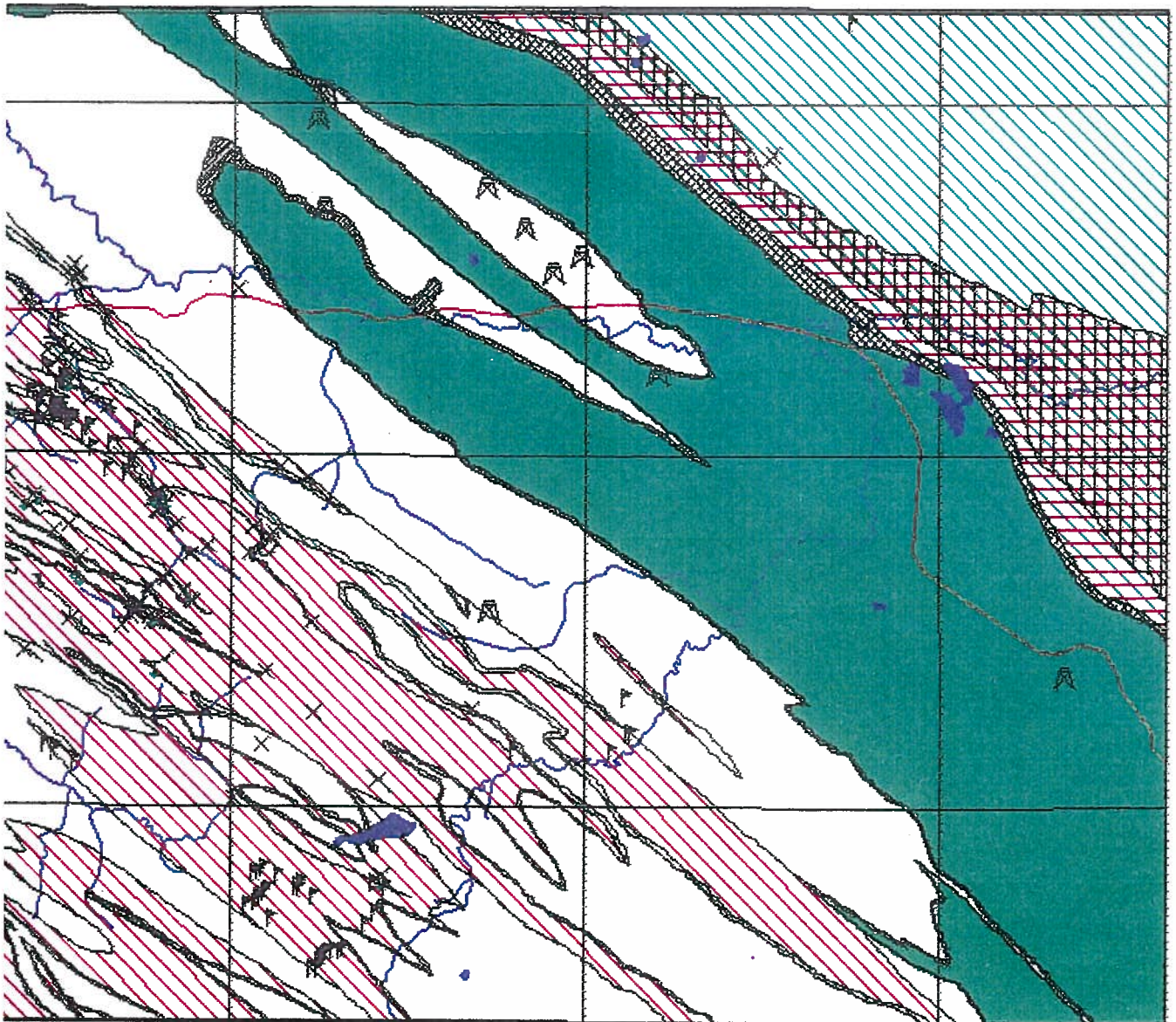


ALBERTA GEOLOGICAL SURVEY - COAL GEOLOGY

COAL COMPILATION PROJECT - PIERRE GREYS LAKES

NTS 83E/15

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Coal Compilation Project
Open File Report: 1990-4
Coal Geology Section
Alberta Geological Survey

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Foreword

The prime objective of the pilot Coal Compilation Project (CCP) is to provide coal resource maps to stimulate and support industry exploration programs, and assist government in matters of resource management. An essential feature of the program is the use of cost effective Geoscience Information System (GIS) technology that allows the database and various thematic maps to be analyzed, updated, and displayed with complete flexibility at any scale.

