Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
Hon. Anne Edwards, Minister

Mineral Resources Division
Geological Survey Branch

BRITISH COLUMBIA COAL QUALITY CATALOG

Information Circular 1992-20

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BRITISH COLUMBIA
CANADA

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FOREWORD

This is the second edition of the British Columbia Coal Quality Catalog. It outlines the range of coal qualities occurring in British Columbia on a deposit-by-deposit basis. It is intended to be used in conjunction with Paper 1986-3, *Coal in British Columbia*. General information concerning coal quality in the province can also be found in Information Circular 1991-20, a brochure entitled *British Columbia's Coals - Quality and Resources*.

This edition of the Catalog differs from the first in three important ways. In the first edition, coal quality data from active mines were compiled primarily from previously published sources. For this edition we have asked each mine to provide their own data. Another difference is the inclusion of coal petrographic data in this edition. Lastly, this version of the Catalog contains graphs which exhibit relationships between calorific value and ash content, and between vitrinite reflectance (R_{max}) and volatile matter (dry, ash-free) for individual coalfields.

The Catalog is intended to be used as a guide to the quality of available British Columbia coal products (Appendix 1). However, caution should be used in making decisions based on its contents; users are advised to check with original sources, especially marketing departments of mining companies, for verification of data. Moreover, the products listed for each mine do not necessarily represent the whole range of products available or potentially producible. Again, the mining companies are the best source of this type of information. They are listed on the inside front cover.

The Catalog is also intended to provide a scientific database of coal quality information. The data on raw coals from non-producing properties (Appendix 2) will be the most useful in this regard. Again, caution is urged in using these data, because they have not been selected randomly. It should also be noted that the information in Appendix 2 cannot be assumed to be representative of the quality of potential commercial production from any given coalfield or property.

The British Columbia Coal Quality Catalog has been assembled with the help of all the staff of the Coal Unit of the British Columbia Geological Survey Branch, and to them I am very grateful. In particular, discussions with my colleagues Maria Holuszko and Barry Ryan have been very helpful. Portions of the text from the first edition concerning the Peace River region, written by Ward Kilby, have been reproduced here with minor changes only.

I am also most grateful to the coal-producing companies in British Columbia for providing data. Ross Leeder, Quintette Coal, provided special assistance at a critical stage. The Coal Association of Canada, in particular Stu Hunter, provided helpful guidance.

Future revisions are planned, on roughly a two-year basis, and comments on the style and content of this edition will be welcomed, as well as any suggestions to help improve future editions.

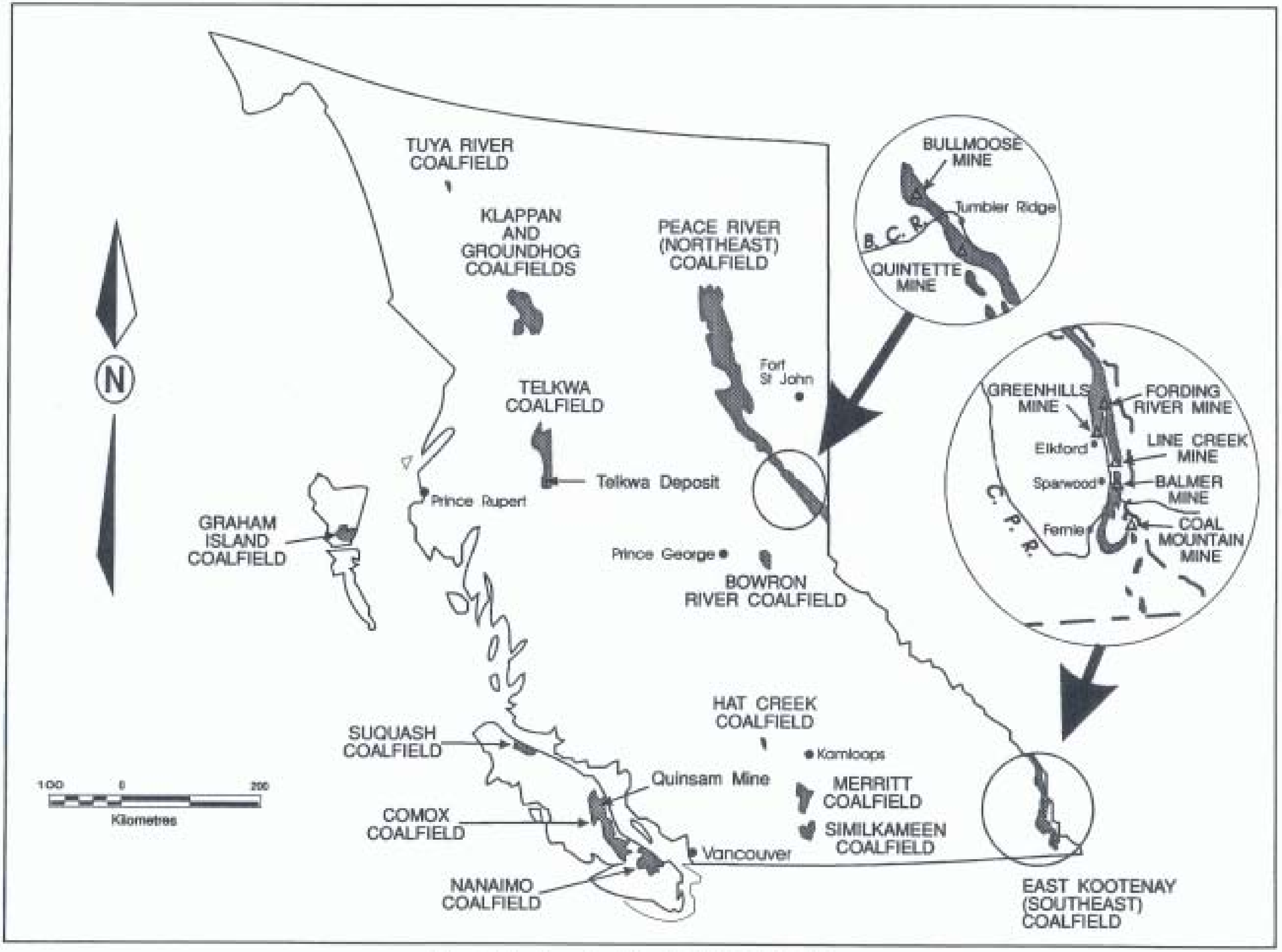


Figure 1. Location of coal deposits in British Columbia.

INTRODUCTION

Coal in British Columbia ranges in ASTM rank from lignitec to anthracite, with most production and reserves currently in the bituminous class. British Columbia coals are used primarily for coke production and thermal power generation, and are exported to all corners of the globe. Their quality and diversity make them attractive to almost all users of coking and thermal coal, as well as for other applications.

Coal production in British Columbia is currently greater than 25 million tonnes per year, and come from eight different mines. Five of these mines are in the southeast of the province (Figure 1): the Westar Mining Ltd. Balmer and Greenhills operations; the Manalta Coal Ltd. Line Creek mine; the Esso Resources Canada Limited Coal Mountain mine, operated by Byron Creek Collieries; and the Fording Coal Limited Fording River operations. Another two are in northeastern British Columbia: the Quintette mine of Quintette Coal Limited (currently being managed by Teck Corporation) and Teck Corporation's Bullmoose mine. The remaining British Columbia coal mine, Quinsam, is on Vancouver Island, and is owned by Hillsborough Resources Limited and operated by Brinco Coal Corporation.

It may appear that we have been somewhat arbitrary in selecting coal deposits to include in the catalog. In some cases this has been forced upon us by nonavailability of data, and in other cases we have made decisions based on our perception of the relative significance of specific coal deposits. In some cases, we have included deposits simply to provide geographic or stratigraphic representation.

Data on active coal mines were provided by the mining companies, and represent attributes of specific products. These are included as Appendix 1.

Data on the other coal deposits have been compiled on a seam-by-seam basis, and come primarily from the Ministry's large collection of coal company assessment reports, representing technical submissions required to document exploration programs. These are included as Appendix 2. Most of these data represent analyses on drill-core samples; in some instances bulk-sample data were used. Raw coal data, as opposed to clean coal, has been used as much as possible. The existence of petrographic data was the primary criterion in selection of sample records to include.

COAL ANALYSIS

The following is intended as only a brief overview of coal analysis and classification. For further information the reader is referred to Ward (1984) and Carpenter (1988) which were used as source material for this section.

REPORTING OF COAL ANALYSIS

Coal analytical data can be presented in several ways, referred to as bases of reporting, depending on the end use of the data. Some of the more common are summarized in Figure 2. Coal quality results on different samples are not directly comparable unless they are reported on the same basis. Simple arithmetic formulae can be used to make conversions between bases (*see* Ward, 1984, Table 2.7). However, the calculation of mineral matter from ash, when required, presents difficulty. It is common to rely on the Parr formula, which was developed for U.S. coals (mineral matter = 1.08 ash + 0.55 sulphur), but it is doubtful that this is a reliable formula in all instances (Ward, 1984, page 62).

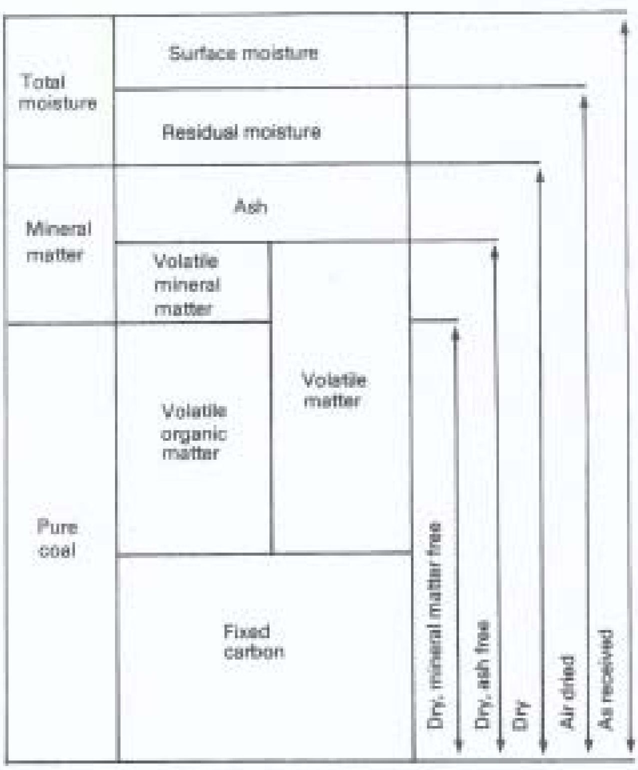


Figure 2. Components of a coal included when reporting analyses to different bases (from Ward, 1984).

Data presented on an as-received (ar) basis, also known as the as-sampled basis, reflect the entire coal prior to any drying treatment. The air-dried (ad) basis, also known as the as-analyzed basis, represents all the coal minus the surface moisture which is lost during laboratory air-drying. The dry basis refers to calculated values on theoretical coal with no moisture. The dry, ash-free basis (daf) is calculated as though the coal contains no moisture or ash. The dry, mineral-matter-free basis (dmmf) represents coal which contains no moisture or mineral matter. Finally, two bases which are not shown in Figure 2, the moist, ash-free (maf) and moist, mineral-matter-free (mmmf) bases, represent coals with their residual (or air-dried) moisture but no ash or mineral matter, respectively.

In this report the most commonly used basis is air-dried; where possible in Appendix 2 (nonproducing properties) volatile matter and calorific value have also been converted to dry, ash-free and moist, ash-free bases, respectively (columns P and V). This permits a rough comparison with the ASTM rank clasification (ASTM D388:1984; see below).

PROXIMATE ANALYSIS

Proximate analysis consists of a series of tests which measure the relative amounts of moisture, volatile and nonvolatile organic compounds, and ash in a coal. The sum of the four components is 100 per cent.

MOISTURE

There are many different forms of moisture which can be measured in coal. For the purposes here, moisture can be measured on either the sample as received or after air drying (Figure 2). In the former case, the value obtained represents total moisture, while in the latter case the surface moisture has been removed and what remains is usually referred to as residual moisture or air-dried moisture. It is not unusual to see residual moisture referred to as inherent moisture, which is incorrect. Inherent moisture is that moisture "considered to be part of the deposit and not that which exists as a surface addition" (Todd, 1982), and is determined differently.

VOLATILE MATTER

Volatile matter consists of "the components of the coal, except for the moisture content, that are liberated at high temperature in the absence of air" (Ward, 1984). This usually consists mainly of organic material, but contains some amount of volatile material liberated from the mineral matter during the analysis.

Ash

Ash is "the non-combustible inorganic residue that remains when coal is burned" (Ward, 1984). It represents most of the mineral matter, the remainder being driven off during determination of volatile matter.

Fixed Carbon

The fixed carbon content of a coal is "the carbon found in the material that remains after the volatile matter has been expelled" (Ward, 1984). It is not determined directly, but is simply the difference between 100% and the sum of the moisture, volatile matter and ash.

ULTIMATE ANALYSIS

Ultimate analysis involves the determination of the percentages of carbon, hydrogen, nitrogen, oxygen and sulphur. If the results are reported on a dry, ash-free basis, the sum of the values of these 5 elements is 100 per cent. All the elements except oxygen are determined directly, while oxygen can be determined directly, but is usually calculated as the difference between 100 per cent and the sum of the other components.

CALORIFIC VALUE

The energy liberated from a coal under controlled conditions in a laboratory is referred to as calorific value or specific energy. It gives a rough indication of the energy available during utilization, but does not necessarily predict the performance of a coal in specific situations.

HARDGROVE GRINDABILITY INDEX

The Hardgrove grindability index (HGI) is a measure of the ease with which a coal may be ground into a powder. Low values (less than 50) represent hard coals.

FREE SWELLING INDEX (FSI)

The free swelling index (or crucible swelling number) of a coal is a measure of its so-called caking capacity, an important indication of its potential for making coke. Values range from 0 (non-caking) to 9. The ideal range is 4 to 6 (Ward, 1984) although as a rule different coals are blended together to provide optimum characteristics. For most Western Canadian coking coals, FSI is a better indicator of coking potential than either fluidity or dilatation tests (Price and Gransden, 1987).

ASTM CLASSIFICATION OF COAL BY RANK

The term "rank" refers to the position of a coal with respect to the metamorphic gradation from lignite (low rank) to anthracite (high rank). There are several coal quality parameters which vary with rank and can be used as rank indicators, including volatile matter, calorific value, carbon, hydrogen, oxygen, vitrinite reflectance, moisture and others. With the exception of vitrinite reflectance, however, none of these is applicable over the entire range of coal ranks. The widely used ASTM rank classification (Table 1) uses two separate parameters, calorific value for low-rank coals and fixed carbon for high-rank coals. For coals which are near the boundary, the presence of agglomerating (essentially caking) characteristics is also used to determine to which group they belong. The ASTM system recognizes four classes of coal: lignitic, subbituminous, bituminous and anthracitic, in increasing rank order. Each of these is subdivided into groups (Table 1), which include familiar terms like "semi-anthracite" and "medium-volatile bituminous".

Individual samples listed in Appendix 2 are not classified into ASTM rank categories. Discussions in the text, however, do indicate the range of rank values in Appendix 2 for individual deposits.

COAL PETROGRAPHY

There are several types of microscopic coal analysis, and data from the two most common, maceral analysis and vitrinite reflectance, are included in this report. Full descriptions of the principles and techniques of coal petrography can be found in Bustin *et al.* (1985).

Maceral Analysis

Macerals are the organic constituents of coal, and their quantification by point counting (in reflected light under oil immersion) is referred to as maceral analysis. Macerals fall into three groups, which differ from each other in their reflectance (brightness), morphology and reactivity: vitrinite, exinite and inertinite. Results shown here (*see* Appendix 2) include the amounts of vitrinite, exinite and the inertinite maceral semifusinite in raw or clean coal.

Vitrinite Reflectance

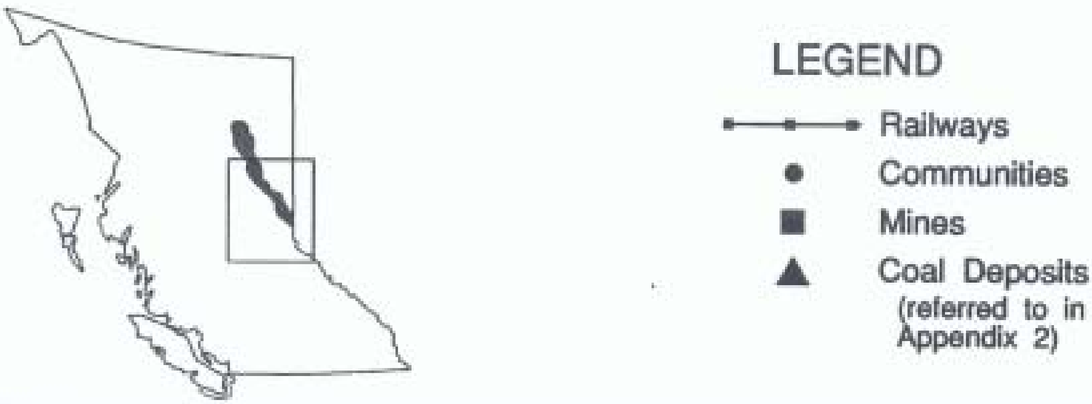
The reflectance (brightness) of the maceral vitrinite increases with increasing rank. Two types of reflectance can be measured on a vitrinite grain, maximum reflectance, obtained by rotating the microscope stage through 360° and recording the highest value, and random reflectance, the reflectance of the grain in the orientation in which it is encountered. In standard practice, the reflectances of 50 vitrinite grains in a sample are averaged, leading to determination of mean maximum reflectance (R_{max}) or mean random reflectance (R_m or R_{random}). In this report (Appendix 2), only R_{max} values are included. Rank classifications are not assigned to reflectance values on a sample-by-sample basis in Appendix 2, but discus-

TABLE 1

Class			Group	Fixed carbon limits, % dmmf		Calorific value limits MJ/kg		Agglomerating character
				Equal or greater than	Less than	Equal or greater than	Less than	
I	Anthracitic	1	meta-anthracite	98				
		2	anthracite	92	98			non-agglomerating
		3	semi-anthracite	86	92			
II	Bituminous	1	low-volatile bituminous coal	78	86			
		2	medium-volatile bituminous coal	69	78			
		3	high-volatile A bituminous coal		69	32.56		commonly agglomerating
		4	high-volatile B bituminous coal		30.24	32.56		
		5	high-volatile C bituminous coal		26.75 24.42	30.24 26.75		 agglomerating
III	Subbituminous	1	sub-bituminous A coal		24.42	26.75		
		2	sub-bituminous B coal		22.10	24.42		
		3	sub-bituminous C coal		19.31	22.10		non-agglomerating
IV	Lignitic	1	lignite A		14.65	19.31		
		2	lignite B			14.65		

sion of rank classifications in the text take reflectance values, where present, into account. For discussion of the relationship between vitrinite reflectance and ASTM rank classes in Western Canadian coals, *see* Cameron (1989).

PEACE RIVER COALFIELD



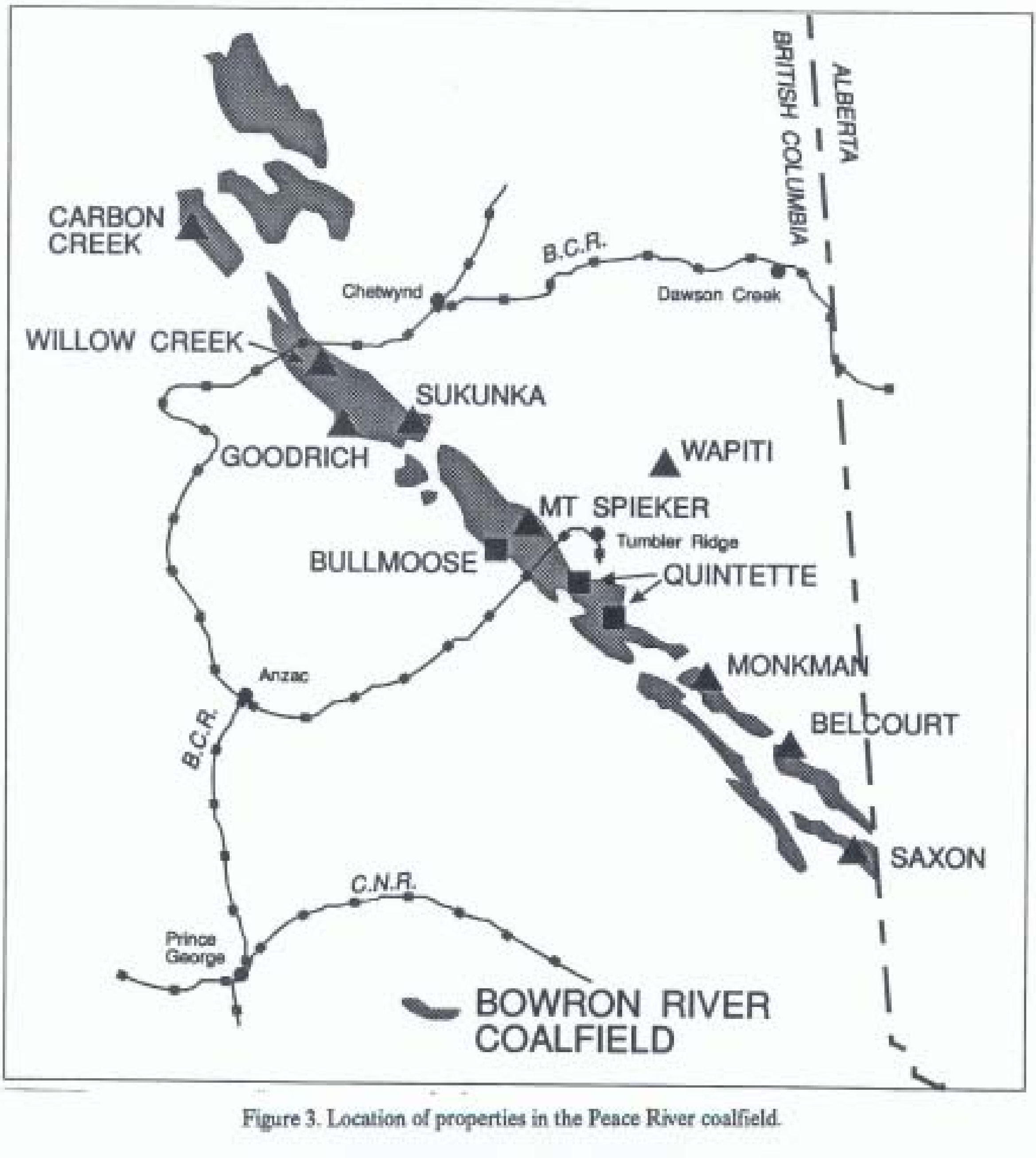


Figure 3. Location of properties in the Peace River coalfield.

