19-10-76 Coal Preparation Plant
Product & Screen Opening (in.):	Clean Coal Minus 2, sq	Clean Coal Minus 2, sq
ERL Laboratory No.	2936-77	3177-76
Rank of Coal (ASTM):	Medium volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	3.0	3.3
Ash ..... %	10.0	11.6
Volatile Matter ..... %	24.0	22.6
Fixed Carbon ..... %	63.0	62.5
Sulphur (As-received) ..... %	0.4	0.4
Calorific Value (As-rec'd):		
Btu/lb	13,220	12,850
MJ/kg	30.7	29.9
Ultimate Analysis (Dry basis):		
Carbon ..... %	78.6	76.7
Hydrogen ..... %	4.4	4.3
Sulphur ..... %	0.4	0.4
Nitrogen ..... %	1.3	1.2
Ash ..... %	10.3	12.0
Oxygen (By difference) .... %	5.0	5.4
Trace Mercury ..... ppm	0.07	0.09
Ash Fusibility Temperature:		
Initial ..... °F	2700 +	2700 +
Spherical ..... °F	2700 +	2700 +
Hemispherical ..... °F	2700 +	2700 +
Fluid ..... °F	2700 +	2700 +
Grindability Index (Hardgrove).	86	72
Free Swelling Index (ASTM)	4	3

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2936-77	50.2	32.0	2.7	-	2.4	2.2	4.1	0.9	3.4	0.3	0.5
3177-76	52.0	32.9	1.9	0.1	2.6	1.6	2.7	0.5	1.3	0.2	0.6

NOTES:

MCINTYRE MINES LIMITED

Mines No. 1765 & 1771 (Smoky River); No. 4 & 11 Seams; Smoky River Coalfield (CF55)

Grande Cache, Smoky River Area, Mountain Region, Alberta

Sampling Date & Location:	11-6-77 Coal Preparation Plant	15/16-9-76 Coal Preparation Plant
Product & Screen Opening (in.):	Clean Coal Minus 1½, sq	Clean Coal Minus 1½, sq
ERL Laboratory No.	2946-77	3053-76
Rank of Coal (ASTM):	Low volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	6.0	6.6
Ash ..... %	7.9	7.4
Volatile Matter ..... %	17.9	16.1
Fixed Carbon ..... %	68.2	69.9
Sulphur (As-received) ..... %	0.5	0.4
Calorific Value (As-rec'd):		
Btu/lb	13,460	14,440
MJ/kg	31.3	33.6
Ultimate Analysis (Dry basis):		
Carbon ..... %	82.9	83.3
Hydrogen ..... %	4.3	4.2
Sulphur ..... %	0.6	0.5
Nitrogen ..... %	1.2	1.1
Ash ..... %	8.4	7.9
Oxygen (By difference) .... %	2.6	3.0
Trace Mercury ..... ppm	0.12	0.23
Ash Fusibility Temperature:		
Initial ..... °F	2470	2410
Spherical ..... °F	2700 +	2570
Hemispherical ..... °F	2700 +	2610
Fluid ..... °F	2700 +	2670
Grindability Index (Hardgrove).	93	99
Free Swelling Index (ASTM)	7	-

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2946-77	56.4	27.2	4.6	-	1.6	1.6	3.7	0.9	2.5	0.9	0.9
3053-76	53.2	31.4	5.9	0.0	1.9	1.3	3.5	0.8	2.0	0.8	0.7

NOTES:

COAL ANALYSES - BRITISH COLUMBIA

BYRON CREEK COLLIERIES LIMITED

Corbin Mine; Mammoth Seam; Crowsnest Coalfield

Corbin, Kootenay Mining District, British Columbia

Sampling Date & Location:	5-7-77 Pit #11	5-7-77 Pit #11	5-7-77 Pit #3
Product & Screen Opening (in.):	Raw Coal Minus 2, sq	Raw Coal Minus 2, sq	Raw Coal Minus 2, sq
ERL Laboratory No.	2937-77	3183-76	3182-76
Rank of Coal (ASTM):	Medium volatile bituminous		
Proximate Analysis (As-rec'd):			
Moisture ..... %	3.9	3.7	3.4
Ash ..... %	14.9	14.0	17.2
Volatile Matter ..... %	24.5	22.0	21.0
Fixed Carbon ..... %	56.7	60.3	58.4
Sulphur (As-received) ..... %	0.2	0.2	0.3
Calorific Value (As-rec'd):			
Btu/lb	11,985	12,310	11,780
MJ/kg	27.8	28.6	27.4
Ultimate Analysis (Dry basis):			
Carbon ..... %	72.7	74.2	72.0
Hydrogen ..... %	4.1	4.1	3.8
Sulphur ..... %	0.2	0.2	0.3
Nitrogen ..... %	1.2	1.1	1.1
Ash ..... %	15.5	14.6	17.7
Oxygen (By difference) .... %	6.3	5.8	5.1
Trace Mercury ..... ppm	0.07	0.08	0.08
Ash Fusibility Temperature:			
Initial ..... °F	2570	2700 +	2430
Spherical ..... °F	2620	2700 +	2530
Hemispherical ..... °F	2650	2700 +	2590
Fluid ..... °F	2700 +	2700 +	2700 +
Grindability Index (Hardgrove).	90	84	76
Free Swelling Index (ASTM)	2	1½	1½

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2937-77	46.2	34.4	2.5	-	2.0	0.6	9.7	1.1	2.7	0.6	0.2
3183-76	54.2	35.0	2.4	0.1	2.1	0.5	1.5	1.2	1.5	0.5	0.5
3182-76	49.4	28.9	3.0	0.1	1.8	0.7	7.5	1.2	3.0	0.5	0.4