Each map set is intended to be a stand alone, unique product contributing to an overall synthesis of information. Maps generated will be at a regional or reconnaissance level. Collection of new data was limited. Data compiled and evaluated will be based on the following principal sources; Alberta Research Council/Alberta Geological Survey (ARC/AGS); Energy Resources Conservation Board (ERCB); Geological Survey of Canada (GSC/ISPG); and information from the coal industry sector. Industry cooperation and support is shown in the making available of unpublished corporate reports to the AGS. The availability of these reports is an essential ingredient for the success of this project.

The CCP will encompass some eighteen 1: 50 000 scale mapsheets to be completed over a three year period.

Custom maps and database searches can be obtained by contacting the Coal Geology Section, Alberta Geological Survey, Alberta Research Council. Raw coal exploration data¹ that are in the 'public' domain can, for a nominal fee, be viewed in microfiche form at the Records Center of the Energy Resources Conservation Board in Calgary, Alberta. Arrangements can also be made to acquire copies of all/selected data.

¹specifically, the geophysical logs (and other associated data) of coal exploration drillholes and, as available, analytical data relating to coal quality.

Acknowledgments

The project was partly funded by the Alberta Office of Coal Research and Technology. The Alberta Geological Survey Coal Technical Advisory Sub-Committee provided valuable guidance for the project. Wolfgang Kalkreuth of the Geological Survey of Canada (GSC/ISPG) participated in the field component of the study and provided vitrinite reflectance measurements. Alberta Forestry, Lands and Wildlife is thanked for permission to enter the Willmore Wilderness Park. D. Goulet and J. Matthie assisted with map digitization. Petro-Canada Resources Inc. and Union Oil Company of Canada are thanked for making unpublished reports available to the Alberta Geological Survey.

Executive Summary

The study area of mapsheet NTS 83E/15 (Pierre Greys Lakes) is located in west-central Alberta. The communities of Hinton (83F/5) and Grande Cache (83E/14) are the primary population centers near the study area. Almost all of the mapsheet 83E/15 is located within the Berland IRP; Willmore Wilderness Provincial Park, located in the extreme southwest corner of the mapsheet, is not part of the Berland IRP.

Within the mapsheet 83E/15, coal measures are deposited amid thick successions of sandstones, siltstones, shales and conglomerates. These coal-bearing sequences are part of the Lower Cretaceous Luscar Group, Upper Cretaceous Brazeau Formation and Paleocene Coalspur Formations.

The Luscar Group consists of sandstones, shales, conglomerates and coals, deposited predominantly in nonmarine environments. Strata of the Lower Cretaceous Luscar Group have been subjected to deformation which has produced northwesterly trending thrust faults and folds. As a result, the Luscar Group coal seams are now exposed in a series of northwest trending thrust sheets and associated folds. Often the coal seams have been further locally folded and faulted. Depending on the severity of these local structural complexities, and acknowledging a general discontinuity of coal outcrops in the Inner Foothills, coal seam correlations and evaluations can be extremely difficult. Within the mapsheet, up to eight seams are present within the Luscar Group. The seams have an average aggregate thickness of 21 meters and are contained within a 150+ meter-thick sedimentary sequence. Average seam thicknesses range from 1.5 to 3.5 meters. Seam correlations are preliminary.

The Entrance Conglomerate which normally separates the Brazeau and Coalspur Formations has not been identified within the mapsheet area. For obvious reasons, it follows that the Brazeau and Coalspur Formations have not be positively differentiated on this mapsheet. Combined, the two formations consist of primarily nonmarine sandstones, conglomerates, shales and (minor...?) coals; the formations lie conformably above the marine Wapiabi Formation.

Within the mapsheet area, three coal occurrences are believed to be from the Coalspur Formation (which contains the Coal Valley Coal Zone/Kakwa Coal Measures). The known coal occurrences include two outcrops, each 0.3 meters thick, and one 1.5 meter thick drillhole intersection. No correlations could be established for the Coalspur Formation coals.

No coal occurrences have been noted in the Brazeau Formation however, no coal exploration drilling has been done in the area of Brazeau sediments.

The undivided Upper Cretaceous Brazeau Formation are located in a series of gentle anticlines and synclines that trend in a northwesterly strike direction. In the northeastern part of the map area the Paleocene Coalspur and Paskapoo strata dip between 10 and 30 degrees towards the northeast..