GEOLOGICAL SETTING OF BRITISH COLUMBIA COALS

Details concerning the geology of the coalfields and individual coal properties in British Columbia are contained in Paper 1986-3, *Coal in British Columbia*, as well as in numerous other technical publications. This section is intended to provide a general overview only, and the reader is referred to other sources for more detailed information.

British Columbia coal deposits range from Late Jurassic to Tertiary in age, and occur in three of the six major tectonic belts. The Insular Belt contains the Upper Cretaceous Vancouver Island coals. The Intermontane Belt contains Jurassic and Cretaceous coals of northwestern British Columbia, and Tertiary coals of south-central British Columbia. The Rocky Mountain Fold and Thrust (or Foreland) Belt includes Jurassic and Cretaceous coal deposits of northeast British Columbia, known as the Peace River coalfield, and Jurassic-Cretaceous coal deposits of southeast British Columbia, known as the East Kootenay coalfields.

PEACE RIVER COALFIELD

Coal deposit locations in the Peace River coalfield are illustrated in Figure 3. These coals occupy a stratigraphic interval of over 3000 metres and are found in four different formations, three of which are shown schematically in Figure 4. Lower Cretaceous Gething and Gates formations contain the major coal resources of the region. Minor coal occurrences have been investigated by exploration companies in the Jurassic-Cretaceous Minnes Group and also in the Upper Cretaceous Wapiti Formation (not shown in Figure 4). The Peace River coalfield proper occurs in the Inner Foothills of the Rocky Mountains from north of the Peace River south to the Alberta British Columbia border. Coals of the Wapiti Formation are not in what has been traditionally known as the Peace River coalfield, but occur in the closely associated Outer Foothills and Alberta syncline structural zones. All major coals in the coalfield are closely associated with marine shorelines and within any formation the marine influence on coal seams may vary with stratigraphic and lateral position; this influence is best reflected in elevated sulphur values (see section on coal quality of the Peace River coalfield).

Minnes Group coals are present throughout the coalfield but so far have not proved to be as economically attractive as those in the overlying Gates and Gething formations. Minnes coal seams tend to be thin.

Gething Formation coals form a significant portion of the resource base of the coalfield, and the Gething Formation is coal bearing throughout. There has been minor production from this formation, but at present it is

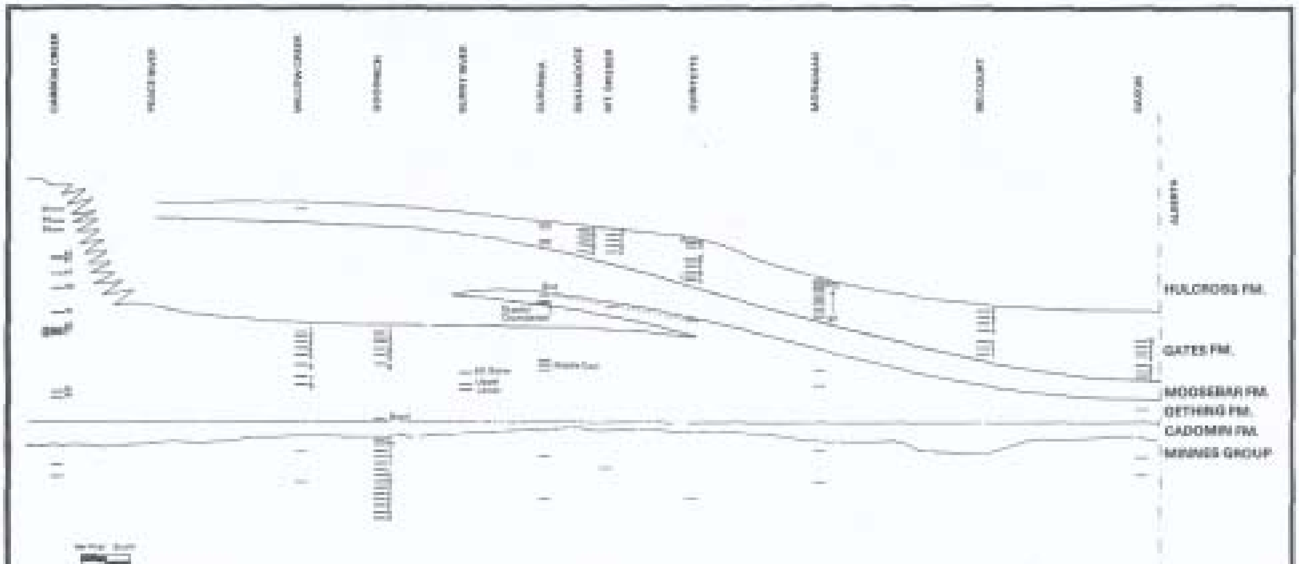
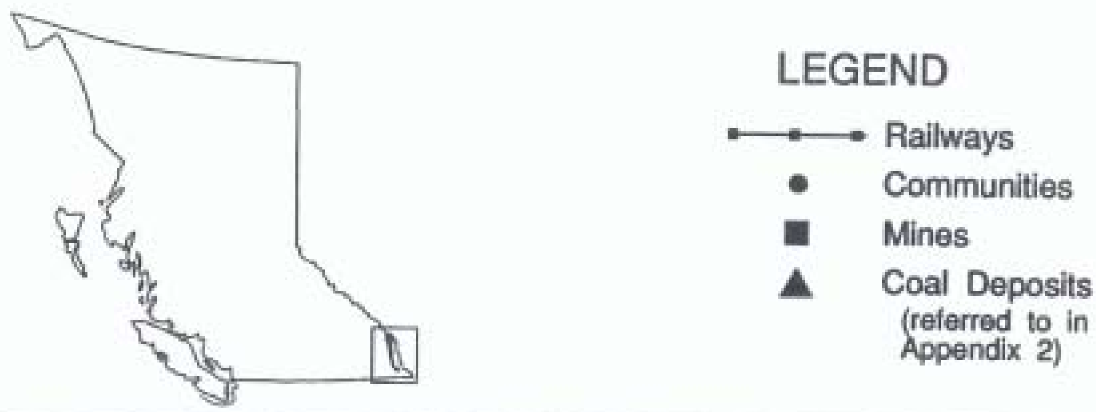


Figure 4. Schematic cross-section of the Peace River coalfield showing stratigraphic relationships and relative coal seam positions. The Wapiti Formation (not shown) is approximately 2 000 metres stratigraphically above the top of the Gates Formation.

EAST KOOTENAY COALFIELDS



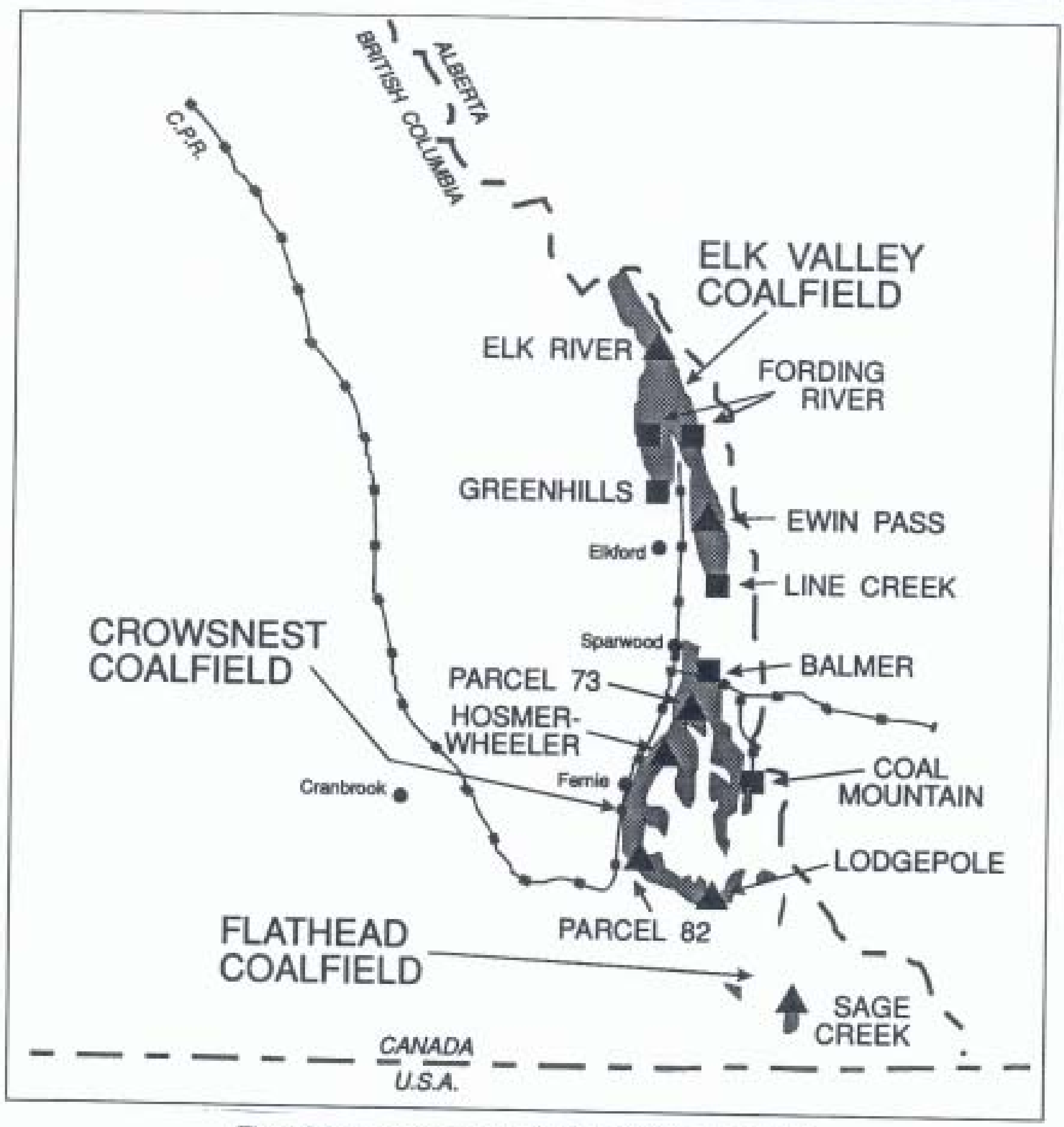


Figure 5. Location of properties in the East Kootenay coalfields.

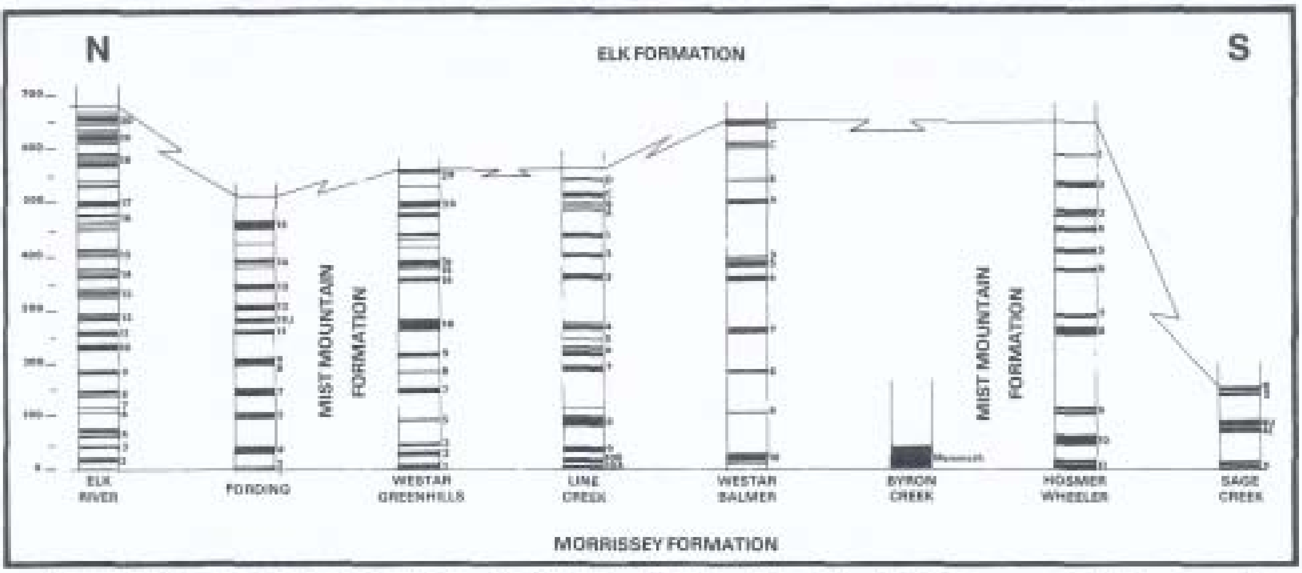


Figure 6. Schematic stratigraphic sections of the Mist Mountain Formation in the East Kootenay coalfields, showing relative coal seam positions and thicknesses.

not a producer. Formation thickness varies from about 100 metres at the Alberta British Columbia border in the south to over 1000 metres at Carbon Creek in the north. In the Sukunka to Quintette region an upper member of the Gething Formation contains several major coal seams (Legun, 1990). This member pinches out just north of the Sukunka deposit (Figure 4). North of Sukunka the coals are located in the major body of the Gething Formation only, with the major coal development being near the top of the formation. At Carbon Creek more than 100 coal seams have been identified, but individual seams rarely exceed 3 metres in thickness (Legun, 1988).

Current coal production in the coalfield is from the Gates Formation. Coals of this interval are usually thick and continuous. They form the major coal resource of the coalfield from the Bullmoose area south to the Alberta border. Formation thickness decreases from about 350 metres at the Alberta border to about 60 metres at Peace River (Figure 4). Important coal seams are present in the formation from the south extreme to just north of the Bullmoose mine, where they thin and the formation becomes mainly marine and barren of coal.

Wapiti Formation coal occurs principally at the base of the formation where seam thickness may reach 2 metres.

The Peace River coalfield lies mainly in the Inner Foothills of the Rocky Mountains. Folding and thrust faulting are common within the coal deposits of the belt. Structural complications within deposits may range from simple to extreme. In some locations multiple fault repeats have substantially increased seam thickness. Coals in the Wapiti Formation are not part of the Inner Foothills belt and are relatively unaffected by structural complications.

EAST KOOTENAY COALFIELDS

The distribution of coal deposits in the East Kootenay coalfields of southeastern British Columbia is shown in Figure 5. Three structurally separate coalfields are recognized: the Elk Valley, Crowsnest and Flathead coalfields. A summary of the geology of the region's coal resources is provided in Grieve (1985).

The Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group contains essentially all the economic coals in this region. Figure 6 shows generalized sections of the Mist Mountain Formation at selected locations. The formation averages 500 metres in thickness in southeastern British Columbia, with a range from less than 200 to greater than 600 metres. Individual seams range from less than 1 to greater than 15 metres in thickness, and cumulatively they comprise between 8 and 12 per cent of the total stratigraphic thickness of the formation at most locations. The seam numbers and names included in Figure 6 apply only to the sections where they are plotted. As a rule, correlation of individual coal seams on a regional basis is not possible in the East Kootenay coalfields. A potential exception to this rule is the significant coal zone which occurs at or near the base of the formation at most locations throughout southeast British Columbia. Examples of this include 5-seam at Sage Creek, the Mammoth seam at Byron Creek Collieries, and 10A and 10B seams at Line Creek. Marine influence is generally not evident within the Mist Mountain Formation.

The East Kootenay coalfields are within the Front Ranges of the Rocky Mountains, a structural province characterized by thrust faults and folds. The distribution and shape of the coalfields are controlled by these fea-

HAT CREEK, MERRITT, AND SIMILKAMEEN COALFIELDS

LEGEND

Railways

Communities

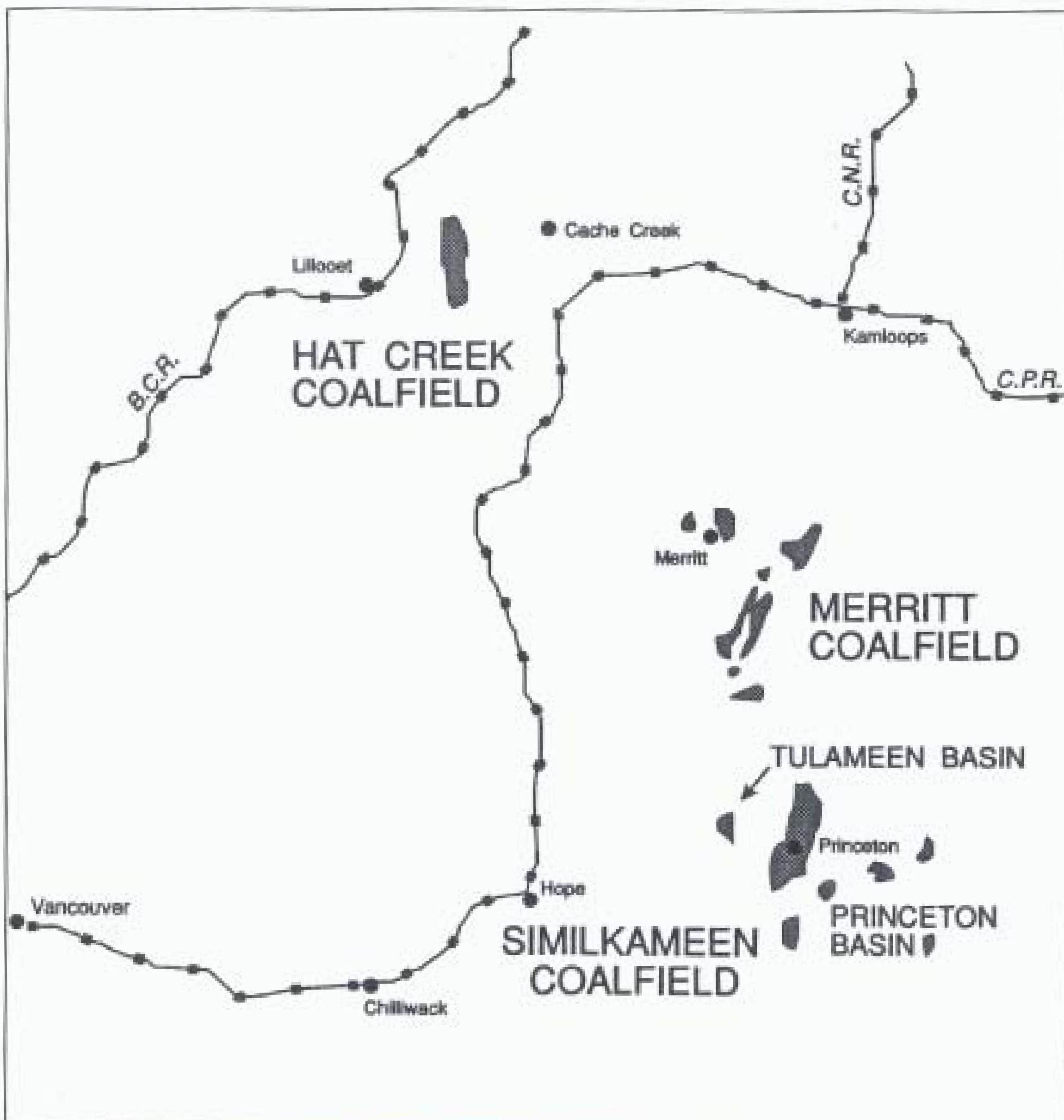


Figure 7. Location of Tertiary coal deposits in the Southern Interior region of British Columbia.

tures, with large synclines forming the major structures in the Crowsnest and Elk Valley coalfields. Because of the structural setting, most areas contain strata which are moderately to steeply dipping, and which are affected by faulting. These deformational features are important factors in mine planning, but are usually not insurmountable, and are often advantageous, especially in cases where coal seams are tectonically thickened. An example is the Mammoth or Number 1 seam at Byron Creek Collieries, which has been thickened by thrust faulting.

HAT CREEK COALFIELD

Coal deposits in the Hat Creek coalfield (Figure 7) occur in the Hat Creek Coal Formation of the Eocene Kamloops Group. The best known part of the Hat Creek coalfield is the so-called Number 1 deposit at the north end of the coal basin, which was extensively explored during the 1970s by B.C. Hydro and Power Authority. The coal measures in the Number 1 deposit are approximately 350 to 560 metres thick, and have been subdivided into four coal zones and two rock zones (Kim, 1985). Only one of the coal zones, however, the D-zone, is devoid of rock partings, and so the bulk of the deposit is composed of thinly interbedded coal and rock. This is reflected in the high ash content of Hat Creek coal, which will be discussed in the next section. Nonetheless, the Hat Creek deposits contain one of the thickest coal sections in the world.

The Hat Creek deposits occupy a north-trending graben (Church, 1977), which is affected by later east-trending normal faults.

MERRITT COALFIELD

Coal measures at Merritt occupy a depression in Triassic volcanic rocks (White, 1947), roughly 11 by 5 kilometres in area (Figure 7). Other separate coal-bearing basins occur in the vicinity, including the deposits on Quilchena Creek, 20 kilometres to the east.

The coal deposits near Merritt are assigned to the Coldwater beds of the Eocene Kamloops Group. The stratigraphy of the coal measures appears to be highly variable. Between five and eight coal seams occur within 230 metres of strata at a former mine area known as Coal Gully (White, 1947). At an adjacent mine area known as Coldwater Hill six coal seams are contained in 140 metres of section. Thickness of individual coal seams ranges up to 4.5 metres (White, 1947).

Structure of the Merritt coalfield is also variable. Steep dips associated with tight, southeast-plunging folds are found in the Coal Gully area, although other parts of the coalfield are characterized by moderate southwest dips (Cockfield, 1948).