NOTES:

FORDING COAL LIMITED

Fording Mine; Greenhills Seam F; Crowsnest Coalfield

Elkford, East Kootenay District, British Columbia

Sampling Date & Location:	5-6-77 Conveyor Belt
Product & Screen Opening (in.):	Clean Coal Minus 1½, sq
ERL Laboratory No.	2939-77
Rank of Coal (ASTM):	Medium volatile bituminous
Proximate Analysis (As-rec'd):	
Moisture ..... %	9.4
Ash ..... %	8.5
Volatile Matter ..... %	21.8
Fixed Carbon ..... %	60.3
Sulphur (As-received) ..... %	0.4
Calorific Value (As-rec'd):	
Btu/lb	12,620
MJ/kg	29.4
Ultimate Analysis (Dry basis):	
Carbon ..... %	80.5
Hydrogen ..... %	4.5
Sulphur ..... %	0.4
Nitrogen ..... %	1.3
Ash ..... %	9.4
Oxygen (By difference) .... %	3.9
Trace Mercury ..... ppm	0.04
Ash Fusibility Temperature:	
Initial ..... °F	2700 +
Spherical ..... °F	2700 +
Hemispherical ..... °F	2700 +
Fluid ..... °F	2700 +
Grindability Index (Hardgrove).	89
Free Swelling Index (ASTM)	7

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2939-77	59.7	30.1	4.3	-	1.8	1.2	1.6	0.6	0.6	0.0	0.9

NOTES:

FORDING COAL LIMITED

Fording Mine, Greenhills & Clode Pits, Crowsnest Coalfield

Elksford, East Kootenay District, British Columbia

Sampling Date & Location:	5-6-77 Train Sampler	21-10-76 Train Sampler
Product & Screen Opening (in.):	Clean Coal Minus 1½, sq	Clean Coal Minus 1½, sq
ERL Laboratory No.	2938-77	3181-76
Rank of Coal (ASTM):	Medium volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	7.6	8.2
Ash ..... %	9.7	7.9
Volatile Matter ..... %	21.1	19.8
Fixed Carbon ..... %	61.6	64.1
Sulphur (As-received) ..... %	0.5	0.3
Calorific Value (As-rec'd):		
Btu/lb	12,740	12,870
MJ/kg	29.6	29.9
Ultimate Analysis (Dry basis):		
Carbon ..... %	79.4	80.9
Hydrogen ..... %	4.5	4.6
Sulphur ..... %	0.6	0.3
Nitrogen ..... %	1.4	1.3
Ash ..... %	10.5	8.6
Oxygen (By difference) .... %	3.6	4.3
Trace Mercury ..... ppm	0.07	0.05
Ash Fusibility Temperature:		
Initial ..... °F	2640	2550
Spherical ..... °F	2700 +	2700 +
Hemispherical ..... °F	2700 +	2700 +
Fluid ..... °F	2700 +	2700 +
Grindability Index (Hardgrove).	90	99
Free Swelling Index (ASTM)	7	5½

Ash Analysis:

(ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2938-77	58.5	29.8	3.8	-	1.8	2.1	2.3	0.7	0.6	0.1	1.0
3181-76	55.6	29.8	4.6	0.1	2.2	2.0	2.8	0.3	0.4	0.0	0.9

NOTES:

KAISER RESOURCES LIMITED

Harmer Ridge Mine & Michel Colliery; Balmer Seam; Crowsnest Coalfield

Sparwood, East Kootenay District, British Columbia

Sampling Date & Location:	5/6-6-77 Elkview Coal Preparation Plant	20-12-76 Elkview Coal Preparation Plant
Product & Screen Opening (in.):	Clean Coal Minus 1½, sq	Clean Coal Minus 1½, sq
ERL Laboratory No.	2940-77	3178-76
Rank of Coal (ASTM):	Medium volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	4.9	3.9
Ash ..... %	8.7	9.2
Volatile Matter ..... %	21.8	17.8
Fixed Carbon ..... %	64.6	69.1
Sulphur (As-received) ..... %	0.5	0.3
Calorific Value (As-rec'd):		
Btu/lb	13,310	13,500
MJ/kg	31.0	31.4
Ultimate Analysis (Dry basis):		
Carbon ..... %	80.2	81.1
Hydrogen ..... %	4.4	4.3
Sulphur ..... %	0.6	0.3
Nitrogen ..... %	1.3	1.2
Ash ..... %	9.2	9.5
Oxygen (By difference) .... %	4.3	3.6
Trace Mercury ..... ppm	0.06	0.07
Ash Fusibility Temperature:		
Initial ..... °F	2570	2700 +
Spherical ..... °F	2700 +	2700 +
Hemispherical ..... °F	2700 +	2700 +
Fluid ..... °F	2700 +	2700 +
Grindability Index (Hardgrove).	85	86
Free Swelling Index (ASTM)	8	5

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2940-77	59.7	28.0	1.7	-	1.6	2.7	3.4	0.7	1.1	0.0	0.7
3178-76	61.7	29.2	2.2	0.1	1.8	1.0	2.1	0.4	1.0	1.0	0.3

NOTES:

KAISER RESOURCES LIMITED

Harmer Ridge Mine & Michel Colliery; Balmer Seam; Crowsnest Coalfield

Sparwood, East Kootenay District, British Columbia

Sampling Date & Location:	5/6-6-77 Elkview Coal Preparation Plant	20-12-76 Elkview Coal Preparation Plant
Product & Screen Opening (in.):	Oxidized Coal Minus ½, sq	Oxidized Coal Minus ½, sq
ERL Laboratory No.	2941-77	3179-76
Rank of Coal (ASTM):	Medium volatile bituminous	
Proximate Analysis (As-rec'd):		
Moisture ..... %	4.8	6.0
Ash ..... %	12.9	21.5
Volatile Matter ..... %	19.8	17.7
Fixed Carbon ..... %	62.5	54.8
Sulphur (As-received) ..... %	0.3	0.3
Calorific Value (As-rec'd):		
Btu/lb	12,210	10,670
MJ/kg	28.4	24.8
Ultimate Analysis (Dry basis):		
Carbon ..... %	75.4	67.5
Hydrogen ..... %	4.0	3.5
Sulphur ..... %	0.3	0.3
Nitrogen ..... %	1.1	1.0
Ash ..... %	13.6	22.9
Oxygen (By difference) .... %	5.6	4.8
Trace Mercury ..... ppm	0.09	0.08
Ash Fusibility Temperature:		
Initial ..... °F	2700	2700
Spherical ..... °F	2700	2700
Hemispherical ..... °F	2700	2700
Fluid ..... °F	2700	2700
Grindability Index (Hardgrove).	100	90
Free Swelling Index (ASTM)	1½	1½

Ash Analysis: (ERL Lab No.)	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	TiO_2	P_2O_5	CaO	MgO	SO_3	Na_2O	K_2O
2941-77	61.2	29.6	2.6	-	1.7	0.8	2.4	0.7	1.7	0.0	0.4
3179-76	66.0	25.5	2.3	0.1	1.3	0.4	1.1	0.4	0.4	1.0	1.2

NOTES:

REFERENCES

1. Swartzman, E. "Analysis directory of Canadian coals"; 2nd edition; EMR, Mines Branch, (since renamed CANMET) Fuels Division; Report No. 836. 1953.

2. Swartzman, E. and Tibbetts, T.E. ibid, Supplement No. 1; Report No. 850; EMR, Mines Branch, Fuels Division. 1955.

3. Tibbetts, T.E. and Montgomery, W.J. ibid, Supplement No. 2; EMR, Mines Branch, Fuels and Mining Practice Division, Monograph No. 868. 1960.

4. Tibbetts, T.E. and Montgomery, W.J. "Evaluation of Canadian commercial coals: Nova Scotia and New Brunswick - 1975"; CANMET, EMR, CANMET Report 76-40. August 1976.

5. Tibbetts, T.E. and Montgomery, W.J. "Evaluation of Canadian commercial coals: Saskatchewan, Alberta and British Columbia - 1975"; EMR, CANMET Report 76-41. August 1976.

6. "Operators list 4, Coal mines in Canada"; (annual), EMR; DSS Cat. No. M36-77/4. January 1977.

7. "1976 assessment of Canada's coal resources and reserves"; EMR, Report EP 77-5 (DSS Cat. No. M23-12/77-5). 1977.

Table 1 - Summarized classification of coal by rank

VM* %	FC* %	Class	Group (rank)	Calorific value** Btu/lb	Calorific value** MJ/kg
2	98 -	Anthracitic (1)	Meta - Anthracite		
8	92 -		Anthracite		
14	86		Semianthracite		
22	78 -	Bituminous (2)	Low volatile bituminous		
31	69 -		Medium volatile bituminous		
			High volatile A bituminous	14,000	32.6
			High volatile B bituminous	13,000	30.2
			High volatile C bituminous	11,500	26.7
		Subbituminous (4)	Subbbituminous A (3)	10,500	24.4
			Subbituminous B	9,500	22.1
			Subbituminous C	8,300	19.3
		Lignitic (4)	Lignite A	6,300	14.7
			Lignite B		

* Dry, mineral-matter-free basis; VM = Volatile matter; FC = Fixed carbon.

** Moist, mineral-matter-free basis.

(1) Nonagglomerating; if agglomerating classified as low volatile bituminous.
(2) Commonly agglomerating.
(3) If agglomerating classified as high volatile C bituminous.
(4) Nonagglomerating.

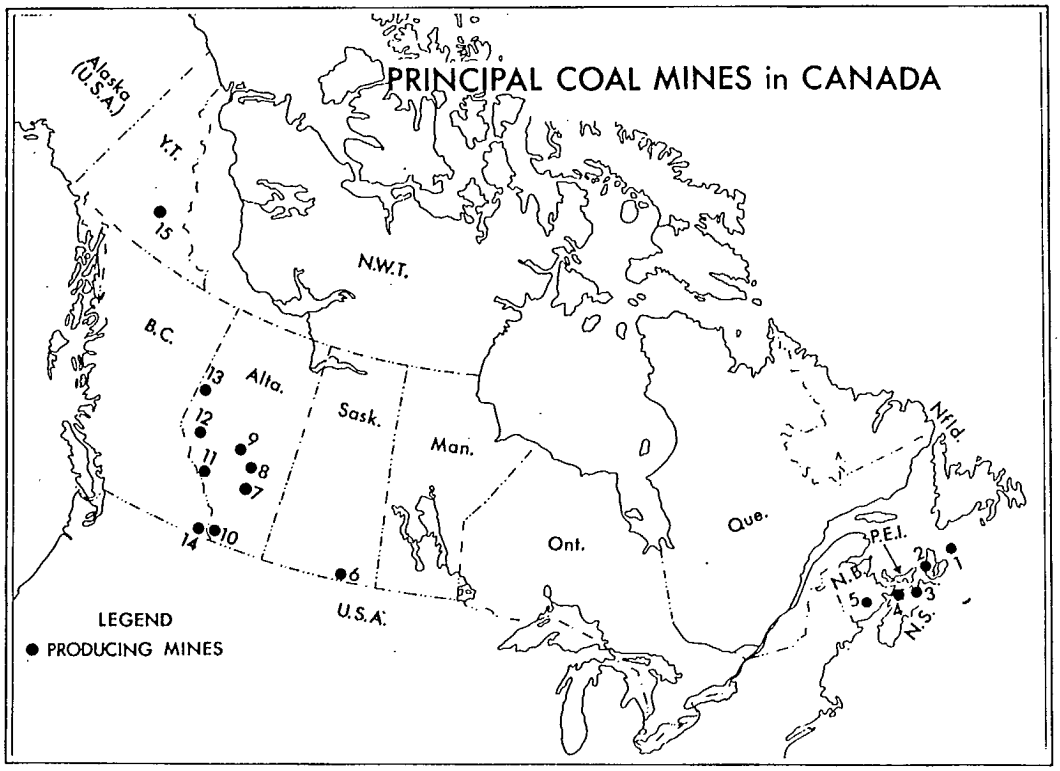
Table 2 - Mines sampled with approximate production of raw coal for 1977
(In thousands of tonnes)