In general, from a coal resource/exploration point of view, the map area has been superficially examined. Only two areas, the ERCB's A La Peche Lake Coal Field and the Sterne Creek area have a good exploration database but structural geology studies are needed for both areas. The Sterne Creek area includes the ERCB Susa Creek coal deposit; described as a 'Small Isolated Deposit'. Within the Sterne Creek area, seams # 3, 4, and 10 from the Grande Cache area can be identified and traced. Seam 3 can also be identified in the La Peche Lake area and from the Sterne Creek area southeast to the Muskeg River.

Little data is available and the coal development potential is uncertain for most of the remaining map area particularly in the northeast where the Brazeau Formation (containing the Cutbank Coal Measures) and the Coalspur Formation (which contains the Coal Valley Coal Zone/Kakwa Coal Measures) have been projected. A promising area for future work is the Coal Valley Coal Zone trend in the east part (Pierre Greys Lakes, Lone Teepee and Burleigh Creeks area) of the map area where a preglacial valley may mean lower overburden than along trend to the northwest. Additional subsurface geological studies, including the construction of regional cross-sections and seam correlations, are needed in the eastern and Sterne Creek/A La Peche Lake regions of the map area.

Introduction

Objective

The objective of the pilot Coal Compilation Project (CCP) is to provide coal resource maps on a 1: 50 000 scale, which will

- o stimulate and support industry exploration programs, and
- o assist government in matters of resource management (eg, Integrated Resource Plans) in areas that may have good coal development potential, but have a lack of data or understanding.

Each map set is intended to be a stand alone, unique product contributing to an overall synthesis of information. Maps generated will be at a regional or reconnaissance level. Collection of new data and/or actual time in the field will be limited. Data compilation and evaluation will be based on the following principal sources

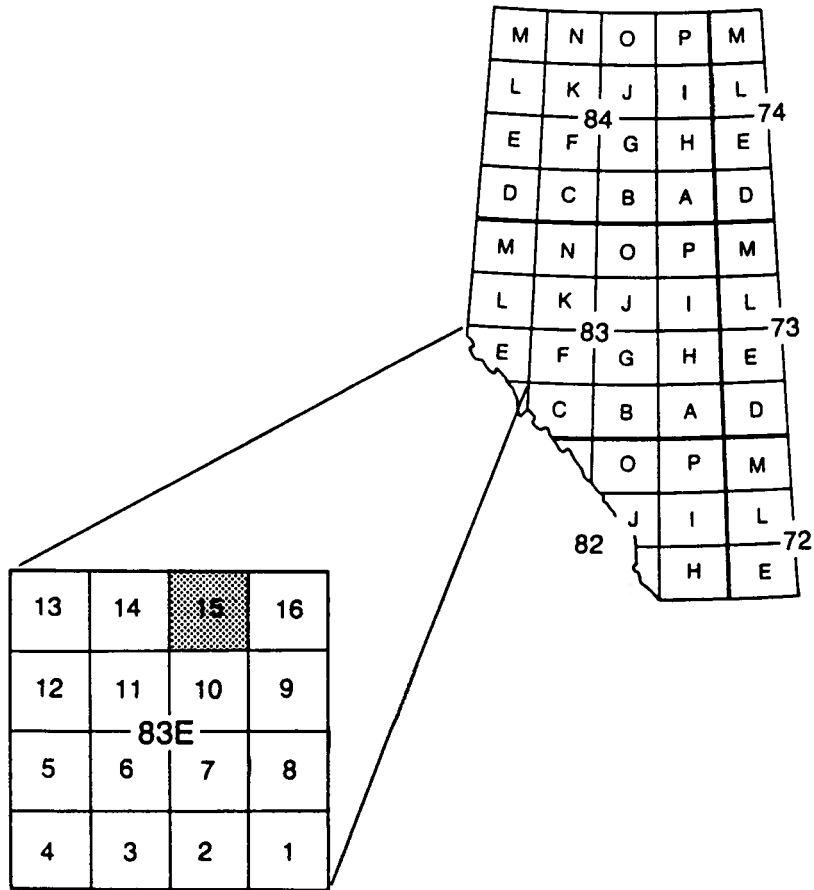
- o Alberta Research Council/Alberta Geological Survey (ARC/AGS)
- o Energy Resources Conservation Board (ERCB)
- o Geological Survey of Canada (GSC/ISPG)
- o cooperation from the coal industry sector.