SIMILKAMEEN COALFIELD

Tulameen Basin

The Tulameen basin is the smaller of two separate basins in the Similkameen coalfield (Figure 7). It is elliptical in shape and covers approximately 20 square kilometres.

The coal in the Tulameen basin is contained in the 130-metre-thick middle member of the Allenby Formation of the Eocene Princeton Group. Only two coal seams of significant thickness are found in the basin, and even these are well developed only along the western edge. In this area the lower seam averages about 7 metres in thickness, while the upper or main seam is 15 to 20 metres thick (Williams and Ross, 1979). They are separated by 20 to 25 metres of mudstone.

The major structure of the Tulameen basin is a southeast-plunging open syncline. The basin is affected by high-angle normal faults, and in some locations the coal appears to be affected by thrust faulting (Evans, 1985).

Princeton Basin

Coal of workable thickness occurs in the southern half of the Princeton basin only, and is contained in the so-called coal-bearing member of the Allenby Formation of the Eocene Princeton Group (McMechan, 1983). A total of eight coal seams or zones has been documented in the member, although no more than five or six occur at any one location. The overall stratigraphic thickness of the member exceeds 1000 metres. Correlation of seams is extremely difficult because of facies changes. The basal coal zone of the member, known as the Princeton-Black-Blue Flame zone (McMechan, 1983), is the thickest and was the most significant producer. Its thickness is highly variable, ranging from 2 to 15 metres; the number of rock partings it contains is fairly high at most locations.

The Princeton basin is a half graben with a major normal fault along its eastern margin (McMechan, 1983). Strata have been deformed into broad, open, east to southeast-trending folds. Small-scale normal and reverse faults are common throughout the basin.

VANCOUVER ISLAND COALFIELDS

Vancouver Island coals dealt with in this report occur in two separate coalfields, the Comox coalfield in the north, and the Nanaimo coalfield in the south (Figure 8). All Vancouver Island coals are contained within the Upper Cretaceous Nanaimo Group, although the Nanaimo coals are younger than those of the Comox coalfield.

The main structures of the Vancouver Island coalfields can be summarized as gently warped and tilted fault blocks (Muller and Atchison, 1971). Most fault blocks are tilted and downthrown to the northeast along

VANCOUVER ISLAND COMOX AND NANAIMO COALFIELDS

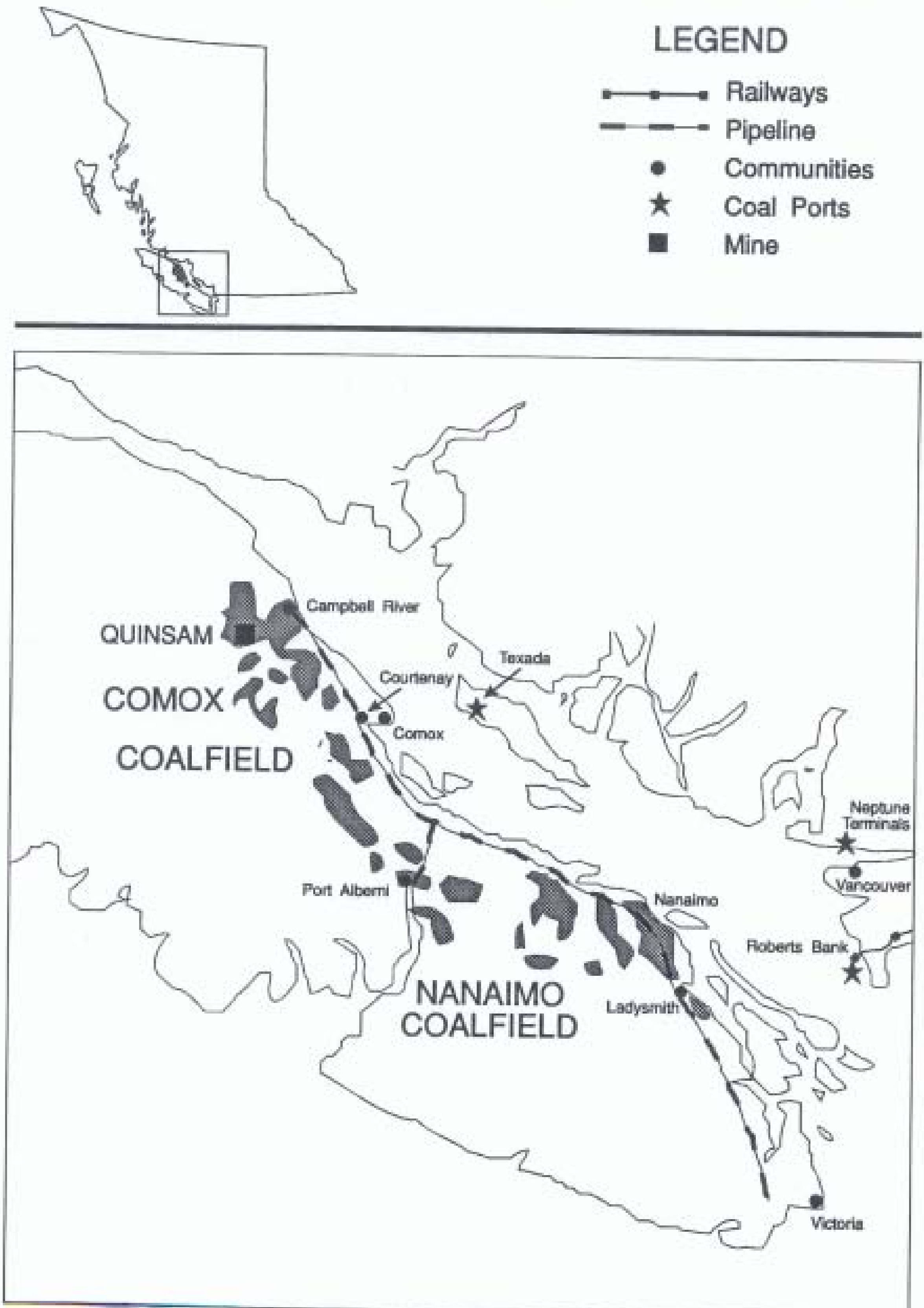


Figure 8. Location of the Comox and Nanaimo coalfields on Vancouver Island.

KLAPPAN, GROUNDHOG AND TELKWA COALFIELDS

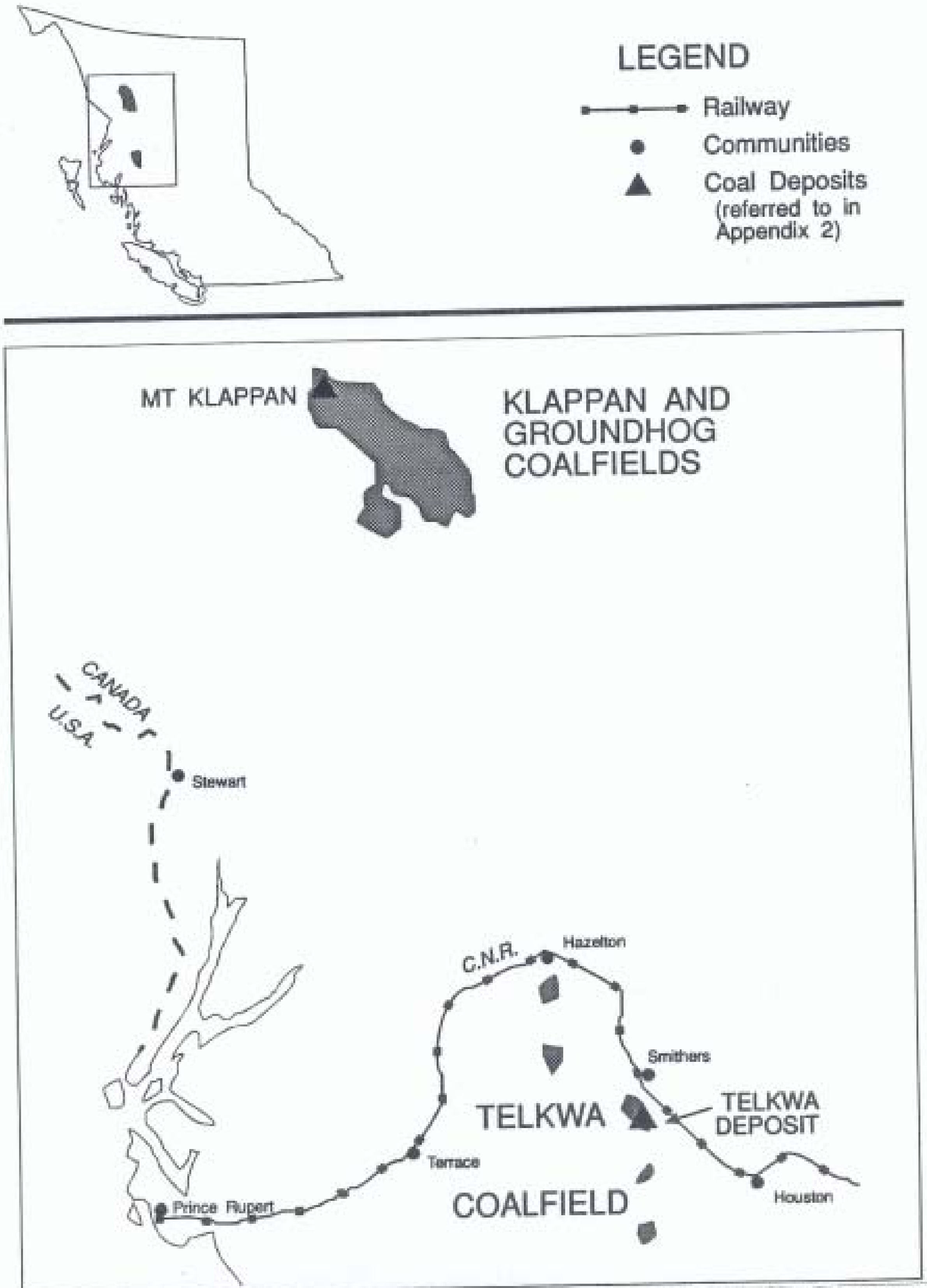


Figure 9. Location of the Telkwa deposit and the Klappan and Groundhog coalfields in northwestern British Columbia.

northwest-trending faults. Faults in the Nanaimo coalfield are more closely spaced and have greater displacement than those in the Comox coalfield.

Comox Coalfield

The Cumberland and Dunsmuir members of the Comox Formation host the coals of the Comox coalfield (Bickford and Kenyon, 1988). All past and current production is from the Cumberland member only. Its characteristics are quite variable, although it generally contains from one to four coal seams or zones, with the thickest individual seam being about 3.5 metres thick. At the operating Quinsam Coal mine, west of Campbell River (Figure 8), the 2.4 to 4.0-metre-thick coal bed No. 1, from the basal Cumberland member, is being mined (Kenyon *et al.*, 1991). Coals of the Dunsmiur member tend to be thin.

Nanaimo Coalfield

In the Nanaimo coalfield, coals are found in the Northfield member of the Extension Formation, the Newcastle member of the Pender Formation, and in the Reserve member of the Protection Formation (Bickford and Kenyon, 1988). The Extension Formation hosts the Wellington and the Little Wellington (No. 2) coal beds, which have average thicknesses of 2.5 and 0.5 metres respectively. Both have contributed to coal production in the Nanaimo area. The Pender Formation hosts the formerly productive Newcastle and Douglas coal beds. Their average thicknesses are 1.0 and 3.0 metres, respectively. There has been no production of coal from the Protection Formation.

TELKWA DEPOSIT

The Telkwa deposit is one of a number of coal-bearing sedimentary deposits of different ages in the Smithers-Hazelton area in northwestern British Columbia (Figure 9), referred to collectively as the Telkwa coalfield. It is hosted by the lower part of the Lower Cretaceous Skeena Group (Palsgrove and Bustin, 1991).

The Telkwa coal measures are 400 metres-thick contain coal in two distinct sequences (Schroeter *et al.*, 1986). The lower sequence includes up to four coal seams with an aggregate thickness of 2 to 12 metres and which individually range from 1 to 6 metres in thickness. Its overall thickness ranges from 2 to 40 metres. The upper sequence contains up to 15 coal seams, with individual thicknesses ranging between 1 and 5 metres and having an aggregate thickness of up to 26 metres. Its overall thickness varies from 20 to 170 metres. Quality reported in this catalog represents coals in the proposed Crows Nest Resources mine plan, which are part of the upper coal sequence. They are numbered sequentially upward from 1 to 10.

The Telkwa coal deposit is characterized by high-angle faulting (Schroeter *et al.*, 1986). Faults trend predominantly northwesterly, and are of both normal and reverse types. Telkwa coal measures are generally preserved in graben structures formed by these faults, and are influenced by broad, open folds and tend to have shallow northeast or southwest dips.

KLAPPAN COALFIELD

The Klappan coalfield and the adjacent Groundhog coalfield are near the north end of the Bowser basin of northwestern British Columbia (Figure 9). The hostrocks are the Jurassic-Cretaceous Bowser Lake Group, and major coal seams at Klappan occur in the Upper Jurassic Currier Formation (MacLeod and Hills, 1990). It contains up to 25 coal seams, which range from 0.5 to 5.0 metres or more in thickness. Seams are given letter designations, and are numbered upward from A at the base.

Two phases of deformation have affected the strata of the Mount Klappan area (Moffat and Bustin, 1984). The first phase involved northwest-trending folds and minor thrust faults. These structures were later deformed by broad, open, northeast-trending folds and flat-lying thrust faults.

BOWRON RIVER COALFIELD

The Bowron River coalfield occupies a northwesterly trending elongate basin about 25 kilometres in length which lies 45 kilometres east of Prince George (Figure 3). Coal deposits occur in the lower portion of an unnamed Tertiary (late Paleocene or younger) sequence, that may be up to 700 metres thick (Smith, 1989). The coal zone, which is up to 35 metres thick, contains an aggregate of 12 metres of coal, in lenticular seams which attain thicknesses of 1.5 to 3.5 metres.

The structure of the coalfield is an asymetric graben; strata dip moderately to the northeast (Smith, 1989). There is significant folding and faulting of the coal measures occurs within the basin.

QUALITY OF BRITISH COLUMBIA COALS

The characteristics of specific British Columbia coal-mine products are listed in Appendix 1, while quality parameters of individual coal seams from the main coalfields and basins in British Columbia, excluding active mine properties, are listed in Appendix 2. Data in Appendix 1 were contributed by the mines, while the data in Appendix 2 were collected mainly from assessment reports. Also included in this section are graphs showing the relationship between calorific value and ash content for certain coalfields, based on data in Appendix 2. Graphs showing the relationship between vitrinite reflectance and volatile matter (daf) for the Peace River, East Kootenay and Klappan coalfields are also included in this section. Data in these graphs comes from assessment reports, but most are not contained in Appendix 2.

PEACE RIVER COALFIELD

Coal quality in the Peace River coalfield spans a significant range of values due to varied stratigraphic positions and thermal maturation histories. Rank of coals ranges from low-volatile bituminous to high-volatile bituminous C. Within the disturbed belt, coal ranks generally tend to decrease towards the mountains due to the initiation sequence of thrusting, which was from west to east (Kalkreuth and McMechan, 1988). As the strata being displaced by thrusting were raised, coalification slowed or ceased relative to equivalent unfaulted strata.

Starting with the oldest coals in the region, Minnes Group coal seams range in rank from high to low-volatile bituminous. Values in Appendix 2, which represent samples from the Monkman property, are low-volatile, higher rank than Gething and Gates Formation coals on the same property. Their ash contents are low (4 out of 5 samples have less than 12 per cent raw ash, air-dried), as are their sulphur contents (all samples with less than or equal to 0.5 per cent sulphur).

Gething Formation coals are of economic interest primarily from the Peace River to the Sukunka River (Figure 4). The rank of Gething Formation coals within this area, based on proximate analysis and vitrinite reflectance of samples in Appendix 2, ranges from low-volatile to high-volatile A bituminous. Lowest ranks occur in the upper part of the formation at Carbon Creek, while the highest ranks occur on the Burnt River property. Farther south, Gething Formation coals on the Monkman property appear to be near the boundary between medium and low-volatile in rank. Figure 10 shows the correlation between vitrinite reflectance (R_{max}) and volatile matter (daf) for clean Gething Formation coals ($r = -0.89$). The degree of scatter of the data in this graph (and also the similar graphs in Figures 12 and 14) is primarily due to factors other than rank, such as maceral composition and nature of mineral matter, which influence volatile matter contents. Moreover, there can be significant variations in reflectance reading results between different petrographic labs.

Ash values (air-dried) of raw Gething Formation samples included in Appendix 2 range from less than 5 to greater than 36 per cent, and average 14.2 per cent. Free swelling index (FSI) values on these same raw coals range up to 8.5, with an average of less than 4; the most commonly occurring value is 1.5. Calorific values (air-dried) on raw Gething Formation coals included in Appendix 2 range from 21.23 to 33.69 megajoules per kilogram, and average 29.75. There is a strong negative correlation ($r = -0.94$) between calorific value and ash content in raw coals (Figure 11), so that ash content is the main factor influencing heat content. Hardgrove grindability index (HGI) values in the raw Gething coals range from 47 to 87, with a mean of 59. Values of sulphur given in Appendix 2 are highly variable, with a range in raw, air-dried samples of 0.24 to 2.49 per cent, and an average of 0.79 per cent. However, 80 per cent of these samples have sulpur contents of 0.75 per cent and lower. The highest sulphur values are associated with seams in close proximity to marine strata, including the Bird seam, which is almost directly overlain by the marine Moosebar Formation (Figure 4). Vitrinite contents in the raw and clean coals combined (8 samples total) range from 28.7 to 86.5 per cent and average 52.0 per cent.

Gates Formation coals are presently being produced from the Bullmoose and Quintette deposits. These coals produce an excellent low-sulphur metallurgical product. Oxidized portions of these seams are mined and sold as low-sulphur thermal coals. Mine products include low-sulphur, medium-volatile metallurgical coals (Appendix 1) and thermal coals.

The rank of raw Gates Formation coals, based on proximate and vitrinite reflectance analysis of samples included in Appendix 2, is mainly medium-volatile bituminous. Some high-volatile A and low-volatile bituminous coals are also included; the latter all occur on the Belcourt property. The correlation between vitrinite reflectance (R_{max}) and volatile matter (daf) for clean Gates Formation coals is shown in Figure 12 ($r = -0.85$). Ash values (air-dried) of raw Gates Formation samples included in Appendix 2 range from less than 5 to greater than 46 per cent, and average 18.8 per cent. Free swelling index values on these same raw coals range up to 8.5, with an average of less than 5.5; the most commonly occurring

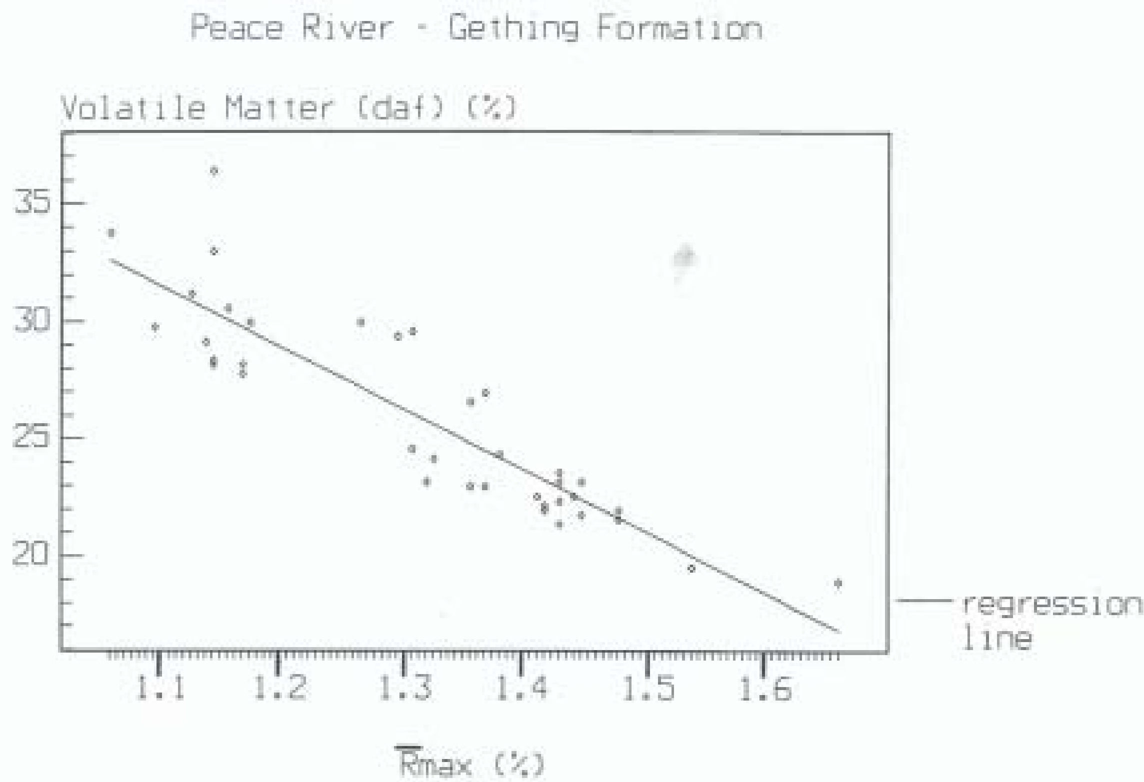


Figure 10. Relationship between volatile matter (daf) and mean maximum vitrinite reflectance for clean coals of the Gething Formation in the Peace River coalfield. All data are from assessment reports.