	1977
NOVA SCOTIA	
Sydney Coalfield	
Cape Breton Development Corporation (DEVCO):	
- Lingan Mine (u/g)	1,479
- No. 26 Colliery (u/g)	811
- Prince Mine (u/g)	205
- Point Aconi (strip)	-
Inverness Coalfield	
Evans Coal Mines Limited (u/g)	32
Pictou Coalfield	
Drummond Coal Company Limited (u/g)	14
Thorburn Mining Limited (reclamation)	44
Joggins Coalfield	
River Hebert Coal Company Limited (u/g)	29
NEW BRUNSWICK	
Minto Coalfield	
N.B. Coal Limited (strip)	313
SASKATCHEWAN	
Estevan Area	
Manalta Coal Limited, Klimax Mine (strip)	1,530
Manitoba & Saskatchewan Coal Company (Limited), Boundary Dam Mine (strip)	1,712

Table 2 (Continued)

	1977
ALBERTA	
Plains Region	
Century Coals Limited, Atlas Mine, No. 1742 (u/g)	24
Forestburg Collieries Ltd., Diplomat Mine, No. 1578 (strip)	928
Manalta Coal Limited	
- Vesta Mine, No. 1046 (strip)	409
- Whitewood Mine, No. 1757 (strip)	1,417
- Highvale Mine, No 1769 (strip)	4,645
- Roselyn Mine, No. 443 (strip)	422
Mountain Region	
Cardinal River Coals Limited, Mine No. 1768 (strip)	1,891
Coleman Collieries Limited	
- Tent Mountain, Mine No. 1695 (strip)	1,147
- Vicary Creek, Mine No. 1747 (u/g)	170
McIntyre Mines Limited (u/g)	
- Grande Cache, Mine No. 1771 & 1774 (strip)	1,387
- Grande Cache, Mine No. 1765 (u/g)	1,760
The Canmore Mines Limited, Mine No. 1775 (u/g)	122
BRITISH COLUMBIA	
Crowsnest Coalfield	
Byron Creek Collieries Limited (strip)	366
Fording Coal Limited (strip)	4,013
Kaiser Resources Limited	
- Harmer Ridge (strip)	5,986
- Michel Colliery (u/g)	784

Figure 1



INDEX FOR MAP

Nova Scotia

1. Cape Breton Development Corporation (DEVCO)
   Lingan Mine, Lingan
   No. 26 Colliery, Glace Bay
   Prince Mine, Point Aconi
2. Evans Coal Mines Limited, St. Rose
3. Drummond Coal Company Limited, Drummond, Westville
3. Thorburn Mining Limited, Stellarton
4. River Hebert Coal Company Limited, River Hebert

New Brunswick

5 N.B. Coal Limited, Minto, Chipman areas

Saskatchewan

6. Manitoba and Saskatchewan Coal Company (Limited), Bienfait Mine, Bienfait
   Boundary Dam Mine, Estevan
6. Manalta Coal Ltd. Klimax Mine, Estevan
6. Utility Coals Ltd. Utility Mine, Estevan
6. Saskatchewan Power Corporation, Souris Valley Mine

Alberta

Subbituminous mines

7. Century Coals Limited, Atlas Mine, East Coulee
   Manalta Coal Ltd. Roselyn Mine, Sheerness
8. Manalta Coal Ltd., Vesta Mine, Halkirk
8. Luscar Ltd., Diplomat Mine, Forestburg
9. Manalta Coal Ltd., Whitewood Mine, Wabamun
   Highvale Mine, Seba Beach
   Egg Lake Coal Company Limited, Egg Lake

Bituminous mines

10. Coleman Colleries Limited Vicary Creek Mine, Coleman
    Tent Mountain Mine, Coleman
11. The Canmore Mines, Limited Canmore
12. Cardinal River Coals Ltd., Cardinal River Mine, Luscar
13. McIntyre Mines Limited, Smoky River Mines, Grande Cache

British Columbia

14. Kaiser Resources Ltd. Michel Colliery, Natal
    Harmer Ridge, Sparwood
14. Fording Coal Limited Fording Mine, Fording Valley
    Byron Creek Collieries Limited, Corbin