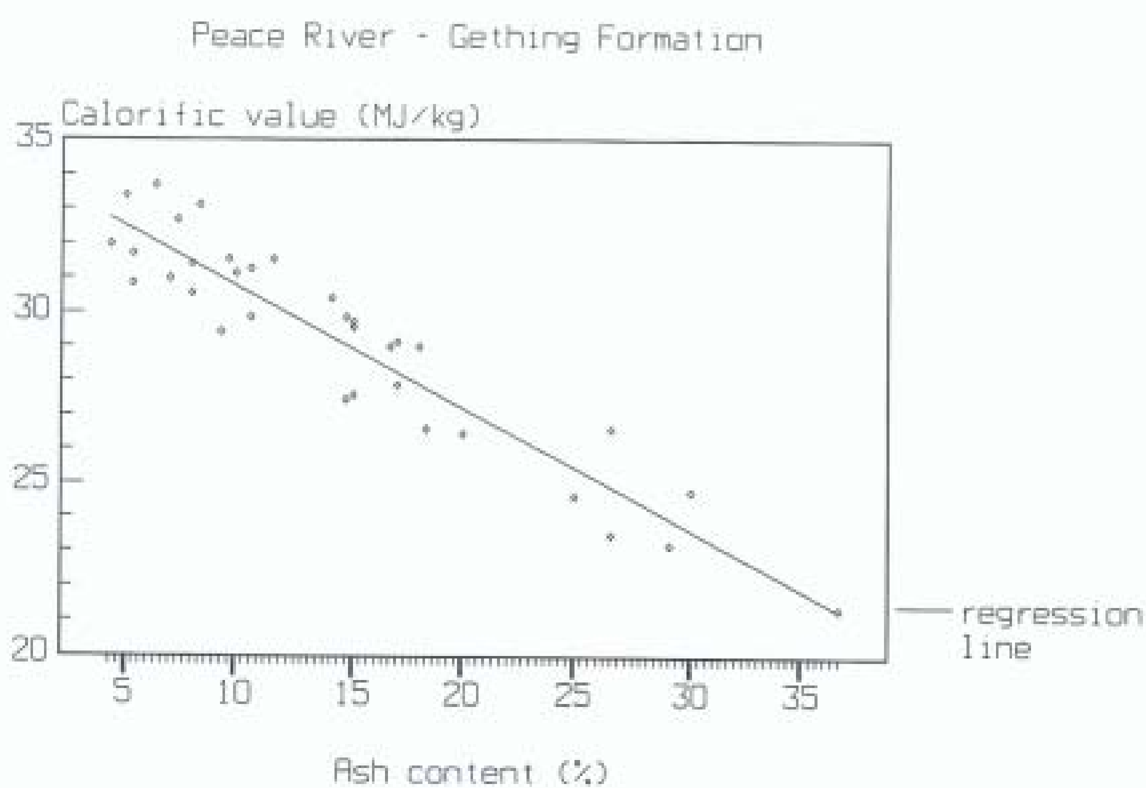


Figure 11. Relationship between calorific value and ash content (air-dried) for raw coals of the Gething Formation in the Peace River coalfield. All data are contained in Appendix 2.

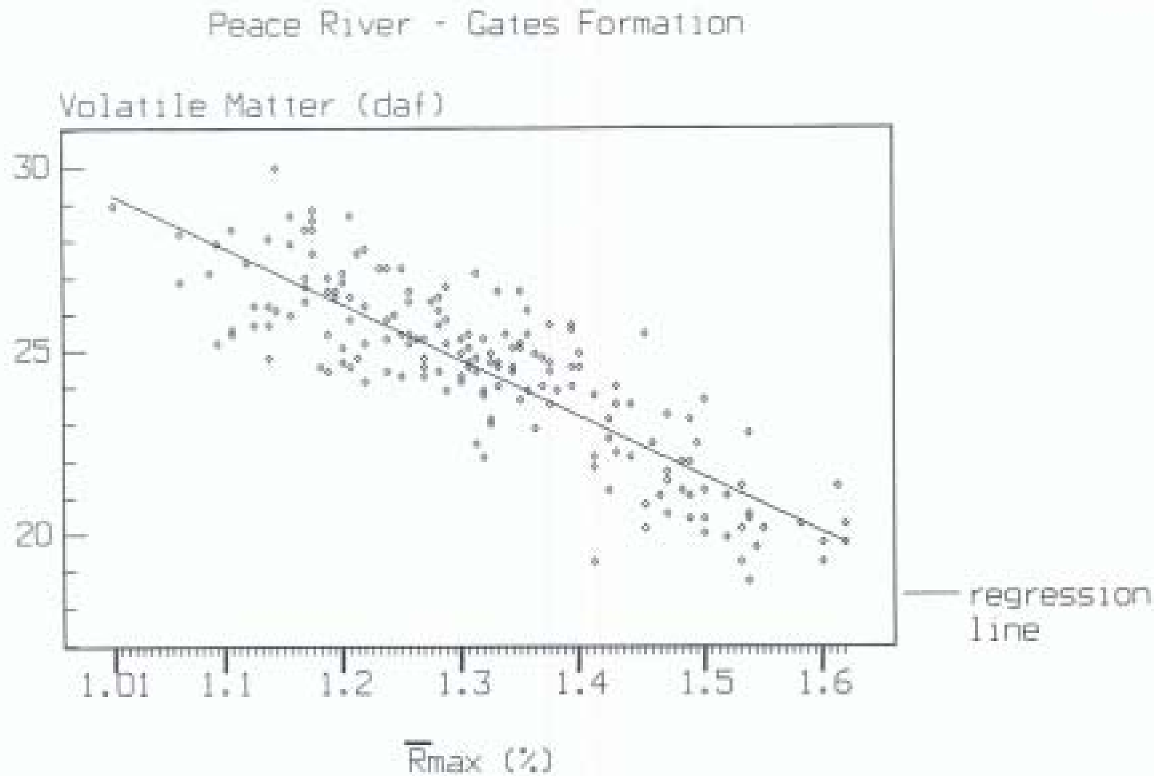


Figure 12. Relationship between volatile matter (daf) and mean maximum vitrinite reflectance for clean coals of the Gates Formation in the Peace River coalfield. All data are from assessment reports.

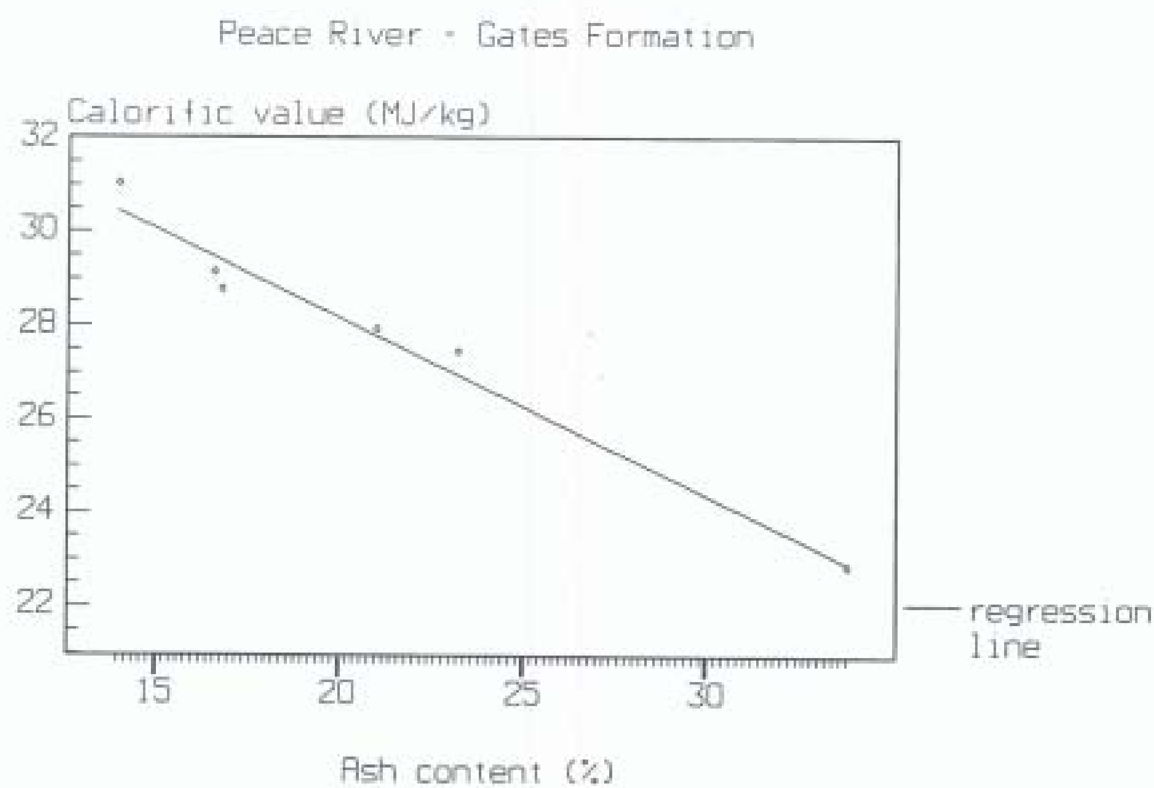


Figure 13. Relationship between calorific value and ash content (air-dried) for raw coals of the Gates Formation in the Peace River coalfield. All data are contained in Appendix 2.

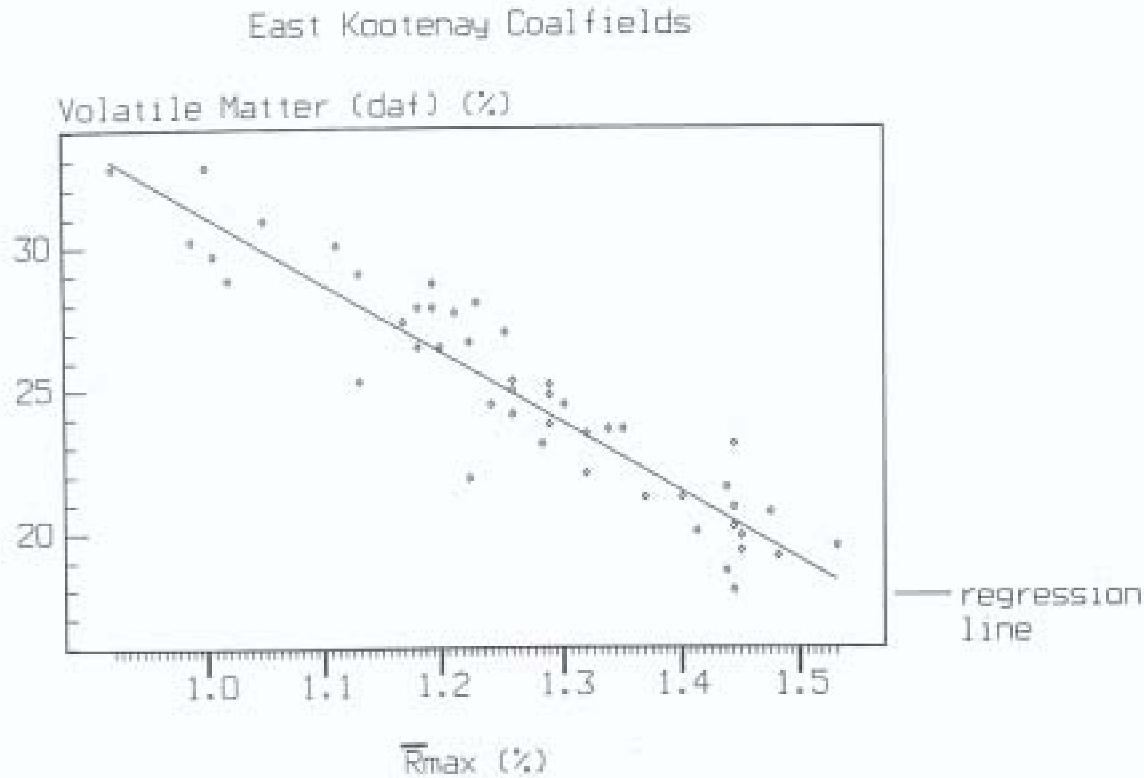


Figure 14. Relationship between volatile matter (daf) and mean maximum vitrinite reflectance for clean coals of the East Kootenay coalfields. All data are from assessment reports.

value is 4. Calorific values on raw coals (air-dried) range from 22.78 to 31.04 megajoules per kilogram, and average 27.83 (six samples only). There is a strong negative correlation (r = -0.99) between calorific value and ash content in raw Gates Formation coals (Figure 13), so that ash content is the main determinant of heat content. Hardgrove index values in the raw Gates coals range from 64 to 98, with a mean of 79. Values of sulphur (air-dried, raw) in Appendix 2 range from 0.21 to 0.78 per cent, with a mean of 0.45. Sixty-five per cent of the samples have sulphur contents less than 0.5 per cent. Vitrinite contents in the clean Gates Formation coals range from 33.0 to 70.3 per cent, and average 57.6 per cent.

Wapiti Formation coals investigated to date occur at one stratigraphic horizon, within a few metres of the formation base. On the basis of calorific value (moist, mineral matter-free) of values in Appendix 2, rank of Wapati coal is high-volatile bituminous C. Ash values (air-dried) are in excess of 20 per cent, and sulphur values are low. Hardgrove index values indicate a relatively hard coal.

EAST KOOTENAY COALFIELDS

The East Kootenay coalfields of southeastern British Columbia contain coals which range in rank from high-volatile B to low-volatile bituminous. Rank of any given seam is dependent on stratigraphic position, structural position and geographic location. The influence of stratigraphic position is compounded, when classifying rank by volatile matter content, by a general up-section increase in reactive maceral contents (Cameron, 1972). Structural position influences rank because of the importance of post and/or syn-Laramide coalification (Pearson and Grieve, 1985; Grieve, 1991). Geographic location influences rank through the effect of regional rank variations.

Example product characteristics (Appendix 1) include metallurgical, semi-coking and thermal coals. Most are medium-volatile in rank, although one high-volatile coking coal is currently produced. All product coals from southeast British Columbia are low in sulphur.

Based on proximate and petrographic analysis of raw samples included in Appendix 2, coal rank in the East Kootenay coalfields ranges from high-volatile A to low-volatile bituminous. Of those properties listed in Appendix 2, the Elk River property and Parcel 82 of the Dominion Coal Block have the greatest proportion of low-volatile coals (high rank), while the Hosmer-Wheeler property and adjacent Parcel 73 of the Dominion Coal Block have the greatest proportion of high-volatile coals. Figure 14 displays the correlations between vitrinite reflectance (R_{max}) and volatile matter (daf) for clean Mist Mountain Formation coals (r = -0.93). Ash values (air-dried) of raw samples included in Appendix 2 range from less than 6.5 to greater than 37 per cent, and average 20.4 per cent. The FSI values on these same raw coals range

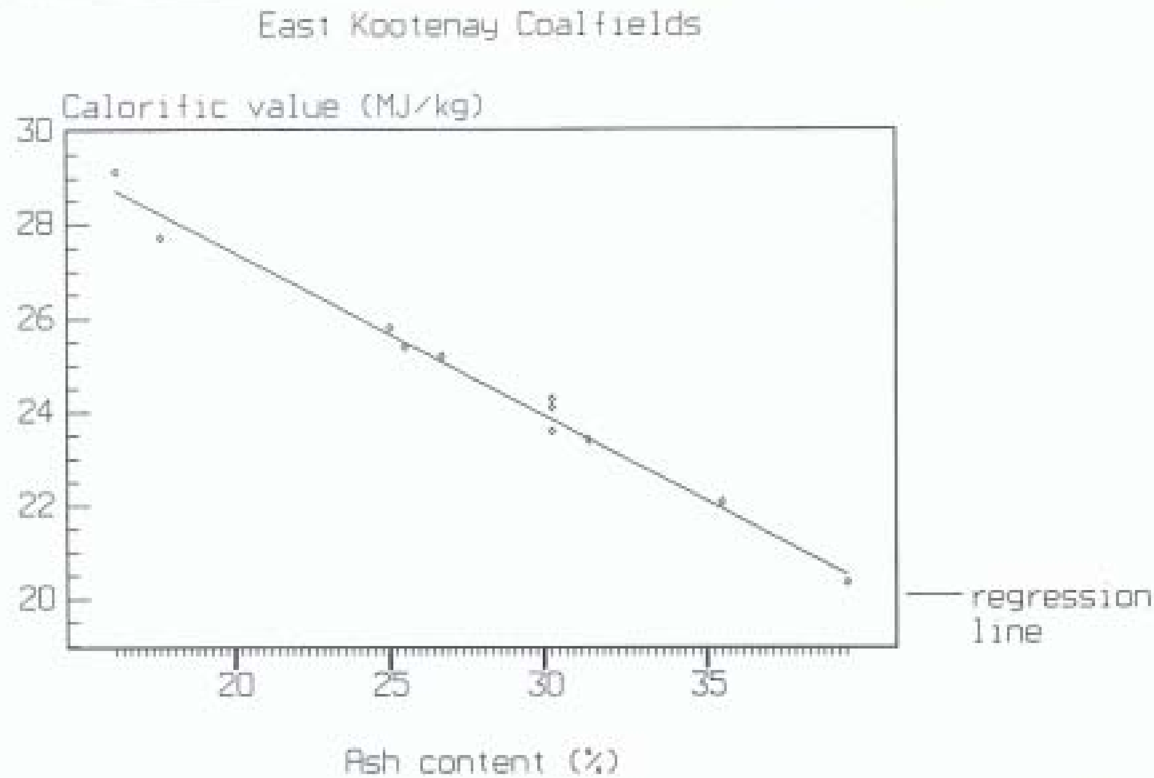


Figure 15. Relationship between calorific value and ash content (dry basis) for raw coals of the East Kootenay coalfields. All data are contained in Appendix 2.

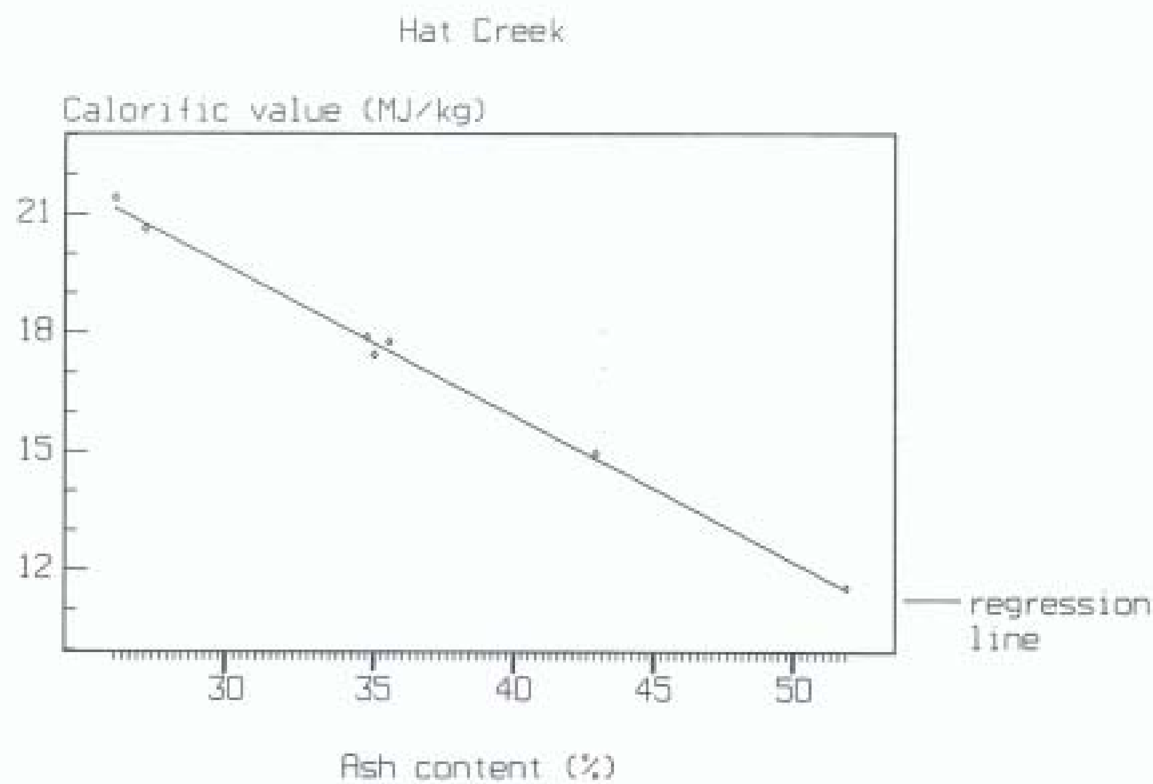


Figure 16. Relationship between calorific value and ash content (dry basis) for raw coals of the Hat Creek Number 1 deposit. All data are contained in Appendix 2.

up to 8.5, with a mean of 4.0; the most commonly occurring value is 2.5. Calorific values (dry) on the raw East Kootenay coals range from 20.26 to 29.13 megajoules per kilogram, with a mean of 24.36. There is a strong negative correlation (r = -0.99) between calorific value and ash content in raw coals (Figure 15), implying that ash content is the main factor determining heating value. The HGI values in the raw coals range from 74 to 112, with a mean of 92. Values of raw sulphur (dry basis) in Appendix 2 range from 0.36 to 0.95 per cent, with an average of 0.57. Half of the samples have sulphur values less than 0.5 per cent. Vitrinite contents in the clean coals range from 31 to 86.9 per cent, with a mean of 59 per cent. On average, vitrinite contents tend to increase up-section (Cameron, 1972).

HAT CREEK COALFIELD

Rank of coals in the Hat Creek coalfield ranges from lignite to sub-bituminous (Smith, 1989; Goodarzi, 1985). Ash contents of Hat Creek coal are relatively high; for example, ash in the seven raw samples included in Appendix 2 ranges from 26.0 to 51.8 per cent (dry basis), with a mean of 36.2. Calorific values (dry basis) of the raw samples in Appendix 2 range from 11.45 to 21.42 megajoules per kilogram, with a mean of 17.34. There is a strong negative correlation (r = -0.999) between calorific value and ash (Figure 16), so that ash is the main determinant of heat content of Hat Creek coal. One HGI value of 58 is included. Sulphur values (dry basis) are low, with a range of 0.23 to 0.79 per cent.

MERRITT COALFIELD

Rank of coals in the Merritt coalfield ranges from high-volatile A to high-volatile C bituminous (Smith, 1989). Based on calorific value (maf) and reflectance, the nine clean samples listed in Appendix 2 are mainly high-volatile A in rank. The FSI values range from 1.5 to 7.5, with a mean and mode of 3. Calorific values (air-dried) of the clean samples in Appendix 2 range from 30.03 to 34.17 megajoules per kilogram, with a mean of 31.12. Sulphur values in Merritt clean coals (Appendix 2) range from 0.49 to 0.83 per cent, with a mean of 0.67 per cent, with six of the nine samples having sulphur values between 0.5 and 0.75 per cent. There are only two petrographic analyses in Appendix 2, but these suggest that at least some Merritt coals are vitrinite rich.

SIMILKAMEEN COALFIELD

Tulameen Basin

Rank of coals in the Tulameen basin ranges from high-volatile C to high-volatile B bituminous (Williams and Ross, 1979), although vitrinite reflectance values as high 0.86 per cent (high-volatile A) have been reported. The three raw coal samples in Appendix 2, however, have calorific values (maf) typical of high-volatile C coals. These same samples have ash contents (air-dried) ranging from 33.9 to 46.7 per cent. Air-dried calorific values range form 14.79 to 17.98 megajoules per kilogram. The HGI values are less than 50, indicating a hard coal. Sulphur values range from 0.42 to 0.66 per cent.

Princeton Basin

Coal rank in the Princeton basin ranges from lignite to high-volatile B bituminous, with most of the former production from the sub-bituminous A to high-volatile C bituminous category (Smith, 1989). The two examples cited in Appendix 2 represent mine-run coal from two separate seams and collieries. Their rank appears to be sub-bituminous, based on calorific values (maf). Their ash values are low, moisture contents are high, and sulphur values are low.

VANCOUVER ISLAND COALFIELDS

Comox Coalfield

The Comox coalfield contains coals predominantly of high-volatile A and B bituminous rank (Smith, 1989), although local occurrences of coal of much higher rank, related to igneous activity, are known (Kenyon and Bickford, 1989). Values of calorific value (maf) in Appendix 2 confirm the general rank range. Quinsam coal product is a high-volatile thermal coal with 13.5 per cent ash and 1.0 per cent sulphur (Appendix 1).

The average ash content (air-dried) of the four raw coal samples from the Chute Creek exploration property that are in Appendix 2 is 24.8 per cent. The calorific values of the same four samples range from 18.69 to 25.60 kilojoules per kilogram. Sulphur values of the four Chute Creek samples range from low (0.47 per cent) to high (2.97 per cent).

Nanaimo Coalfield

The Nanaimo coalfield contains coals of high-volatile A and B bituminous rank (Smith, 1989; Kenyon and Bickford, 1989). Four of the five values cited in Appendix 2 represent four formerly productive seams, while the fifth set represents raw analyses for one seam, possibly the Wellington seam, on the Wolf Mountain exploration property. Calorific values (maf) for these five coals, together with vitrinite reflectance of the Wolf Mountain sample, confirm the rank range given above. Ash values (air-dried) of the five samples in Appendix 2 range from 10.5 to 19.3 per cent. Air-dried calorific values range from 26.38 to 28.19 megajoules per kilogram, and air-dried sulphur values range from 0.42 to 1.12 per cent. The vitrinite content of the Wolf Mountain sample is high (73.5 per cent, raw basis).

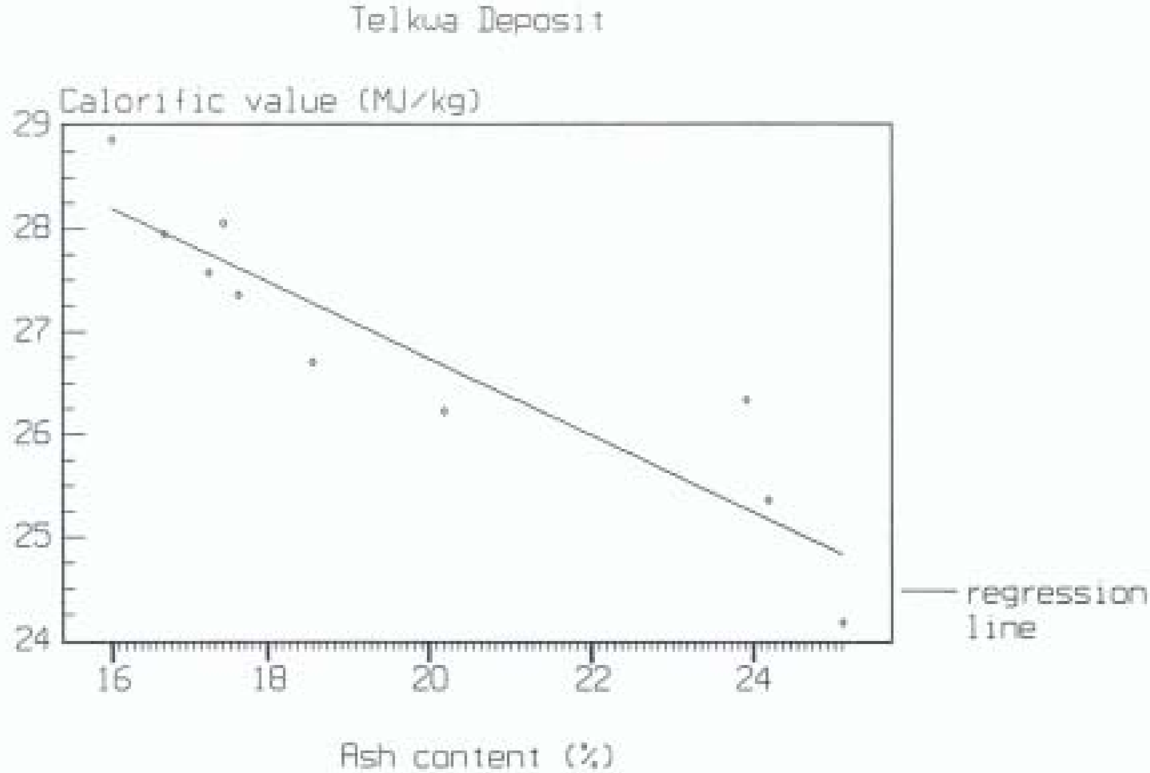


Figure 17. Relationship between calorific value and ash content (air-dried) for coals of the Telkwa deposit. All data are contained in Appendix 2, and represent weighted averages for each coal seam.

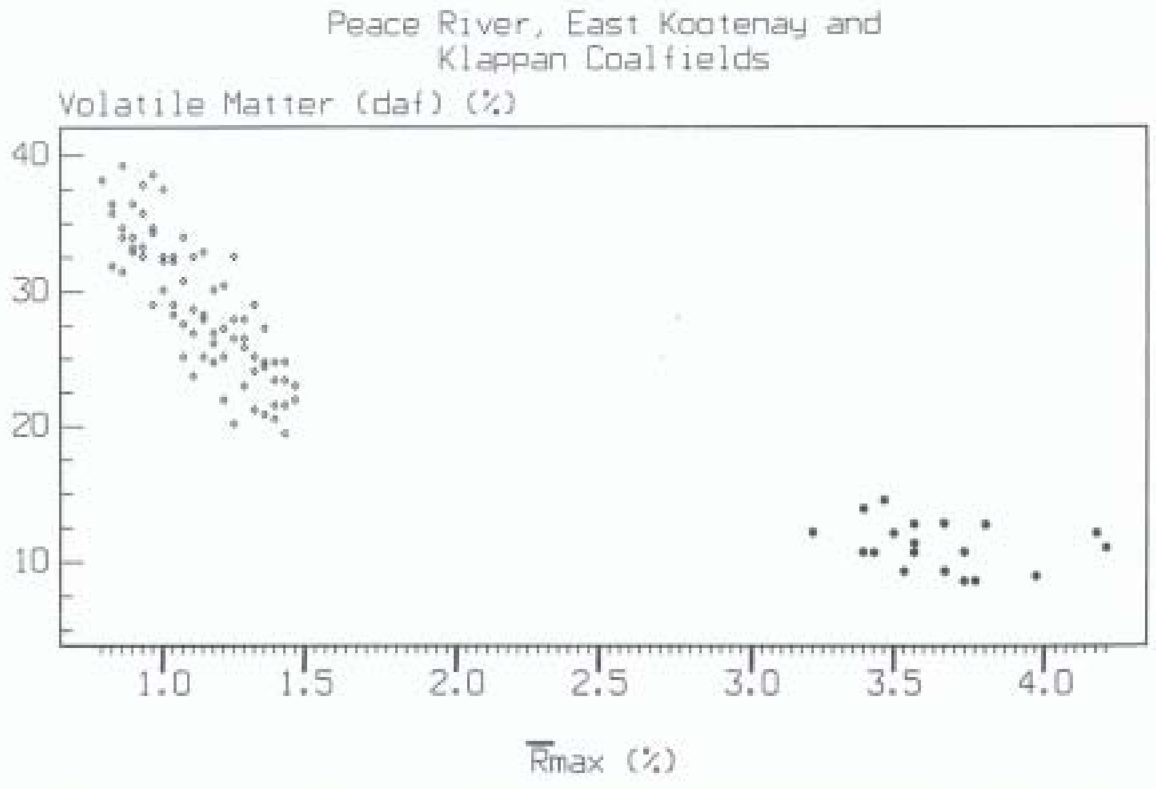


Figure 18. Relationship between volatile matter (daf) and mean maximum vitrinite reflectance for raw coals of the Peace River, East Kootenay and Klappan coalfields. All data are from assessment reports. Solid dots represent Klappan coals.

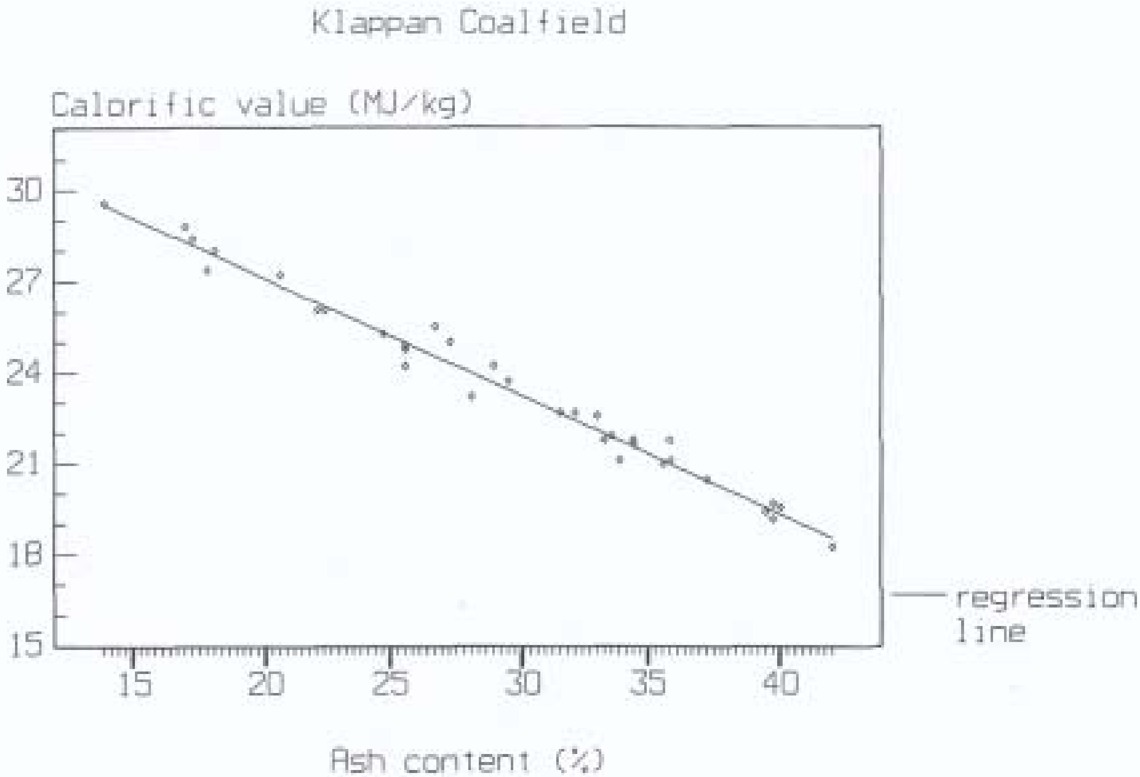


Figure 19. Relationship between calorific value and ash content (air-dried) for coals of the Klappan coalfield. All data are contained in Appendix 2.

TELKWA DEPOSIT

Data from the Telkwa deposit cited in Appendix 2 represent weighted averages of raw coal drill-core of each of seams 1 to 10. Based on proximate and calorific value determinations listed in Appendix 2, Telkwa coals are high-volatile A in rank. Ash values in these raw coals range from 16.0 to 25.1 per cent, with a mean of 19.7 per cent. Values of FSI range from 1.0 to 3.5, with a mean of 1.5 and a mode of 1.0. Calorific values in raw coal (air-dried) range from 24.13 to 28.87 megajoules per kilogram, with a mean of 26.84. Calorific value is inversely proportional ($r = -0.92$) to ash content (Figure 17). Sulphur values in Telkwa clean coals in Appendix 2 (air-dried), range from 0.65 to 2.07 per cent, with a mean of 1.17 per cent. Half of the samples have sulphur values less than 1 per cent.

KLAPPAN COALFIELD

Coals in the Klappan coalfield which are listed in Appendix 2, representing the Hobbit-Broatch and Lost-Fox deposits in the Mount Klappan area, are anthracitic in rank, based on vitrinite reflectance analysis. Variation of volatile matter (dry, ash-free) with vitrinite reflectance in raw Klappan coals is shown in Figure 18, together with the variation in the same parameters in raw Peace River and East Kootenay coals, for comparison. Raw ash contents (air-dried) in Appendix 2 range from less than 14 to greater than 42 per cent, with a mean of 29.5 per cent. Raw calorific value (air-dried) ranges from 18.09 to 29.56 megajoules per kilogram, with a mean of 23.41. Calorific value is inversely related ($r = -0.99$) to ash content (Figure 19), suggesting that ash content is the main factor controlling heat content of Klappan coals. The HGI values on raw coals range from 40 to 79, with a mean of 54. Sulphur values on raw coals range from 0.33 to 3.05 per cent, with a mean of 0.70 per cent. Over 70 per cent of the samples have sulphur values less than 0.75 per cent. Vitrinite contents of two of the samples from the Hobbit-Broatch area are in the neighbourhood of 50 per cent (raw basis).

BOWRON RIVER COALFIELD

Rank of Bowron River coals is in the high-volatile C and B bituminous range. Moist, ash-free calorific values (Appendix 2) confirm this. Values of ash in raw coals included in Appendix 2 range from 23.65 to 33.36 per cent (air-dried). Calorific values (also air-dried) range from 19.33 to 23.12 kilojoules per kilogram. Calorific value appears to increase with decreasing ash content. The HGI value of the one raw bulk sample included in Appendix 2 is 58. Sulphur values on the three raw core samples in Appendix 2 range from 1.11 to 1.22 per cent (air-dried).

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APPENDICES

APPENDIX 1

QUALITY OF BRITISH COLUMBIA COALS (MINE PRODUCTS)

LIST OF ABBREVIATIONS:

FSI	-	Free swelling index
HGI	-	Hardgrove grindability index

Listed in alphabetical order by property name. All data submitted by mining companies.

PROPERTY: BALMER
Region: East Kootenay
Company: Westar Mining Ltd.
Product name or designation: Balmer Met
Utilization: coke making

Proximate analysis
Basis of reporting: air dried
Moisture: 1.5%
Ash: 9.5 (0.5% tolerance)
Volatile matter: 21.0-24.0%
Fixed Carbon: 68.0-65.0%

Calorific value: 32.0 MJ/kg
7650 kcal/kg
13,800 BTU/lb
Basis of reporting: gross air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 82.00%
Hydrogen: 4.48%
Nitrogen: 1.10%
Sulphur: 0.40%
Oxygen: 2.32%

FSI: 6-8

HGI: 80-100

Partial ash analysis
SiO_2: 63.2%
Al_2O_3: 27.7%
Fe_2O_3: 2.5%
MgO: 0.4%
CaO: 1.9%
Na_2O: 0.1%
K_2O: 0.5%
P_2O_5: 0.8%

Other information: base/acid ratio 0.058

PROPERTY: BALMER
Region: East Kootenay
Company: Westar Mining Ltd.
Product name or designation: Balmer Thermal
Utilization: thermal

Proximate analysis
Basis of reporting: air dried
Moisture: 1.5%
Ash: %
Volatile matter: 19.5-23.5%
Fixed Carbon: 63.0-59.0%

Calorific value: 28.5 MJ/kg
6800 kcal/kg
12,200 BTU/lb
Basis of reporting: gross air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 73.10%
Hydrogen: 4.25%
Nitrogen: 1.12%
Sulphur: 0.51%
Oxygen: 4.74%

HGI: 90-100

Partial ash analysis
SiO_2: 61.0%
Al_2O_3: 27.3%
Fe_2O_3: 2.9%
MgO: 0.9%
CaO: 2.6%
Na_2O: 0.1%
K_2O: 0.8%
P_2O_5: 0.7%

Other information: base/acid ratio 0.081

PROPERTY: COAL MOUNTAIN COAL
Region: East Kootenay
Company: Byron Creek Collieries
Product name or designation: Thermal
Utilization: thermal power generation (domestic and export); smelting

Proximate analysis
Basis of reporting: as shipped
Moisture: 8.0%
Ash: 15.1%
Volatile matter: 22.6%
Fixed Carbon: 54.3%

Calorific value: 26.7 MJ/kg
6370 kcal/kg
11,500 BTU/lb
Basis of reporting: as shipped

Ultimate analysis
Basis of reporting: as shipped
Carbon: 66.3%
Hydrogen: 3.7%
Nitrogen: 0.6%
Sulphur: 0.3%
Oxygen: 5.96%

FSI: 1.5-2
HGI: 78

Partial ash analysis
SiO_2: 51.4%
Al_2O_3: 32.5%
Fe_2O_3: 2.8%
MgO: 1.2%
CaO: 5.3%
Na_2O: 1.0%
K_2O: 0.5%
P_2O_5: 0.4%

PROPERTY: COAL MOUNTAIN COAL
Region: East Kootenay
Company: Byron Creek Collieries
Product name or designation: Weak Coking Coal
Utilization: blend in coke making

Proximate analysis
Basis of reporting: as shipped
Moisture: 8.0%
Ash: 11.0%
Volatile matter: 21.5%
Fixed Carbon: 59.5%

Calorific value: 28.6 MJ/kg
6840 kcal/kg
12,300 BTU/lb
Basis of reporting: as shipped
Ultimate analysis
Basis of reporting: as shipped
Sulphur: 0.30%
FSI: 2.5-5
HGI: 78

PROPERTY: FORDING RIVER
Region: East Kootenay
Company: Fording Coal Limited
Product name or designation: Fording River Standard
Utilization: coke making

Proximate analysis
Basis of reporting: air dried
Residual moisture: 1.0%
Ash: 9.5 (0.5% tolerance)
Volatile matter: 21.0-24.0%
Fixed Carbon: 65.5-69.0%

Sulphur: 0.45% maximum

Calorific value: 35.8 MJ/kg
8550 kcal/kg
15,400 BTU/lb

Basis of reporting: dry, ash free

Ultimate analysis
Basis of reporting: air dried
Carbon: 80.56%
Hydrogen: 4.69%
Nitrogen: 1.21%
Sulphur: 0.40%
Oxygen: 3.14%

FSI: 6-8

HGI: 82

Partial ash analysis
SiO_2: 58.20%
Al_2O_3: 30.58%
Fe_2O_3: 3.86%
MgO: 0.50%
CaO: 1.96%
Na_2O: 0.08%
K_2O: 0.82%
P_2O_5: 1.52%

Other information: base/acid ratio 0.08

PROPERTY: FORDING RIVER
Region: East Kootenay
Company: Fording Coal Limited
Product name or designation: Fording River Medium Volatile
Utilization: coke making

Proximate analysis
Basis of reporting: air dried
Residual moisture: 1.0%
Ash: 8.0 (0.5% tolerance)
Volatile matter: 26.0-29.0%
Fixed Carbon: 61.0-64.0%

Sulphur: 0.70% maximum

Calorific value: 35.6 MJ/kg
8500 kcal/kg
15,300 BTU/lb
Basis of reporting: dry, ash free

Ultimate analysis
Basis of reporting: air dried
Carbon: 79.70%
Hydrogen: 4.78%
Nitrogen: 1.42%
Sulphur: 0.68%
Oxygen: 4.05%

FSI: 6-8

HGI: 78

Partial ash analysis
SiO_2: 61.51%
Al_2O_3: 27.75%
Fe_2O_3: 3.20%
MgO: 0.55%
CaO: 1.86%
Na_2O: 0.07%
K_2O: 1.34%
P_2O_5: 1.68%

Other information: base/acid ratio 0.07

PROPERTY: FORDING RIVER
Region: East Kootenay
Company: Fording Coal Limited
Product name or designation: Fording River High Volatile
Utilization: coke making

Proximate analysis
Basis of reporting: air dried
Residual moisture: 1.0%
Ash: 6.5 (0.5% tolerance)
Volatile matter: 29.0-32.0%
Fixed Carbon: 60.0-63.0%

Sulphur: 0.60% maximum

Calorific value: 35.2 MJ/kg
8400 kcal/kg
15,100 BTU/lb
Basis of reporting: dry, ash free

Ultimate analysis
Basis of reporting: air dried
Carbon: 80.34%
Hydrogen: 5.15%
Nitrogen: 1.40%
Sulphur: 0.53%
Oxygen: 5.48%

FSI: 6-8

HGI: 68

Partial ash analysis
SiO_2: 61.35%
Al_2O_3: 26.10%
Fe_2O_3: 4.30%
MgO: 0.88%
CaO: 1.96%
Na_2O: 0.09%
K_2O: 1.47%
P_2O_5: 1.50%

Other information: base/acid ratio 0.11

PROPERTY: GREENHILLS
Region: East Kootenay
Company: Westar Mining Ltd.
Product name or designation: Greenhills Standard Met
Utilization: coke making

Proximate analysis
Basis of reporting: air dried
Moisture: 1.5%
Ash: 7.0% (0.50% tolerance)
Volatile matter: 25.5-29.0%
Fixed Carbon: 62.5-66.0%

Calorific value: 32.9 MJ/kg
7850 kcal/kg
14,100 BTU/lb
Basis of reporting: gross, air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 81.97%
Hydrogen: 4.89%
Nitrogen: 1.40%
Sulphur: 0.55%
Oxygen: 4.03%

FSI: 6-8

HGI: 85-95

Partial ash analysis
SiO_2: 56.9%
Al_2O_3: 30.5%
Fe_2O_3: 4.4%
MgO: 0.7%
CaO: 2.0%
Na_2O: 0.1%
K_2O: 0.8%
P_2O_5: 2.1%

Other information: dilatation, 40-70; fluidity, 200-600; Ro, 1.00.