Yukon

15. Cyprus Anvil Mining Corporation Tantalus Butte Coal Mine, Carmacks

Figure 2

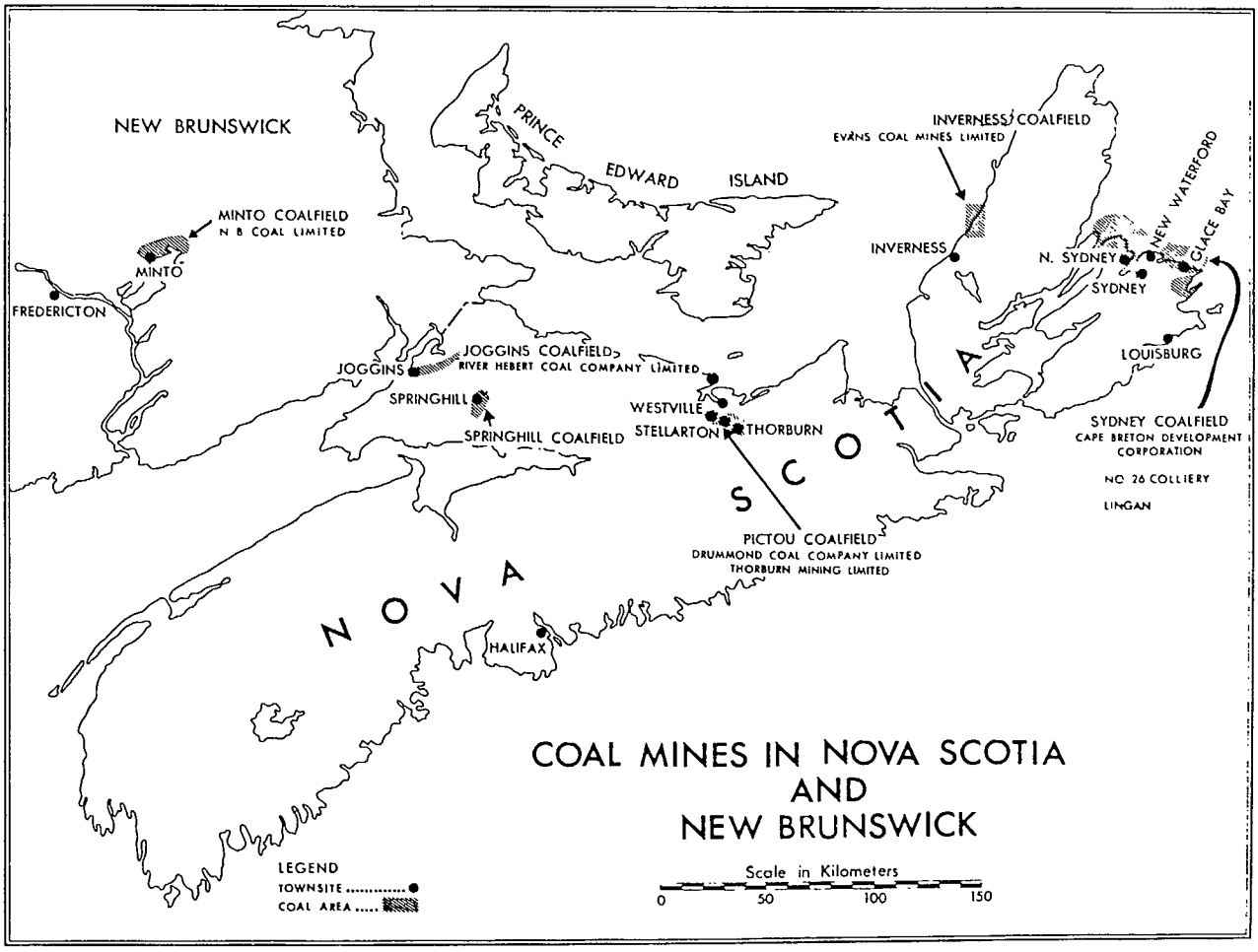

NEW BRUNSWICK
PRINCE
EDWARD
ISLAND
MINTO COALFIELD
N B COAL LIMITED
MINTO
FREDERICTON
JOGGINS
JOGGINS COALFIELD
RIVER HEBERT COAL COMPANY LIMITED
SPRINGHILL
SPRINGHILL COALFIELD
WESTVILLE
STELLARTON
THORBURN
PICTOU COALFIELD
DRUMMOND COAL COMPANY LIMITED
THORBURN MINING LIMITED
INVERNESS COALFIELD
EVANS COAL MINES LIMITED
INVERNESS
N. SYDNEY
SYDNEY
NEW WATERFORD
GLACE BAY
LOUISBURG
SYDNEY COALFIELD
CAPE BRETON DEVELOPMENT CORPORATION
NO 26 COLLIERY
LINGAN
NOVA SCOTIA
HALIFAX
LEGEND
TOWNSITE
COAL AREA
COAL MINES IN NOVA SCOTIA
AND
NEW BRUNSWICK
Scale in Kilometers
0
50
100
150

Figure 3

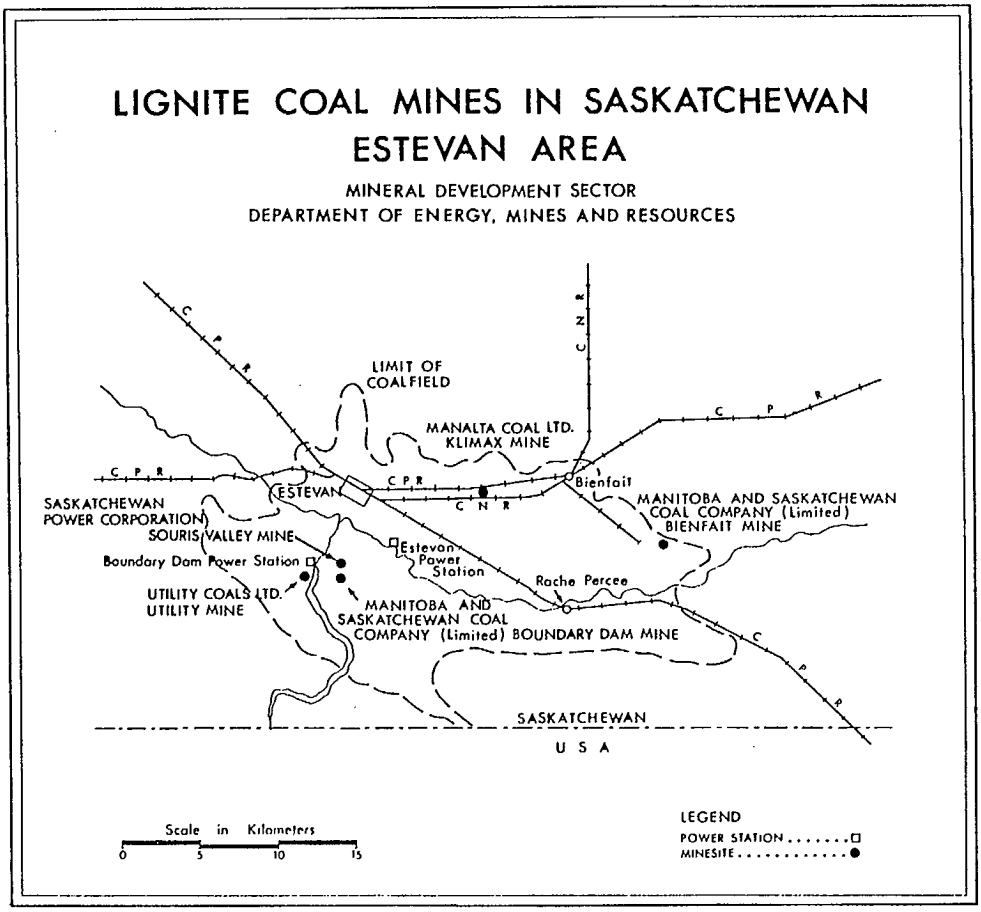

LIGNITE COAL MINES IN SASKATCHEWAN
ESTEVAN AREA
MINERAL DEVELOPMENT SECTOR
DEPARTMENT OF ENERGY, MINES AND RESOURCES
C P R
C N R
LIMIT OF COALFIELD
MANALTA COAL LTD. KLIMAX MINE
ESTEVAN
Bienfait
MANITOBA AND SASKATCHEWAN COAL COMPANY (Limited) BIENFAIT MINE
SASKATCHEWAN POWER CORPORATION
SOURIS VALLEY MINE
Boundary Dam Power Station
Estevan Power Station
Roche Percee
UTILITY COALS LTD. UTILITY MINE
MANITOBA AND SASKATCHEWAN COAL COMPANY (Limited) BOUNDARY DAM MINE
SASKATCHEWAN
U S A
Scale in Kilometers
0 5 10 15
LEGEND
POWER STATION
MINESITE