PROPERTY: GREENHILLS
Region: East Kootenay
Company: Westar Mining Ltd.
Product name or designation: Greenhills Thermal
Utilization: thermal

Proximate analysis
Basis of reporting: air dried
Moisture: 1.5%
Ash: 16.0% (1% tolerance)
Volatile matter: 27.0% (1.5% tolerance)
Fixed Carbon: 55.5%

Calorific value: 28.5 MJ/kg
6800 kcal/kg
12,200 BTU/lb
Basis of reporting: gross, air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 72.65%
Hydrogen: 4.35%
Nitrogen: 1.20%
Sulphur: 0.55%
Oxygen: 5.25%

FSI: 0-3

HGI: 80-110

Partial ash analysis
SiO_2: 57.1%
Al_2O_3: 27.8%
Fe_2O_3: 6.5%
MgO: 0.5%
CaO: 2.0%
Na_2O: 0.1%
K_2O: 1.4%
P_2O_5: 1.5%

PROPERTY: QUINSAM MINE
Region: Vancouver Island
Company: Brinco Coal Mining Corporation
Product name or designation: Quinsam Coal
Utilization: thermal

Proximate analysis
Basis of reporting: air dried
Moisture: 3.0% (average)
Ash: 13.5%
Volatile matter: 36.5%
Fixed Carbon: 47.0%

Calorific value: 27.2 MJ/kg
6500 kcal/kg
11,700 BTU/lb
Basis of reporting: gross air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 70.1%
Hydrogen: 4.6%
Nitrogen: 0.9%
Sulphur: 1.0%
Oxygen: 9.5%

HGI: 48

Partial ash analysis (typical result)
SiO_2: 38.5%
Al_2O_3: 27.3%
Fe_2O_3: 10.7%
MgO: 0.3%
CaO: 16.6%
Na_2O: 0.2%
K_2O: 0.1%
P_2O_5: 0.6%

PROPERTY: QUINTETTE
Region: Peace River
Company: Quintette Coal Limited
Product name or designation: Quintette Metallurgical Coal
Utilization: coke making (Japanese steel industry)

Proximate analysis
Basis of reporting: average, air dried
Moisture: 0.75%
Ash: 9.5%
Volatile matter: 22.9%
Fixed Carbon: 66.8%

Calorific value: 32.4 MJ/kg
7745 kcal/kg
13,940 BTU/lb
Basis of reporting: air dried

Ultimate analysis
Basis of reporting: dry
Carbon: 82%
Hydrogen: 4.3%
Nitrogen: 0.8%
Sulphur: 0.4% (air dried)
Oxygen: 3.0%

FSI: 7
HGI: 82

Partial ash analysis
SiO_2: 60%
Al_2O_3: 22%
Fe_2O_3: 4.5%
MgO: 1.5%
CaO: 4.0%
Na_2O: 0.5%
K_2O: 1.2%
P_2O_5: 0.75%

APPENDIX 2

QUALITY OF BRITISH COLUMBIA COALS (NON-PRODUCING PROPERTIES)

LIST OF ABBREVIATIONS

DAF	-	Dry, ash-free basis
FSI	-	Free swelling index
MAB	-	Moist, ash-free basis
R_{max}	-	Mean maximum vitrinite reflectance
A.R.	-	Assessment report
DM	-	Drill-hole
AD	-	Air-dried basis
AR	-	As-received basis
MMMB	-	Moist, mineral matter free basis
CAL.	-	Calorific
VAL.	-	Value

Table Item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	*Raw/ clean*
1	Nanaimo	*South Wellington*	#10 Mine	Dickson	Nanaimo	Douglas			Mine-run	1.00	19.30	25.30	54.40	ad	31.74		
2	Nanaimo	*Western Fuel Corp.*	#1 Mine	Dickson	Nanaimo	Newcastle			Lump	0.20	10.50	33.50	54.00	ad	38.29		
3	Nanaimo	*Beban Mine*	Extension	Dickson	Nanaimo	Wellington			Mine-run	0.60	15.20	31.90	52.30	ad	37.89		
4	Nanaimo	*Northfield Mine*		Dickson	Nanaimo	Little Wellington			Mine-run	0.80	13.00	34.30	51.90	ad	39.79		
5	Nanaimo	*Wolf Mtn.*		A.R. 177	Nanaimo	W1 (Wellington?)	Core, raw	91.9	DH-82-02A	2.25	14.89	36.93	45.93	ad	44.57		
6	Comox		#5 Mine	Dickson	Nanaimo	2			Mine-run	1.10	17.60	25.50	55.80	ad	31.37		
7	Comox	*Chute Creek*		A.R. 701	Nanaimo	A (main)	Core, raw	100.0	DH-85-20	3.53	19.02	32.42	45.03	ad	41.86		
8	Comox	*Chute Creek*		A.R. 701	Nanaimo	B	Core, raw	92.9	DH-85-27	2.75	36.80	28.71	31.74	ad	47.49		
9	Comox	*Chute Creek*		A.R. 701	Nanaimo	C	Core, raw	100.0	DH-85-26	2.71	19.42	34.03	43.84	ad	43.70		
10	Comox	*Chute Creek*		A.R. 701	Nanaimo	D	Core, raw	100.0	DH-85-27	3.25	24.00	28.02	44.73	ad	38.52		
11	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	1	Core, raw		Weighted avg.	0.84	23.94	24.73	51.32	ad	32.52	3.5	clean
12	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	2	Core, raw		Weighted avg.	1.09	24.22	25.37	47.56	ad	34.79	1.0	clean
13	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	3	Core, raw		Weighted avg.	0.99	25.14	24.10	46.20	ad	34.28	1.0	clean
14	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	4	Core, raw		Weighted avg.	1.02	17.60	26.80	53.54	ad	33.36	2.0	clean
15	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	5	Core, raw		Weighted avg.	1.16	17.29	25.59	54.34	ad	32.02	1.0	clean
16	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	6	Core, raw		Weighted avg.	1.21	20.13	25.28	51.04	ad	33.12	1.0	clean
17	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	7	Core, raw		Weighted avg.	1.14	18.50	26.24	51.21	ad	33.88	1.5	clean
18	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	8	Core, raw		Weighted avg.	1.21	16.74	26.44	54.43	ad	32.69	1.0	clean
19	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	9	Core, raw		Weighted avg.	1.06	16.03	30.02	50.92	ad	37.09	1.5	clean
20	Telkwa	*Telkwa*	Goathorn East	A.R. 239	Skeena	10	Core, raw		Weighted avg.	1.06	17.46	28.00	50.02	ad	35.89	2.0	clean
21	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	A	Core, raw	100.0	DH-82006	0.75	17.19	8.54	73.52	ad	10.41		
22	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	B	Core, raw	78.0	DH-82006	0.86	28.83	7.39	62.92	ad	10.51		
23	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	C	Core, raw	100.0	DH-82002	1.48	25.67	7.77	65.08	ad	10.67		
24	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	D	Core, raw	89.8	DH-82006	1.57	35.78	7.40	55.25	ad	11.81		
25	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	D	Core, raw	86.8	DH-82002	1.14	25.63	9.22	64.01	ad	12.59		
26	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	E	Core, raw	89.1	?	1.34	27.16	7.94	63.56	ad	11.10		
27	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	G	Core, raw	84.5	DH-82001	1.85	32.05	7.40	58.70	ad	11.20		
28	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	G upper	Core, raw	94.7	?	1.43	25.59	7.75	65.23	ad	10.62		
29	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	H	Core, raw	96.5	DH-82002	1.77	40.16	7.19	50.88	ad	12.38		
30	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	I	Core, raw	79.9	DH-82003	1.50	34.27	7.82	56.41	ad	12.17		
31	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	I lower	Core, raw	85.9	DH-82001	1.63	16.91	6.99	74.47	ad	8.58		
32	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	I upper	Core, raw	91.7	DH-82001	2.04	18.01	7.25	72.70	ad	9.07		
33	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	J	Core, raw	100.0	DH-82001	1.13	22.07	9.05	67.75	ad	11.78		
34	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	K	Core, raw	68.1	DH-82001	1.75	28.02	8.78	61.45	ad	12.50		
35	Klappan		Hobbit-Broach	A.R. 695	Bowser Lake	K	Core, raw	76.4	DH-82003	1.67	35.46	7.80	55.07	ad	12.41		
36	Klappan		Lost-Fox	A.R. 707	Bowser Lake	D	Core, raw	100.0	DH-85016	0.81	33.33	7.56	58.30	ad	11.48		
37	Klappan		Lost-Fox	A.R. 707	Bowser Lake	E	Core, raw	86.3	DH-85004	1.00	13.76	6.68	78.56	ad	7.84		
38	Klappan		Lost-Fox	A.R. 707	Bowser Lake	E	Core, raw	95.3	DH-85016	0.88	18.24	7.32	73.56	ad	9.05		
39	Klappan		Lost-Fox	A.R. 707	Bowser Lake	F	Core, raw	90.8	DH-85004	2.89	42.15	5.87	49.09	ad	10.68		
40	Klappan		Lost-Fox	A.R. 707	Bowser Lake	F	Core, raw	86.9	DH-85014	1.23	35.85	6.59	56.33	ad	10.47		

Table Item	Calorific Value (MJ/kg)	(kcal/kg)	(BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	*Raw/ clean*	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	*Raw/ clean*
1	26.38	6300	11340	ad	14052					0.45				ad					
2	27.40	6544	11780	ad	13432					1.12				ad					
3	28.01	6689	12040	ad	14198					0.51				ad					
4	28.19	6733	12120	ad	13931					0.74				ad					
5	28.12	6717	12090	ad	14205				14.89	0.42	71.71	5.57	6.08	ad	0.74	73.50	2.20	12.20	raw
6	28.91	6906	12430	ad	15085					2.80				ad					
7	25.27	6035	10860	ad	13411					0.95				ad					
8	18.69	4463	8033	ad	12710					0.73				ad					
9	25.60	6113	11000	ad	13651					2.97				ad					
10	23.58	5630	10130	ad	13329					0.47				ad					
11	26.31	6285	11310	ad	14709					0.85				ad, clean					
12	25.36	6059	10900	ad	14726					0.81				ad, clean					
13	24.13	5764	10380	ad	14580					1.22				ad, clean					
14	27.33	6528	11750	ad	14442					0.96				ad, clean					
15	27.57	6586	11850	ad	14613					0.65				ad, clean					
16	26.20	6258	11260	ad	14523					0.88				ad, clean					
17	26.70	6378	11480	ad	14607					1.32				ad, clean					
18	27.93	6671	12010	ad	14632					1.15				ad, clean					
19	28.87	6896	12410	ad	15134					1.75				ad, clean					
20	28.02	6693	12050	ad	15238					2.07				ad, clean					
21	28.33	6770	12180	ad	14708	59	raw	0.75	17.19	0.48	75.33	2.62	2.62	ad	3.72				
22	24.15	5768	10380	ad	14585	43	raw	0.86	28.83	3.05	63.00	2.26	1.31	ad	3.55				
23	24.66	5890	10600	ad	14261	43	raw	1.48	25.67	0.51	66.07	2.13	3.21	ad	3.55				
24	21.06	5030	9050	ad	14092	43	raw	1.57	35.78	0.42	57.37	2.42	1.75	ad	3.79				
25	24.85	5935	10680	ad	14361	55	raw	1.14	25.63	0.59	66.90	2.58	2.39	ad					
26	24.93	5954	10720	ad	14717	61	raw	1.34	27.16	0.56	65.51	2.23	2.40	ad	3.56				
27	22.61	5400	9720	ad	14305	47	raw	1.85	32.05	0.87	59.71	2.09	2.84	ad	3.65	51.20	0.00	28.10	raw
28	24.09	5754	10360	ad	13923	43	raw	1.43	25.59	0.65	66.32	2.70	2.41	ad	3.37				
29	19.47	4650	8370	ad	13987	46	raw	1.77	40.16	1.26	52.07	1.86	2.27	ad	3.54				
30	21.60	5159	9290	ad	14134	61	raw	1.50	34.27	1.00	58.06	2.16	2.15	ad	3.27				
31	28.73	6862	12350	ad	14863	40	raw	1.63	16.91	0.47	74.95	2.41	2.71	ad	3.76				
32	27.30	6521	11740	ad	14319	67	raw	2.04	18.01	0.47	73.17	2.26	3.33	ad	3.52	46.10	0.00	40.50	raw
33	26.03	6217	11190	ad	14359			1.13	22.07	0.63	69.33	2.39	3.64	ad	3.47				
34	23.09	5515	9930	ad	13795	45	raw	1.75	28.02	0.54	65.72	2.42	0.69	ad	3.54				
35	20.93	5000	9000	ad	13945	57	raw	1.67	35.46	0.60	57.73	2.16	1.66	ad	3.36				
36	21.71	5185	9330	ad	13994	55	raw	0.81	33.33	0.35	61.44	2.07	1.44	ad					
37	29.56	7060	12710	ad	14738	59	raw	1.00	13.76	0.46	80.11	2.89	0.96	ad					
38	27.95	6676	12020	ad	14702	45	raw	0.88	18.24	0.42	73.43	2.48	3.72	ad					
39	18.09	4321	7780	ad	13449	58	raw	2.89	42.15	1.07	46.94	1.67	4.72	ad					
40	21.66	5173	9310	ad	14513	49	raw	1.23	35.85	0.47	57.55	1.89	2.39	ad					

Table item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	*Raw/ clean*
41	Klappan		Lost-Fox	A.R. 707	Bowser Lake	G	Core, raw	96.8	DH-85001	0.96	39.68	6.05	51.31	ad	13.56		
42	Klappan		Lost-Fox	A.R. 707	Bowser Lake	H	Core, raw	90.6	DH-85001	1.20	29.45	6.66	62.69	ad	9.60		
43	Klappan		Lost-Fox	A.R. 707	Bowser Lake	H	Core, raw	97.9	DH-85013	1.31	33.85	7.89	56.95	ad	12.17		
44	Klappan		Lost-Fox	A.R. 707	Bowser Lake	I	Core, raw	100.0	DH-85001	0.95	20.85	6.35	71.85	ad	8.12		
45	Klappan		Lost-Fox	A.R. 707	Bowser Lake	I	Core, raw	93.6	DH-85016	1.75	24.55	7.12	66.58	ad	9.66		
46	Klappan		Lost-Fox	A.R. 707	Bowser Lake	K	Core, raw	100.0	DH-85005	2.65	22.46	5.73	69.16	ad	7.65		
47	Klappan		Lost-Fox	A.R. 707	Bowser Lake	K	Core, raw	85.7	DH-85009	1.70	31.53	7.65	59.12	ad	11.46		
48	Klappan		Lost-Fox	A.R. 707	Bowser Lake	L	Core, raw	94.8	DH-85027	0.95	39.36	9.48	50.21	ad	15.88		
49	Klappan		Lost-Fox	A.R. 707	Bowser Lake	L	Core, raw	100.0	DH-85005	0.86	34.45	6.05	58.64	ad	9.35		
50	Klappan		Lost-Fox	A.R. 707	Bowser Lake	M	Core, raw	83.6	DH-85009	0.84	33.63	10.03	55.50	ad	15.31		
51	Klappan		Lost-Fox	A.R. 707	Bowser Lake	M upper	Core, raw	100.0	DH-85027	1.10	32.86	6.46	59.58	ad	9.78		
52	Klappan		Lost-Fox	A.R. 707	Bowser Lake	N	Core, raw	90.9	DH-85027	1.09	37.31	7.40	54.20	ad	12.01		
53	Klappan		Lost-Fox	A.R. 707	Bowser Lake	O	Core, raw	91.1	DH-85027	0.99	39.72	5.86	53.43	ad	9.88		
54	Klappan		Lost-Fox	A.R. 707	Bowser Lake	O	Core, raw	75.8	DH-85005	0.76	26.70	5.80	66.74	ad	8.00		
55	E. Kootenay	*Sage Creek*	South Hill	A.R. 365	Mist Mountain	5	Bulk, raw		Adit 73-5A-S	1.00	36.60	19.80	42.10	ad	31.99	2.5	raw
56	E. Kootenay	*Sage Creek*	North Hill	A.R. 365	Mist Mountain	4 lower	Bulk, raw		Adit 72-4-N	1.20	26.90	20.40	51.00	ad	28.57	2.0	raw
57	E. Kootenay	*Sage Creek*	North Hill	A.R. 365	Mist Mountain	4 upper	Bulk, raw		Adit 72-4-N	1.40	19.70	22.80	56.50	ad	28.75	2.5	raw
58	E. Kootenay	*Sage Creek*	North Hill	A.R. 365	Mist Mountain	2	Bulk, raw		Adit 72-2-N	0.90	20.70	21.10	56.50	ad	27.19	5.5	raw
59	E. Kootenay	*Lodgepole*		A.R. 428	Mist Mountain	1	Bulk, raw		Adit LP-1	0.80	37.40	16.20	45.60	ad	26.21	1.0	raw
60	E. Kootenay	*Lodgepole*		A.R. 428	Mist Mountain	2	Bulk? raw		?	0.90	24.90	16.20	58.00	ad	21.83	3.0	raw
61	E. Kootenay	*Dominion Coal Block*	Parcel 82, Morrissey Creek	A.R. 292	Mist Mountain	K1	Bulk, clean		Adit K1 lower	1.20	8.50	14.50	75.80	ad	16.06	3.5	clean
62	E. Kootenay	*Dominion Coal Block*	Parcel 82, Morrissey Creek	A.R. 292	Mist Mountain	K5	Bulk, clean		Adit K5 upper	1.00	8.90	16.20	74.00	ad	17.96	4.5	clean
63	E. Kootenay	*Dominion Coal Block*	Parcel 82, Flathead	A.R. 292	Mist Mountain	A	Bulk, clean		Adit TA-1	1.40	4.60	21.00	73.00	ad	22.34	7.5	clean
64	E. Kootenay	*Dominion Coal Block*	Parcel 82, Flathead	A.R. 292	Mist Mountain	B	Bulk, clean		Adit TB-6	1.80	6.80	23.20	68.20	ad	25.38	8.5	clean
65	E. Kootenay	*Dominion Coal Block*	Parcel 82, Flathead	A.R. 292	Mist Mountain	B	Bulk, clean		Adit TB-3	1.30	6.00	20.80	71.90	ad	22.44	7.5	clean
66	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	10	Bulk, raw		Adit 4	1.60	27.50	21.80	49.10	ad	30.75	5.5	raw
67	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	10 upper	Bulk, raw		Adit 4	1.70	19.20	24.20	54.90	ad	30.59	6.5	raw
68	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	9 lower	Bulk, raw		Adit 2	0.90	17.40	26.50	55.20	ad	32.44	4.0	raw
69	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	9 middle	Bulk, raw		Adit 1	1.60	26.50	23.80	48.10	ad	33.10	3.0	raw
70	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	9 upper	Bulk, raw		Adit 3	2.20	13.80	24.50	59.50	ad	29.17	5.0	raw

Table Item	Calorific Value (MJ/kg)	Calorific Value (kcal/kg)	Calorific Value (BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	Raw/clean	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	Raw/clean
41	19.01	4540	8170	ad	13544	61	raw	0.96	39.68	0.37	52.82	1.86	3.64	ad					
42	23.65	5645	10170	ad	14415	48	raw	1.20	29.45	0.33	63.26	2.07	3.07	ad					
43	21.04	5025	9050	ad	13681	48	raw	1.31	33.85	0.62	58.47	1.78	3.29	ad					
44	27.12	6478	11660	ad	14732	48	raw	0.95	20.85	0.38	70.66	2.19	4.12	ad					
45	25.23	6026	10850	ad	14380	67	raw	1.75	24.55	0.37	67.62	2.29	2.55	ad					
46	25.93	6193	11150	ad	14380	47	raw	2.65	22.46	0.50	68.08	2.26	3.48	ad					
47	22.57	5391	9700	ad	14167	51	raw	1.70	31.53	0.45	61.75	2.15	1.65	ad					
48	19.38	4629	8330	ad	13737	75	raw	0.95	39.36	0.35	51.95	1.59	5.21	ad					
49	21.67	5176	9320	ad	14218	79	raw	0.86	34.45	1.36	57.42	1.75	3.47	ad					
50	21.82	5212	9380	ad	14133	58	raw	0.84	33.63	0.78	58.15	2.49	3.43	ad					
51	22.50	5374	9670	ad	14403	58	raw	1.10	32.86	0.41	60.71	2.02	2.07	ad					
52	20.35	4861	8750	ad	13958	54	raw	1.09	37.31	1.09	55.64	1.79	2.33	ad					
53	19.61	4684	8430	ad	13985	50	raw	0.99	39.72	1.50	50.70	1.62	4.72	ad					
54	25.39	6064	10920	ad	14898	53	raw	0.76	26.70	0.54	65.27	2.11	3.69	ad					
55										0.53				ad					
56										0.56				ad					
57										0.48				ad					
58										0.83				ad					
59	21.09	5038	9068	ad	14486					0.37				ad					
60	26.20	6257	11262	ad	14996					0.45				ad					
61	32.78	7830	14090	ad	15399			0.00	8.50	0.60	83.10	4.00	2.50	dry					
62	32.49	7760	13970	ad	15318			0.00	8.90	0.60	82.60	4.00	2.60	dry					
63	34.12	8150	14670	ad	15377			0.00	4.60	0.40	85.50	4.80	3.50	dry		63.00	0.00		clean
64	33.08	7900	14220	ad	15258			0.00	6.80	0.40	79.80	4.90	6.70	dry		86.90	0.00		clean
65	33.75	8060	14510	ad	15436			0.00	6.00	0.50	84.40	4.50	3.40	dry		73.40	0.00		clean
66										0.69				ad, clean					
67										0.56				ad, clean					
68										0.33				ad, clean					
69										0.39				ad, clean					
70										0.30				ad, clean					