Figure 4

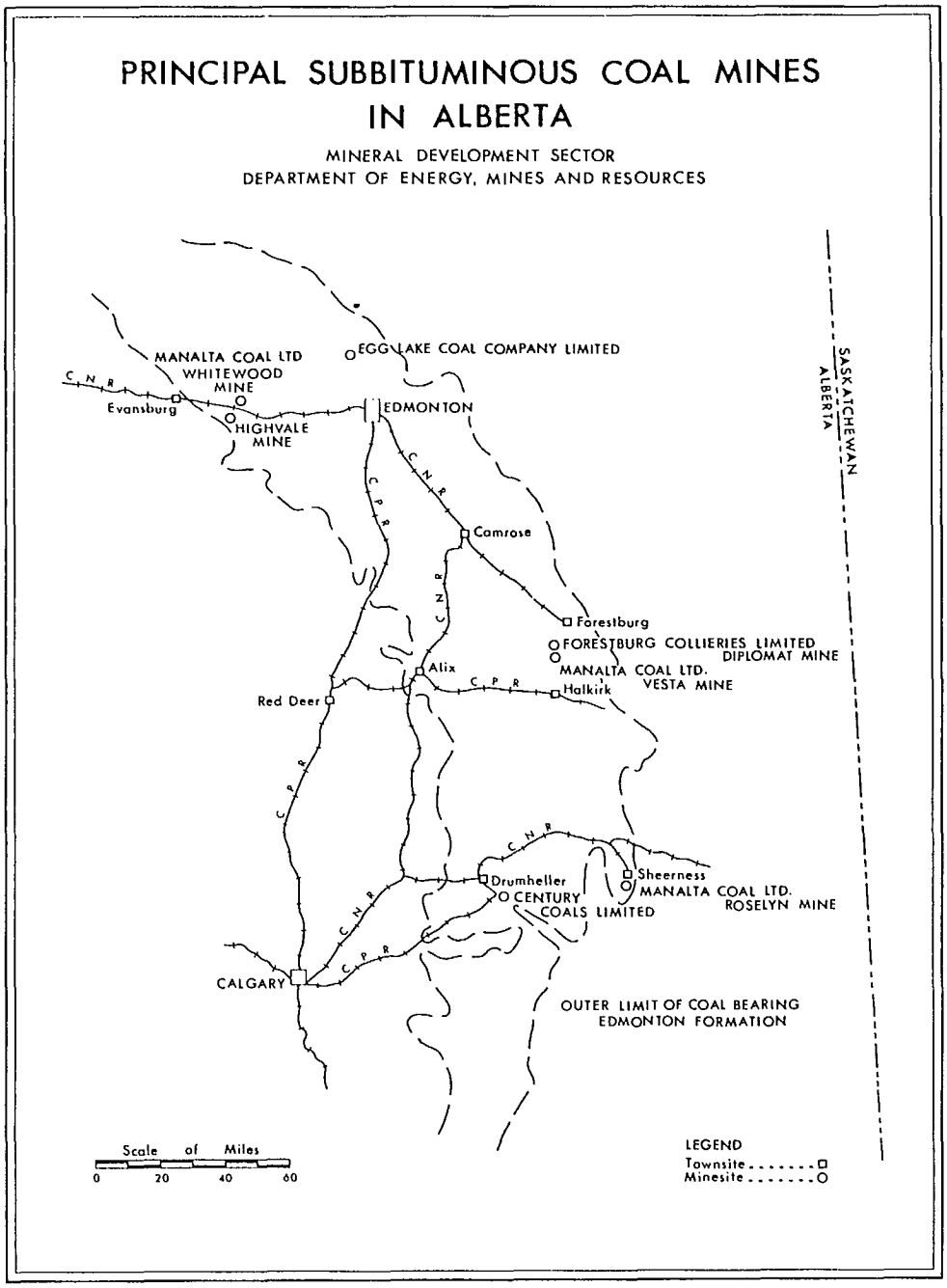

PRINCIPAL SUBBITUMINOUS COAL MINES IN ALBERTA
MINERAL DEVELOPMENT SECTOR
DEPARTMENT OF ENERGY, MINES AND RESOURCES
MANALTA COAL LTD WHITEWOOD MINE
EGG LAKE COAL COMPANY LIMITED
C N R
Evansburg
HIGHVALE MINE
EDMONTON
C P R
C N R
Camrose
C N R
Forestburg
FORESTBURG COLLIERIES LIMITED DIPLOMAT MINE
MANALTA COAL LTD. VESTA MINE
Alix
C P R
Halkirk
Red Deer
C P R
C N R
Drumheller
Sheerness
MANALTA COAL LTD. ROSELYN MINE
CENTURY COALS LIMITED
C N R
C P R
CALGARY
OUTER LIMIT OF COAL BEARING EDMONTON FORMATION
SASKATCHEWAN
ALBERTA
Scale of Miles
0 20 40 60
LEGEND
Townsite
Minesite