Table Item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	Raw/ clean
71	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	8	Bulk, raw		Adit 6	1.40	13.00	25.70	59.90	ad	30.02	3.5	raw
72	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	7	Bulk, raw		Adit 10	1.60	25.20	25.10	48.10	ad	34.29	2.0	raw
73	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	5	Bulk, raw		Adit 13	1.00	15.70	26.70	56.60	ad	32.05	2.5	raw
74	E. Kootenay	*Dominion Coal Block*	Parcel 73	Co. rpt.	Mist Mountain	4	Bulk, raw		Adit 8	2.70	20.60	26.00	50.70	ad	33.90	2.5	raw
75	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	10	Bulk, raw		Adit 21	1.40	15.80	25.90	56.90	ad	31.28	2.5	raw
76	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	9 lower	Bulk, raw		Adit 23	1.50	18.70	26.40	46.60	ad	36.16	5.5	raw
77	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	9	Bulk, raw		Adit 23	1.20	23.60	26.20	49.00	ad	34.84	4.5	raw
78	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	8	Bulk, raw		Adit 19	1.40	14.50	26.00	58.10	ad	30.92	2.0	raw
79	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	7	Bulk, raw		Adit 22	1.20	31.80	23.80	43.20	ad	35.52	2.5	raw
80	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt. Co. rpt.	Mist Mountain	5	Bulk, raw		Adit 17	1.70	22.00	24.80	51.50	ad	32.50	1.5	raw
81	E. Kootenay	*Hosmer-Wheeler*	Hosmer Ridge	Co. rpt.	Mist Mountain	4	Bulk, raw		Adit 25	2.00	23.40	24.60	50.00	ad	32.98	2.5	raw
82	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	3	Bulk, raw		Adit 20	1.80	15.40	28.80	54.00	ad	34.78	6.0	raw
83	E. Kootenay	*Hosmer-Wheeler*	Hosmer Ridge	Co. rpt.	Mist Mountain	3	Bulk, raw		Adit 11	2.00	7.00	31.30	59.70	ad	34.40	7.5	raw
84	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	2	Bulk, raw		Adit 15	2.60	33.50	24.00	39.90	ad	37.56	3.0	raw
85	E. Kootenay	*Hosmer-Wheeler*	Wheeler Ridge	Co. rpt.	Mist Mountain	1	Bulk, raw		Adit 16	2.20	23.30	27.00	47.50	ad	36.24	1.0	raw
86	E. Kootenay	*Ewin Pass*		A.R. 396&397	Mist Mountain	8	Channel, raw		Adit 3	0.86	18.29	28.80	52.05	ad	35.62	5.0	clean
87	E. Kootenay	*Ewin Pass*		A.R. 396	Mist Mountain	7	Channel, raw?		Adit 1	0.62	7.87	27.23	64.28	ad	29.76	7.5	raw?
88	E. Kootenay	*Ewin Pass*		A.R. 398	Mist Mountain	5	Bulk, raw?		Adit 4	1.20	8.70	26.30	63.80	ad	29.19	8.5	raw?
89	E. Kootenay	*Ewin Pass*		A.R. 396&397	Mist Mountain	4	Channel, raw?		Adit 2	0.60	6.47	27.16	65.77	ad	29.23	7.5	raw
90	E. Kootenay	*Elk River*	?	A.R. 274	Morrissey	1	Core, raw	100.0	DH-EB-53	0.60	25.70	18.30	55.40	ad	24.83	9.0	clean
91	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	2	Channel, raw		Adit 2	0.00	31.20	16.00	52.80	dry	23.26	8.0	clean
92	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	3	Channel, raw		Adit 3	0.00	30.20	14.40	55.40	dry	20.63	8.5	clean
93	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	4	Channel, raw		Adit 4	0.00	26.70	14.60	58.70	dry	19.92	1.0	clean
94	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	4A	Channel, raw		Adit 4	0.00	35.50	13.70	50.80	dry	21.24	7.0	clean
95	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	6	Channel, raw		Adit 27	0.00	16.30	16.60	67.10	dry	19.83	3.5	clean
96	E. Kootenay	*Elk River*	Weary Ridge	A.R. 274	Mist Mountain	7	Core, raw	75.0	DH-EB-31	0.60	21.90	15.90	61.60	ad	20.52	2.5	clean
97	E. Kootenay	*Elk River*	?	A.R. 274	Mist Mountain	8	Channel, raw		Adit 8	0.00	30.19	15.10	54.71	dry	21.63	6.0	clean?
98	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	9	Channel, raw		Adit 9	0.00	24.94	16.00	59.06	dry	21.32	3.0	clean
99	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	10	Channel, raw		Adit 10	0.00	25.40	17.60	57.00	dry	23.59	6.0	clean
100	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	12	Channel, raw		Trench EB-T16	0.00	39.51	16.20	44.29	dry	26.78	8.0	clean

Table Item	Calorific Value (MJ/kg)	(kcal/kg)	(BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	Raw/clean	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	Raw/clean
71																			
72																			
73																			
74										0.39				ad, clean					
75										0.32				ad, clean					
76										0.41				ad, clean					
77										0.44				ad, clean					
78										0.32				ad, clean					
79										0.42				ad, clean					
80										0.37				ad, clean					
81										0.45				ad, clean					
82										0.66				ad, clean					
83										0.38				ad, clean					
84																			
85										0.48				ad, clean					
86										0.56				ad, clean					
87										0.51				ad, clean					
88	33.94	8107	14590	ad, clean						0.63				ad					
89										0.40				ad					
90						89	raw			1.73				dry					
91	23.37	5582	10050	dry		94	raw			0.47				dry	1.47	33.00	0.00		clean
92	24.23	5787	10416	dry		112	raw			0.45				dry	1.53	60.00	0.00		clean
93	25.16	6010	10820	dry		98	raw			0.36				dry	1.44	39.00	0.00		clean
94	22.00	5254	9460	dry		95	raw			0.49				dry	1.45	60.00	1.00		clean
95	29.13	6958	12520	dry		92	raw			0.69				dry	1.44	31.00	0.00		clean
96						101	raw			0.52				dry					
97	24.04	5742	10336	dry		89	raw			0.39				dry	1.45	55.00	0.00		clean
98	25.76	6152	11070	dry		80	raw			0.38				dry	1.41	45.00	0.00		clean
99	25.33	6050	10890	dry		81	raw			0.41				dry	1.32	57.00	0.00		clean
100	20.26	4839	8710	dry		79	raw			0.67				dry	1.31	75.00	1.00		clean

Table Item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	Raw/ clean
101	E. Kootenay	*Elk River*	Little Weary Ridge	A.R. 274	Mist Mountain	13	Core, raw	98.0	DH-EB-6	1.10	27.40	21.40	50.20	ad	29.89	8.5	clean
102	E. Kootenay	*Elk River*	Little Weary Ridge	A.R. 274	Mist Mountain	14	Core, raw	100.0	DH-EB-14	1.00	27.00	17.40	54.60	ad	24.17	8.5	clean
103	E. Kootenay	*Elk River*	Weary Ridge	A.R. 274	Mist Mountain	15	Core, raw		DH-EB-39	1.00	7.50	26.50	65.00	ad	28.96	9.0	clean
104	E. Kootenay	*Elk River*	?	A.R. 274	Mist Mountain	16	Core, raw	100.0	DH-EB-12	1.50	15.30	24.30	58.90	ad	29.21	8.5	clean
105	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	17	Channel, raw		Trench EB-T17	0.00	17.90	26.30	55.80	dry	32.03	8.0	clean
106	E. Kootenay	*Elk River*	Proposed Elco mine-site	A.R. 274	Mist Mountain	18	Channel, raw		Trench EB-T17	0.00	30.20	25.10	44.70	dry	35.96	6.0	clean
107	Peace River	*Carbon Creek*		A.R. 495	Gething	14	Core, raw		DH-71-1	1.08	14.35	19.71	64.86	ad	23.31	4.0	raw
108	Peace River	*Carbon Creek*		A.R. 496	Gething	14	Core, raw		DH-72-14	1.35	7.58	19.03	72.04	ad	20.90	2.0	raw
109	Peace River	*Carbon Creek*		A.R. 495	Gething	15	Core, raw		DH-71-1	1.28	5.21	20.96	72.55	ad	22.41	2.0	raw
110	Peace River	*Carbon Creek*		A.R. 496	Gething	15	Core, raw		DH-72-14	0.98	9.65	21.36	68.01	ad	23.90	4.5	raw
111	Peace River	*Carbon Creek*		A.R. 495	Gething	31	Core, raw		DH-71-3	1.55	14.76	23.41	60.28	ad	27.97	7.0	raw
112	Peace River	*Carbon Creek*		A.R. 495	Gething	31	Core, raw		DH-71-9	1.72	36.55	18.97	42.76	ad	30.73	4.5	raw
113	Peace River	*Carbon Creek*		A.R. 504	Gething	40	Core, raw	99.0	DH-81-89	2.38	10.81	28.02	58.79	ad	32.28	6.0	raw
114	Peace River	*Carbon Creek*		A.R. 504	Gething	40	Core, raw	100.0	DH-81-90	2.64	8.06	27.45	61.85	ad	30.74	6.0	raw
115	Peace River	*Carbon Creek*		A.R. 504	Gething	46	Core, raw		DH-81-88	2.59	17.04	22.69	57.68	ad	28.23	2.5	raw
116	Peace River	*Carbon Creek*		A.R. 504	Gething	46	Core, raw	100.0	DH-81-90	3.20	5.70	25.98	65.12	ad	28.52	2.5	raw
117	Peace River	*Carbon Creek*		A.R. 504	Gething	47	Core, raw	100.0	DH-81-90	2.81	24.83	21.64	50.72	ad	29.91	1.5	raw
118	Peace River	*Carbon Creek*		A.R. 504	Gething	47	Core, raw	94.0	DH-81-92	3.76	9.54	22.72	63.98	ad	26.21	0.5	raw
119	Peace River	*Carbon Creek*		A.R. 504	Gething	51	Core, raw		DH-81-88	2.95	7.16	25.41	64.48	ad	28.27	1.5	raw
120	Peace River	*Carbon Creek*		A.R. 504	Gething	51	Core, raw	100.0	DH-81-89	3.70	15.33	24.70	56.27	ad	30.51	3.0	raw
121	Peace River	*Carbon Creek*		A.R. 504	Gething	51A	Core, raw	100.0	DH-81-90	3.26	8.19	25.57	62.98	ad	28.88	1.5	raw
122	Peace River	*Carbon Creek*		A.R. 504	Gething	52	Core, raw	98.0	DH-81-89	2.76	28.91	24.57	43.76	ad	35.96	3.5	raw
123	Peace River	*Carbon Creek*		A.R. 504	Gething	52	Core, raw		DH-81-90	2.31	20.07	26.38	51.24	ad	33.99	3.5	raw
124	Peace River	*Carbon Creek*		A.R. 504	Gething	54	Core, raw	88.0	DH-81-88	2.58	4.47	26.99	65.96	ad	29.04	1.5	raw
125	Peace River	*Carbon Creek*		A.R. 504	Gething	55	Core, raw	86.0	DH-81-90	3.50	5.47	28.43	62.60	ad	31.23	1.5	raw
126	Peace River	*Carbon Creek*		A.R. 504	Gething	58	Core, raw	98.0	DH-81-91	2.73	18.32	26.97	51.98	ad	34.16	2.0	raw
127	Peace River	*Carbon Creek*		A.R. 504	Gething	63	Core, raw	91.0	DH-81-91	2.83	14.95	30.60	51.52	ad	37.26	2.0	raw
128	Peace River	*Willow Creek*		A.R. 690	Gething	1	Core, raw	95.0	DH-81-31	0.00	6.85	22.93	70.22	dry	24.62	4.5	raw
129	Peace River	*Willow Creek*		A.R. 690	Gething	2	Core, raw	92.0	DH-81-22	0.00	10.09	22.48	67.43	dry	25.00	8.5	raw
130	Peace River	*Willow Creek*		A.R. 690	Gething	3	Core, raw	100.0	DH-81-15	0.00	11.79	19.70	68.51	dry	22.33	1.5	raw
131	Peace River	*Willow Creek*		A.R. 690	Gething	4	Core, raw	100.0	DH-81-39	0.00	11.34	19.49	69.17	dry	21.98	1.0	raw
132	Peace River	*Willow Creek*		A.R. 690	Gething	5	Core, raw	100.0	DH-81-37	0.00	8.95	16.22	74.83	dry	17.81	1.5	raw
133	Peace River	*Willow Creek*		A.R. 690	Gething	6	Core, raw	99.0	DH-81-10	0.00	7.03	20.54	72.43	dry	22.09	1.0	raw
134	Peace River	*Willow Creek*		A.R. 690	Gething	7	Core, raw	100.0	DH-81-25	0.00	9.04	17.73	73.23	dry	19.49	1.5	raw
135	Peace River	*Willow Creek*		A.R. 690	Gething	A	Core, raw	100.0	DH-81-30	0.00	6.75	19.78	73.47	dry	21.21	4.0	raw
136	Peace River	*Goodrich*		A.R. 533	Gething	6	Core, raw		DH-81005	0.79	26.58	23.62	49.01	ad	32.52	7.0	raw
137	Peace River	*Goodrich*		A.R. 533	Gething	5	Core, raw		DH-81015	0.62	16.93	19.71	62.74	ad	23.91	1.5	raw
138	Peace River	*Goodrich*		A.R. 533	Gething	Lower part #3	Core, raw	54.6	DH-81014	0.36	10.58	25.13	63.93	ad	28.22	4.5	raw

Table item	Calorific Value (MJ/kg)	Calorific Value (kcal/kg)	Calorific Value (BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	Raw/clean	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	Raw/clean
101						97	raw			0.60				dry					
102						109	raw			0.46				dry					
103						88	raw			0.89				dry					
104						74	raw			0.95				dry					
105	27.65	6604	11890	dry		89	raw			0.79				dry	0.99	74.00	7.00		clean
106	23.50	5613	10100	dry		91	raw			0.66				dry	0.92	77.00	8.00		clean
107	30.31	7240	13032	ad	15215					0.65				ad					
108	32.59	7783	14010	ad	15159					0.58				ad					
109	33.34	7963	14333	ad	15121					0.71				ad					
110	31.50	7523	13541	ad	14987					0.50				ad					
111	29.73	7100	12780	ad	14993					0.70				ad					
112	21.23	5071	9128	ad	14386					0.71				ad					
113	29.79	7116	12809	ad	14361	60	raw	2.38	10.81	0.93	73.21	4.70	6.50	ad					
114	31.30	7477	13458	ad	14638	58	raw	2.64	8.06	1.12	75.74	4.80	6.18	ad					
115	27.79	6638	11949	ad	14403	56	raw	2.59	17.04	0.65	68.65	4.15	5.94	ad					
116	31.68	7566	13619	ad	14442	52	raw	3.20	5.70	0.71	78.63	4.85	5.65	ad					
117	24.52	5857	10542	ad	14024	53	raw	2.81	24.83	0.73	61.30	3.96	5.15	ad					
118	29.36	7013	12623	ad	13954	49	raw	3.76	9.54	0.71	76.14	5.10	3.59	ad					
119	30.93	7388	13298	ad	14324			2.95	7.16	0.71	77.11	4.50	6.64	ad					
120	27.58	6587	11856	ad	14003	58	raw	3.70	15.33	0.84	69.25	4.65	5.16	ad					
121	30.56	7299	13139	ad	14311	50	raw	3.26	8.19	0.69	76.01	4.84	5.79	ad					
122	23.20	5542	9976	ad	14033	55	raw	2.76	28.91	1.52	56.92	3.96	5.06	ad					
123	26.44	6314	11366	ad	14220	52	raw	2.31	20.07	2.49	63.75	4.61	5.55	ad					
124	31.96	7634	13742	ad	14385	51	raw	2.58	4.47	0.71	81.38	5.09	4.61	ad					
125	30.77	7350	13230	ad	13896	47	raw	3.50	5.47	0.66	77.49	5.00	6.60	ad					
126	26.52	6334	11402	ad	13959	53	raw	2.73	18.32	0.85	66.26	4.44	6.23	ad					
127	27.44	6554	11798	ad	13872	50	raw	2.93	14.95	0.63	68.35	4.85	7.18	ad					
128	33.35	7966	14338	dry						0.46				dry					
129	32.52	7767	13981	dry						0.66				dry					
130	30.03	7173	12912	dry						0.36				dry					
131	31.50	7524	13543	dry						0.54				dry					
132	32.90	7859	14146	dry						0.76				dry					
133	33.08	7902	14224	dry						0.63				dry					
134	32.72	7816	14069	dry						0.85				dry					
135	33.45	7988	14379	dry						0.58				dry					
136	23.38	5584	10052	ad	13691					0.60				ad	1.26	86.50	1.50	10.40	raw
137	28.98	6922	12459	ad	14998					0.31				ad	1.34	28.70	0.20	65.60	raw
138	31.21	7454	13418	ad	15006					0.31				ad					

Table item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	Raw/clean
139	Peace River	*Goodrich*		A.R. 533	Gething	Upper part #3	Core, raw	75.0	DH-81014	0.56	18.05	22.66	58.73	ad	27.84	7.0	raw
140	Peace River	*Goodrich*		A.R. 533	Gething	2	Core, raw	96.0	DH-81010	0.44	29.97	21.56	48.03	ad	30.98	5.5	raw
141	Peace River	*Goodrich*		A.R. 533	Gething	Lower part #1	Core, raw	85.3	DH-81005	1.06	15.19	26.24	57.51	ad	31.33	4.0	raw
142	Peace River	*Goodrich*		A.R. 533	Gething	Upper part #1	Core, raw	85.0	DH-81005	1.28	10.24	23.90	64.58	ad	27.01	1.0	raw
143	Peace River	*Burnt River*		A.R. 489	Gething	Lower	Bulk, raw		Adit	0.50	8.60	13.40	77.05	ad	14.81		
144	Peace River	*Burnt River*		A.R. 489	Gething	Upper	Bulk, raw		Adit	0.70	6.40	13.00	79.90	ad	13.99		
145	Peace River	*Burnt River*		A.R. 489	Gething	60	Bulk, raw		Surface	0.70	11.70	16.40	71.20	ad	18.72	1.0	raw
146	Peace River	*Sukunka*	No. 1 mine	A.R. 663	Gething	Chamberlain	Bulk, raw		No. 1 mine	0.80	10.70	20.60	67.90	ad	23.28	7.0	raw
147	Peace River	*Sukunka*	Main mine	A.R. 663	Gething	Chamberlain	Bulk, raw		Main mine	0.60	11.00	20.50	67.90	ad	23.19	7.5	raw
148	Peace River	*Sukunka*	No. 1 mine	A.R. 663	Gething	Skeeter	Bulk, raw		No. 1 mine	1.00	24.50	16.70	55.60	ad	25.17	6.5	raw
149	Peace River	*Sukunka*	Saddle Creek	A.R. 663	Gething	Bird	Bulk, raw		Saddle Ck. adit	0.80	8.50	21.70	69.00	ad	23.93	8.5	raw
150	Peace River	*Sukunka*		A.R. 663	Gates	Gates B	Core, raw		DH-BP-7	0.70	6.10	27.70	65.50	ad	29.72	5.5	raw
151	Peace River	*Sukunka*		A.R. 663	Gates	Gates D	Core, raw		DH-BP-6	0.60	20.10	23.40	55.90	ad	29.51	5.5	raw
152	Peace River	*Sukunka*		A.R. 663	Gates	Gates E	Core, raw		DH-BP-14	0.60	26.70	21.60	51.10	ad	29.71	4.5	raw
153	Peace River	*Mt. Spieker*	Mt. Spieker	A.R. 556	Gething	Lower Bird	Core, raw	85.9	DH-MS-20A	0.70	5.40	19.80	74.10	ad	21.09	7.5	raw
154	Peace River	*Mt. Spieker*	Mt. Spieker	A.R. 556	Gething	Upper Bird	Core, raw	51.7	DH-MS-20A	0.40	8.70	19.80	71.10	ad	21.78	7.5	raw
155	Peace River	*Mt. Spieker*	EB1	A.R. 556	Gates	A	Core, raw	88.5	DH-MS-16	0.70	8.00	22.60	68.70	ad	24.75	8.5	raw
156	Peace River	*Mt. Spieker*	Mt. Spieker	A.R. 556	Gates	B	Core, raw	98.5	DH-MS-20	0.80	11.10	25.00	63.10	ad	28.38	5.5	raw
157	Peace River	*Mt. Spieker*	Underground mining area	A.R. 556	Gates	C2	Core, raw	65.6	DH-MS-33	0.60	10.80	22.00	66.00	ad	25.00	4.0	raw
158	Peace River	*Mt. Spieker*	EB1	A.R. 556	Gates	D	Core, raw	69.0	DH-MS-19	0.80	32.30	20.50	46.40	ad	30.64	1.5	raw
159	Peace River	*Monkman*	Duchess	A.R. 547	Gething	Unnamed	Core, raw	73.0	DH-MUD-81-04	0.56	26.36	16.93	56.15	ad	23.17	1.5	raw
160	Peace River	*Monkman*	Duchess	A.R. 547	Gething	Unnamed	Core, raw	82.0	DH-MUD-81-04	0.59	17.26	17.79	64.36	ad	21.66	1.0	raw
161	Peace River	*Monkman*	Duchess	A.R. 547	Gething	Unnamed	Core, raw	100.0	DH-MUD-81-07	0.70	15.11	19.89	64.30	ad	23.63	6.5	raw
162	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B1-B2	Core, raw	92.0	DH-MUD-81-03	0.72	13.96	21.67	63.65	ad	25.40	7.5	raw
163	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B3	Core, raw	76.0	DH-MUD-81-03	0.78	23.14	20.26	55.82	ad	26.63	7.0	raw
164	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B4	Core, raw	82.0	DH-MUD-81-03	0.74	21.10	21.59	56.57	ad	27.62	6.5	raw
165	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B5	Core, raw	62.0	DH-MUD-81-09	0.78	33.91	21.76	43.55	ad	33.32	5.0	raw
166	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B7	Core, raw	88.0	DH-MUD-81-13	0.45	16.76	22.40	60.39	ad	27.06	7.0	raw
167	Peace River	*Monkman*	Duchess	A.R. 547	Gates	B9	Core, raw	98.0	DH-MUD-81-13	1.05	16.62	22.81	59.52	ad	27.71	2.0	raw
168	Peace River	*Monkman*	Duke	A.R. 546	Minnes	2	Core, raw	70.0	DH-MDD-80-11	0.46	3.10	17.82	78.62	ad	18.48	2.5	raw
169	Peace River	*Monkman*	Duke	A.R. 546	Minnes	6	Core, raw	69.0	DH-MDD-80-11	0.50	4.10	16.88	78.52	ad	17.69	1.5	raw
170	Peace River	*Monkman*	Duke	A.R. 546	Minnes	7	Core, raw	45.0	DH-MDD-80-11	0.68	11.15	16.17	72.00	ad	18.34	1.5	raw
171	Peace River	*Monkman*	Duke	A.R. 546	Minnes	8	Core, raw	64.0	DH-MDD-80-11	0.62	7.57	16.56	75.25	ad	18.04	1.5	raw
172	Peace River	*Monkman*	Duke	A.R. 546	Minnes	10	Core, raw	73.0	DH-MDD-80-11	0.57	23.45	16.99	58.99	ad	22.36	8.0	raw
173	Peace River	*Monkman*	Duke, proposed	A.R. 464	Gething	Lower (low. bench)	Core, raw	100.0	DH-MRC-82-06	0.00	22.26	17.11	60.63	dry	22.01	1.5	raw

Table Item	Calorific Value (MJ/kg)	Calorific Value (kcal/kg)	Calorific Value (BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	*Raw/ clean*	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	*Raw/ clean*
139	28.96	6917	12451	ad	15193					0.43				ad					
140	24.68	5895	10611	ad	15152					0.31				ad					
141	29.63	7077	12739	ad	15021					0.24				ad	1.10	53.08	5.96	29.80	raw
142	31.02	7409	13336	ad	14857					0.24				ad	1.15	38.80	1.80	42.70	raw
143	33.11	7908	14235	ad	15651	65	raw			0.39				ad					
144	33.69	8047	14486	ad	15476	57	raw			0.38				ad					
145	31.51	7526	13546	ad	15341	79	raw			0.36				ad					
146	34.06	8134	14641	ad, clean		76	clean			0.73				ad	1.36	51.76	0.00	24.90	clean
147	34.19	7609	14697	ad, clean		81	clean			0.58				ad	1.37	52.95	0.00	24.90	clean
148	33.82	8077	14539	ad, clean		86	clean			0.51				ad	1.33	50.26	0.00	26.41	clean
149	33.90	8097	14574	ad, clean		104	clean			2.48				ad	1.32	53.76	0.00	22.94	clean
150										0.78				ad					
151										0.60				ad					
152										0.29				ad					
153						83	raw			0.72				ad					
154						87	raw			2.33				ad					
155						86	raw			0.54				ad	1.20	56.84	0.98	20.19	clean
156						68	raw			0.53				ad	1.16	49.71	2.35	29.55	clean
157						85	raw			0.41				ad	1.21	39.29	7.23	34.56	clean
158						70	raw			0.33				ad	1.19	53.18	0.56	21.36	clean
159	26.57	6347	11424	ad	15513	74	clean			2.21				ad					
160	29.12	6955	12519	ad	15131	68	clean			0.32				ad					
161	29.54	7056	12700	ad	14961	77	clean			0.38				ad					
162	31.04	7415	13346	ad	15511	93	clean	1.09	5.90	0.46	75.69	4.37	11.87	ad, clean	1.27	61.31	0.00	30.42	clean
163	27.38	6538	11769	ad	15312	90	clean	1.68	6.85	0.66	75.07	4.24	10.84	ad, clean	1.28	62.31	0.00	26.55	clean
164	27.94	6674	12013	ad	15226	82	clean	1.30	8.40	0.28	73.51	4.48	11.10	ad, clean	1.19	58.62	0.24	30.47	clean
165	22.78	5441	9794	ad	14819	81	clean	0.60	11.21	0.57	74.43	3.75	8.61	ad, clean	1.20	65.71	0.00	25.56	clean
166	28.74	6864	12356	ad	14844	77	clean	0.66	10.87	0.63	77.09	4.45	5.47	ad, clean	1.10	62.65	1.41	25.30	clean
167	29.11	6952	12513	ad	15007	74	clean	0.87	8.85	0.31	77.86	4.21	6.98	ad, clean	1.09	40.66	2.05	46.80	clean
168						88	clean			0.49				ad					
169										0.50				ad					
170						79	clean			0.47				ad					
171						79	clean			0.44				ad					
172										0.49				ad					
173	27.60	6593	11867	dry		72	clean			0.46				dry					

Table item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	*Raw/ clean*
174	Peace River	*Monkman*	Duke, proposed	A.R. 464	Gething	Lower (up. bench)	Core, raw	100.0	DH-MRC-82-06	0.00	12.78	18.79	68.43	dry	21.54	2.5	raw
175	Peace River	*Monkman*	Duke, proposed	A.R. 464	Gething	Upper (low. bench)	Core, raw	100.0	DH-MRC-82-06	0.00	17.01	19.22	63.77	dry	23.16	5.0	raw
176	Peace River	*Monkman*	Duke	A.R. 545	Gates	B1	Core, raw	100.0	DH-MDD-79-06	0.25	13.49	23.61	62.65	ad	27.37	8.5	raw
177	Peace River	*Monkman*	Duke	A.R. 545	Gates	B1	Core, raw	100.0	DH-MDD-79-01	0.17	27.82	20.14	51.87	ad	27.97	5.5	raw
178	Peace River	*Monkman*	Duke	A.R. 545	Gates	B3	Core, raw	91.0	DH-MDD-79-03	0.61	21.20	20.68	57.51	ad	26.45	7.0	raw
179	Peace River	*Monkman*	Duke	A.R. 545	Gates	B4	Core, raw	99.0	DH-MDD-79-03	0.58	15.95	22.59	60.88	ad	27.06	7.5	raw
180	Peace River	*Monkman*	Duke	A.R. 546	Gates	B5	Core, raw	74.0	DH-MDD-80-07	1.01	15.27	20.66	63.06	ad	24.68	4.0	raw
181	Peace River	*Monkman*	Duke	A.R. 545	Gates	B7	Core, raw	94.0	DH-MDD-79-03	0.68	30.84	20.57	47.91	ad	30.04	7.0	raw
182	Peace River	*Monkman*	Duke	A.R. 545	Gates	B9	Core, raw	100.0	DH-MDD-79-02	0.29	24.39	20.96	54.36	ad	27.83	4.0	raw
183	Peace River	*Monkman*	Honeymoon	A.R. 546	Gates	B1	Core, raw	80.0	DH-MDD-80-01	0.60	4.39	22.84	72.17	ad	24.04	8.5	raw
184	Peace River	*Monkman*	Honeymoon	A.R. 546	Gates	B3	Core, raw	80.0	DH-MDD-80-01	0.64	10.37	22.03	66.96	ad	24.76	7.5	raw
185	Peace River	*Monkman*	Honeymoon	A.R. 546	Gates	B4	Core, raw	79.0	DH-MDD-80-01	0.75	15.88	20.68	62.39	ad	24.89	4.0	raw
186	Peace River	*Monkman*	Honeymoon	A.R. 545	Gates	B5	Core, raw	79.0	DH-MDD-79-10	0.62	20.92	20.24	58.22	ad	25.80	2.5	raw
187	Peace River	*Monkman*	Honeymoon	A.R. 545	Gates	B6	Core, raw	85.0	DH-MDD-79-10	0.25	46.16	18.81	34.78	ad	35.10	3.0	raw
188	Peace River	*Monkman*	Honeymoon	A.R. 545	Gates	B7	Core, raw	100.0	DH-MDD-79-10	0.59	28.06	22.41	48.94	ad	31.41	5.5	raw
189	Peace River	*Monkman*	Honeymoon	A.R. 545	Gates	B9	Core, raw	100.0	DH-MDD-79-08	0.75	11.55	21.93	65.77	ad	25.01	2.5	raw
190	Peace River	*Belcourt*	Omega	A.R. 463	Gates	1	Core, raw	55.6	DH-BD-7806	0.58	10.36	17.35	71.71	ad	19.48	3.0	raw
191	Peace River	*Belcourt*	Holtslander	A.R. 463	Gates	1	Core, raw	58.9	DH-BD-7801	0.88	12.48	23.67	62.97	ad	27.32	6.0	raw
192	Peace River	*Belcourt*	Red Deer	A.R. 463	Gates	1	Core, raw	83.1	DH-BD-7807	0.87	15.60	24.07	59.46	ad	28.82	6.0	raw
193	Peace River	*Belcourt*	Omega	A.R. 463	Gates	2	Core, raw	60.0	DH-BD-7806	0.52	20.88	15.33	63.27	ad	19.50	3.5	raw
194	Peace River	*Belcourt*	Red Deer	A.R. 463	Gates	2	Core, raw	78.0	DH-BD-7812	0.45	7.15	27.60	64.80	ad	29.87	4.0	raw
195	Peace River	*Belcourt*	Omega	A.R. 463	Gates	3	Core, raw	56.8	DH-BD-7806	0.52	23.12	15.44	60.92	ad	20.22	2.5	raw
196	Peace River	*Belcourt*	Omega	A.R. 463	Gates	5	Core, raw	76.0	DH-BD-7806	0.54	10.08	19.22	70.16	ad	21.50	5.5	raw
197	Peace River	*Belcourt*	Holtslander	A.R. 463	Gates	5	Core, raw	53.3	DH-BD-7801	0.94	18.56	22.88	57.62	ad	28.42	5.0	raw
198	Peace River	*Belcourt*	Holtslander	A.R. 463	Gates	6	Core, raw	85.4	DH-BD-7801	1.14	26.35	20.56	51.95	ad	28.35	5.0	raw
199	Peace River	*Belcourt*	Red Deer	A.R. 463	Gates	7	Core, raw	91.1	DH-BD-7802	1.20	22.26	24.24	52.30	ad	31.67	5.5	raw
200	Peace River	*Belcourt*	Red Deer	A.R. 463	Gates	8	Core, raw	77.9	DH-BD-7802	1.05	38.42	19.69	40.84	ad	32.53	4.0	raw
201	Peace River	*Saxon*	Saxon East	A.R. 628	Gates	1	Bulk, raw		Adit 77-1-1	0.80	26.30	16.50	56.40	ad	22.63	4.0	raw
202	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	1	Bulk, raw		Adit 77-1-3	0.60	21.30	19.10	59.00	ad	24.46	4.0	raw
203	Peace River	*Saxon*	Saxon East	A.R. 628	Gates	2	Bulk, raw		Adit 77-2-2	0.80	19.50	17.00	62.70	ad	21.33	4.0	raw
204	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	2	Bulk, raw		Adit 77-2-4	1.70	8.50	22.10	67.70	ad	24.61	7.5	raw
205	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	3	Core, raw	88.0	DH-SD-7720	0.60	17.00	21.80	60.60	ad	26.46	7.5	clean
206	Peace River	*Saxon*	Saxon East	A.R. 628	Gates	4	Bulk, raw		Adit 76-4-1	0.40	18.30	18.40	62.90	ad	22.63	4.0	raw
207	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	4	Bulk, raw		Adit 77-4-5	0.90	23.40	21.60	54.10	ad	28.53	6.0	raw
208	Peace River	*Saxon*	Saxon East	A.R. 628	Gates	5	Core, raw	100.0	DH-SD-7702	0.50	6.70	23.60	69.20	ad	25.43	8.5	raw
209	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	5	Core, raw	100.0	DH-SD-7726	0.80	21.60	21.80	55.80	ad	28.09	8.5	raw
210	Peace River	*Saxon*	Saxon South	A.R. 628	Gates	10	Core, raw	100.0	DH-SD-7724	1.00	8.30	26.50	64.20	ad	29.22	7.5	raw
211	Peace River	*Wapiti*		A.R. 683	Wapiti	1	Core, raw	100.0	DH-W-7943	11.00	22.20	29.00	37.80	ar	43.41		
212	Peace River	*Wapiti*		A.R. 685	Wapiti	1	Cores, raw		Avg. of all DHs	2.42	27.19	29.47	40.92	ad	41.87		
213	Peace River	*Wapiti*		A.R. 685	Wapiti	1	Bulk, raw		Adit 1	3.70	27.25	27.73	41.31	ad	40.17		
214	Bowron River			A.R. 16		Lower	Bulk, raw			2.24	36.10	30.99	30.67	ad	50.26		
215	Bowron River			A.R. 16		Lower (mn. bench)	Core, raw		DH-77-5	2.95	33.36	31.20	32.49	ad	48.99		

Table Item	Calorific Value (MJ/kg)	Calorific Value (kcal/kg)	Calorific Value (BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	Raw/ clean	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	Raw/ clean
174	31.98	7639	13749	dry						0.36				dry					
175	32.68	7806	14051	dry, clean						1.41				dry					
176										0.59				ad	1.29	57.80	0.00	28.90	clean
177										0.64				ad	1.34	60.67	0.00	29.05	clean
178										0.45				ad	1.32	63.67	0.00	26.92	clean
179										0.22				ad	1.24	57.93	0.00	35.12	clean
180										0.38				ad	1.24	55.53	0.00	30.71	clean
181										0.66				ad	1.20	68.06	0.00	19.21	clean
182										0.34				ad	1.19	49.89	1.20	40.08	clean
183										0.56				ad	1.35	62.33	0.00	27.91	clean
184										0.34				ad	1.33	65.75	0.00	25.59	clean
185										0.24				ad	1.28	57.36	0.00	30.78	clean
186										0.50				ad	1.30	50.29	0.00	38.98	clean
187										0.41				ad	1.25	53.96	0.00	34.34	clean
188										0.73				ad	1.18	70.30	0.00	19.55	clean
189										0.39				ad	1.22	32.96	0.00	54.95	clean
190						98	raw			0.31				ad	1.61	59.25	0.19	28.04	clean
191						75	raw			0.28				ad	1.20	57.58	0.98	27.26	clean
192						90	raw			0.21				ad	1.23	66.17	2.55	17.87	clean
193						80	raw			0.49				ad	1.62	61.06	0.00	26.60	clean
194						75	raw			0.30				ad	1.16	58.49	3.21	25.47	clean
195						86	raw			0.37				ad	1.62	61.48	0.00	28.07	clean
196						90	raw			0.33				ad	1.54	68.55	0.00	21.17	clean
197						74	raw			0.33				ad	1.17	58.72	1.83	25.14	clean
198						72	raw			0.39				ad	1.17	63.86	3.01	19.68	clean
199						64	raw			0.67				ad					
200						68	raw			0.41				ad					
201						96	clean	0.00	8.17	0.27	82.77	4.36	3.46	dry, clean	1.38	51.00	0.00		clean
202	32.18	7686	13834	ad, clean						0.39				ad					
203	33.31	7957	14322	ad, clean		119	clean	0.00	7.61	0.46	83.61	4.42	2.92	dry, clean					
204	34.53	8248	14847	ad, clean		85	clean			0.35				ad					
205										0.54				ad					
206						115	clean			0.47				ad	1.36	54.00	0.00		clean
207	33.07	7898	14217	ad, clean		85	clean			0.43				ad					
208						116	clean			0.61				ad					
209										0.73				ad					
210										0.63				ad					
211	18.55	4431	7976	ar	10252	62	raw			0.38				ar					
212	28.27	6753	12156	mmmf		49	raw	0.00	0.00	0.61	78.11	5.49	14.62	daf					
213	26.59	6352	11433	mmmf		49	raw	0.00	0.00	0.56	75.94	4.38	18.26	daf					
214	19.33	4617	8310	ad	13005	58	raw	0.00	36.10	0.97	46.59	3.75	9.69	dry					
215	19.42	4639	8350	ad	12530					1.11				ad					

Table item	Coalfield or basin	Property	Pit or Area	Reference	Unit	Seam	Sample Type	Core Recovery (%)	Sample desc.	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Basis	Vol. mat. (daf) (%)	FSI	Raw/ clean
216	Bowron River			A.R. 16		Lower (mn. bench)	Core, raw		DH-77-7	3.93	23.65	36.08	36.34	ad	49.82		
217	Bowron River			A.R. 16		Lower (low. bench)	Core, raw		DH-77-11	4.36	29.81	26.38	39.45	ad	40.07		
218	Hat Creek		No. 1 deposit	Sinclair	Kamloops	D zone	Core, raw		DH-76-135	0.00	25.99	32.91	41.10	dry	44.47		
219	Hat Creek		No. 1 deposit	Sinclair	Kamloops	C zone	Core, raw		DH-76-136	0.00	51.83	26.58	21.59	dry	55.18		
220	Hat Creek		No. 1 deposit	Sinclair	Kamloops	B zone	Core, raw		DH-76-135	0.00	34.84	31.37	33.78	dry	48.15		
221	Hat Creek		No. 1 deposit	Sinclair	Kamloops	A zone	Core, raw		DH-76-135	0.00	42.92	29.63	27.46	dry	51.90		
222	Hat Creek		No. 2 deposit, south end	A.R. 135	Kamloops		Core, raw		DH-75-100	0.00	35.21	33.64	31.15	dry	51.92		
223	Hat Creek		No. 2 deposit, north end	A.R. 135	Kamloops		Core, raw		DH-75-080	0.00	27.07	34.35	38.38	dry	47.23		
224	Hat Creek		No. 2 deposit, north end	A.R. 135	Kamloops		Core, raw		DH-75-077	0.00	35.63	32.39	31.97	dry	50.33		
225	Merritt		Coldwater Hill	A.R. 149	Kamloops	8	Core, clean	87.3	DH-2	4.00	7.30	37.60	51.10	ad	42.39	1.5	clean
226	Merritt		Coldwater Hill	A.R. 149	Kamloops	8	Core, clean	90.9	DH-3	3.30	7.50	38.10	51.10	ad	42.71	2.5	clean
227	Merritt		Coldwater Hill	A.R. 149	Kamloops	No name	Core, clean	89.9	DH-3	3.20	6.10	38.50	52.20	ad	42.45	2.0	clean
228	Merritt		Coldwater Hill	A.R. 149	Kamloops	4	Core, clean	69.1	DH-3	2.80	6.40	39.50	51.30	ad	43.50	3.0	clean
229	Merritt		Coldwater Hill	A.R. 149	Kamloops	4	Core, clean	72.3	DH-4	2.00	9.00	34.20	54.80	ad	38.43	7.5	clean
230	Merritt		Coldwater Hill	A.R. 149	Kamloops	5	Core, clean	97.0	DH-2	3.60	7.90	38.10	50.40	ad	43.05	3.0	clean
231	Merritt		Coldwater Hill	A.R. 149	Kamloops	5	Core, clean	81.9	DH-3	2.50	7.70	36.50	53.30	ad	40.65	2.5	clean
232	Merritt		Coldwater Hill	A.R. 149	Kamloops	1 lower	Core, clean	91.6	DH-2	2.90	7.30	37.30	52.50	ad	41.54	3.0	clean
233	Merritt		Coldwater Hill	A.R. 149	Kamloops	1 upper	Core, clean	97.8	DH-2	2.90	8.30	37.70	51.10	ad	42.45	3.5	clean
234	Tulameen			A.R. 200	Princeton	Lower	Core, raw	98.0	DH-T-77-3	4.84	46.72	19.98	28.46	ad	41.25		
235	Tulameen			A.R. 200	Princeton	Main	Core, raw	98.0	DH-T-77-3	5.80	36.54	26.83	30.83	ad	46.53		
236	Tulameen			A.R. 200	Princeton	Main	Bulk, raw		Bulk sample 1	5.99	33.88	27.15	32.98	ad	45.15		
237	Princeton	*Pr.-Tulameen Coal Co.*	No. 1 mine	McMechan	Princeton	Princeton, etc.	Mine run			14.90	8.00	29.50	47.60	?	38.26		
238	Princeton	*Bromley (Granby Coll.)*	No. 1 Mine	Dickson	Princeton	Gem-Bromley Vale	Mine run			13.90	13.70	28.30	44.10	?	39.09		

Note: Table items 227 & 231 Rmax values are expressed as per cent dominant Reflectance expressed in V-class

Table Item	Calorific Value (MJ/kg)	(kcal/kg)	(BTU/lb)	Basis	Cal.val. (maf) (BTU/lb)	HGI	*Raw/ clean*	Moisture (%)	Ash (%)	Sulphur (%)	Carbon (%)	Hydrogen (%)	Oxygen (%)	Basis	Rmax (%)	Vitrinite (%)	Exinite (%)	Semi-fusinite (%)	*Raw/ clean*
216	23.12	5522	9940	ad	13019					1.13				ad					
217	20.38	4868	8763	ad	12485					1.22				ad					
218	21.42	5117	9211	dry						0.23			16.35	dry					
219	11.45	2736	4924	dry						0.40			14.43	dry					
220	17.86	4266	7679	dry						0.79			15.73	dry					
221	14.92	3564	6415	dry						0.68			15.00	dry					
222	17.44	4164	7496	dry						0.56				dry					
223	20.59	4919	8854	dry						0.68				dry					
224	17.71	4230	7614	dry						0.48				dry					
225	30.03	7170	12906	ad	13922					0.64				ad					
226	30.49	7280	13104	ad	14166					0.49				ad					
227	31.11	7430	13374	ad	14243					0.78				ad	68.9% V8	83.50	11.60	0.40	clean
228	31.41	7500	13500	ad	14423					0.71				ad					
229	30.44	7270	13086	ad	14380					0.64				ad					
230	34.17	8160	14688	ad	15948					0.64				ad					
231	31.11	7430	13374	ad	14490					0.69				ad	36.1% V7	76.30	16.50	0.00	clean
232	30.86	7370	13266	ad	14311					0.63				ad					
233	30.44	7270	13086	ad	14270					0.57				ad					
234	14.79	3533	6360	ad	11937	49	raw			0.66				ad					
235	17.54	4189	7540	ad	11882	47	raw			0.42				ad					
236	17.98	4299	7730	ad	11691					0.54				ad					
237	22.82	5450	9810	?	10663					0.20				ad					
238	19.91	4756	8560	?	9919					0.63				ad					