Figure 5

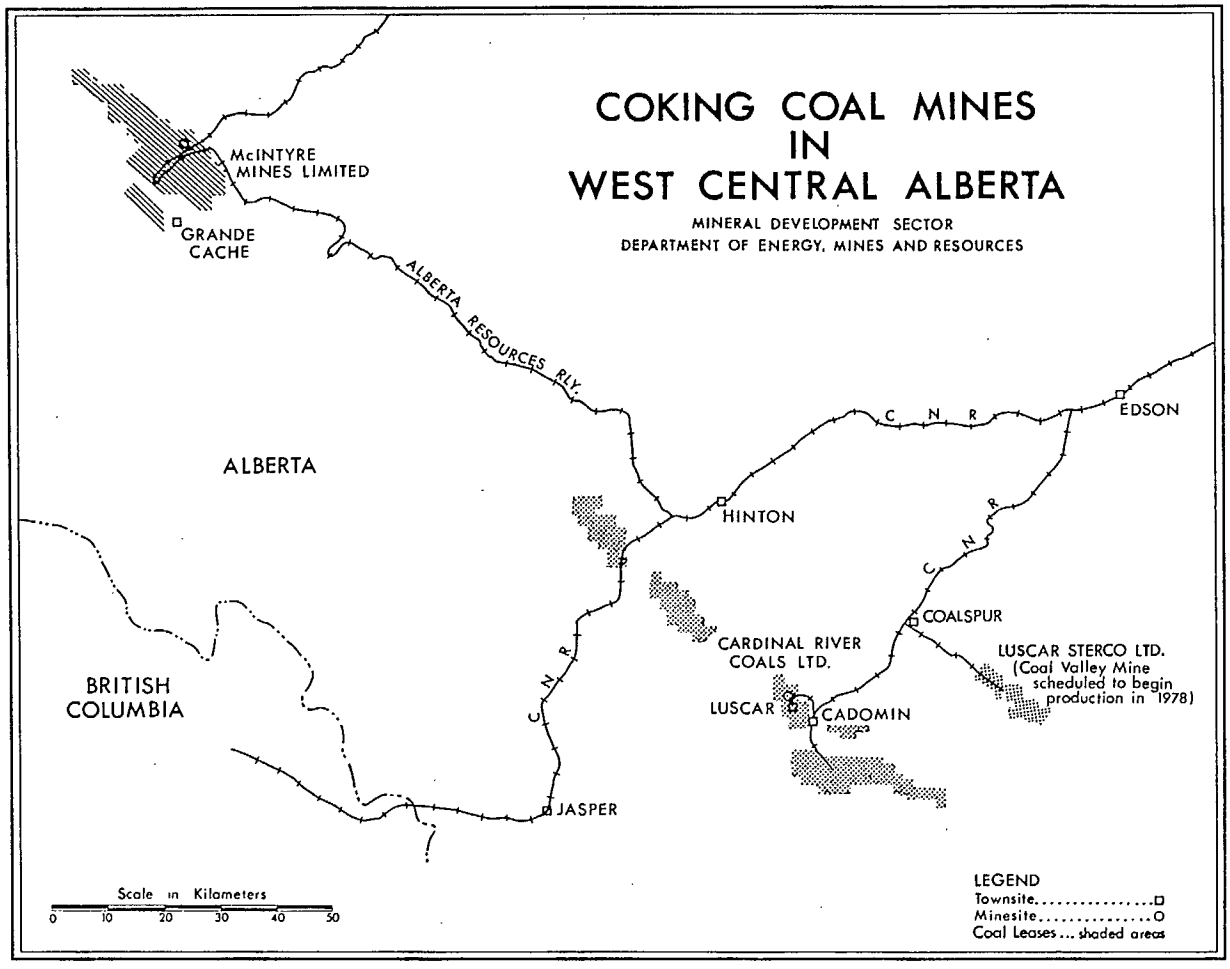
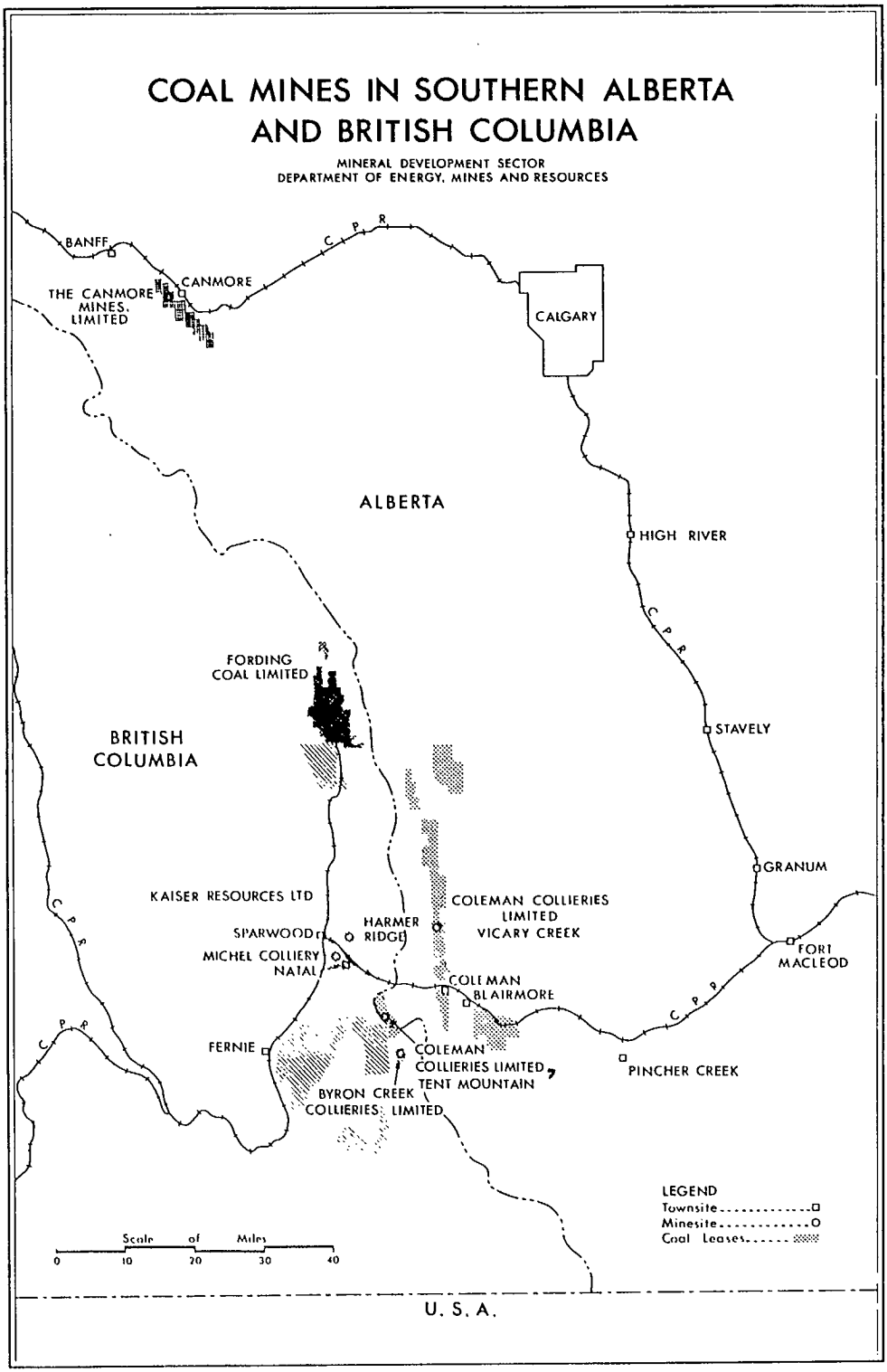

COKING COAL MINES
IN
WEST CENTRAL ALBERTA
MINERAL DEVELOPMENT SECTOR
DEPARTMENT OF ENERGY, MINES AND RESOURCES
McINTYRE
MINES LIMITED
GRANDE
CACHE
ALBERTA RESOURCES RLY.
ALBERTA
BRITISH
COLUMBIA
C N R
EDSON
HINTON
COALSPUR
CARDINAL RIVER
COALS LTD.
LUSCAR STERCO LTD.
(Coal Valley Mine
scheduled to begin
production in 1978)
LUSCAR
CADOMIN
JASPER
Scale in Kilometers
0 10 20 30 40 50
LEGEND
Townsite.....□
Minesite.....○
Coal Leases ... shaded areas

Figure 6


COAL MINES IN SOUTHERN ALBERTA AND BRITISH COLUMBIA
MINERAL DEVELOPMENT SECTOR
DEPARTMENT OF ENERGY, MINES AND RESOURCES
BANFF
CANMORE
THE CANMORE MINES, LIMITED
C P R
CALGARY
ALBERTA
HIGH RIVER
FORDING COAL LIMITED
BRITISH COLUMBIA
STAVELY
GRANUM
KAISER RESOURCES LTD
COLEMAN COLLIERIES LIMITED VICARY CREEK
HARMER RIDGE
SPARWOOD
MICHEL COLLIERY NATAL
FORT MACLEOD
COLEMAN BLAIRMORE
FERNIE
COLEMAN COLLIERIES LIMITED TENT MOUNTAIN
PINCHER CREEK
BYRON CREEK COLLIERIES LIMITED
LEGEND
Townsite
Minesite
Coal Leases
Scale of Miles
0 10 20 30 40
U. S. A.