The CCP will encompass some eighteen 1: 50 000 scale mapsheets to be completed over a three year period.

When completed, the CCP can be evaluated to determine if the project should be expanded province wide. As each map represents a complete product, the technical committee could monitor the progress of the research and react to changing priorities without being committed to spending funds more than one year in advance.

The fiscal year, 1989-90, was the first year of the CCP. The CCP focussed on the Hinton - Grande Cache Corridor and included four contiguous NTS mapsheets (see Figure 1). From

Figure 1. Coal Completion Project - Pierre Greys Lakes NTS 83E/15 :
Location



southeast to northwest, they are 83F/5 (Entrance), 83E/9 (Moberly Creek), **83E/15 (Pierre Greys Lakes)** and 83E/14 (Grande Cache).

For each mapsheet, a product has been generated that includes

- o a coal resource map (scale 1: 50 000)
- o 'snapshot' maps (scale 1: 250 000)
- o supplementary text.

Methodology and Discussion of GIS

Geographic Information Systems (GIS) which encompass spacial data storage, display and analysis by computer have been employed in the municipal, environmental and forestry sectors for many years. The term GIS has been applied to mainly surface or geographic studies and has not as a rule been extended to the 3rd dimension (depth) or temporal aspects (time). A Geoscience Information System (GSIS) goes beyond what is generally thought of as traditional GIS and is focused strongly on subsurface information. An essential feature of the Coal Compilation Project is the use of cost effective Geoscience Information System (GSIS) technology that allows the database and various thematic maps to be analyzed, updated, and displayed with complete flexibility at any scale. In addition custom maps can be produced from the various data and graphic elements that have been entered into the information system.

Much of the present methodology, software and hardware used in this study is described in detail in the Alberta Research Council, Open File Report 1989-03A (Richardson et al., 1989). In general both digital and hard copy data or graphic elements are entered into a GIS software product (pcARC/INFO) where they can be analyzed, displayed or plotted to hardcopy.

During this first year of the CCP, substantial time was spent in

- o developing the hardcopy, product template, and
- o replicating the above template into the electronic medium of GIS.

Assuming that all/most of the above design work will be utilized for future mapsheets, and that all other factors remain the same, the number of CCP sheets generated during a given year should increase. Rather than spending time on the design of the product, time will be spent on actual product compilation and generation.

Location and Access

The study area of mapsheet NTS 83E/15 (Pierre Greys Lakes) is located in west-central Alberta between Latitudes 53° 45' and 54° 00' North, and Longitudes 118° 30' and 119° 00' West (West of the 6th Meridian, between Townships 55 and 58 inclusive, and Ranges 4 to 7 inclusive).

The communities of Hinton (83F/5) and Grande Cache (83E/14) are the primary population centers near the study area.

Paved access to and within the area is provided by Highways No. 16 and 40 . Numerous all-weather, gravelled wellsite and logging roads also exist. Additional secondary seasonal access is provided by a network of roads, trails and seismic lines.

The area is serviced by the Canadian National Railway and the Alberta Resources Railway; the rail lines have the capacity to accomodate coal unit trains. Coal could be shipped to:

- o Ridley Island at Prince Rupert, B.C. located
 - o 1170 rail-kilometers from Hinton
 - o 1310 rail-kilometers from Grande Cache
- o Neptune Terminals at Vancouver, B.C. located
 - o 1010 rail-kilometers from Hinton
 - o 1150 rail-kilometers from Grande Cache.

Geological Setting

Within the mapsheet 83E/15, coal measures are deposited within thick successions of sandstones, siltstones, shales and conglomerates. Known coal-bearing sequences are part of the Lower Cretaceous Luscar Group and, while occurrences are limited, additional coal potential is believed to be contained within the

- o Upper Cretaceous Brazeau Formation (or Cutbank Coal Measures of Dawson et. al., 1989)
- o Paleocene Coalspur Formation (or Kakwa Coal Measures of Dawson et. al., 1989)).

Stratigraphic nomenclature for the above strata is shown in Figure 2.

Stratigraphy of Coal-Bearing Units

Luscar Group

The Luscar Group consists of sandstones, shales, conglomerates and coals that have been deposited predominantly in nonmarine environments. The strata of the Group have been divided into four formations (Langenberg and McMechan, 1985), ie:

- o Cadomin Formation, a basal conglomerate
- o Gladstone Formation, predominantly nonmarine sandstones and shales
- o Moosebar Formation, marine shales and sandstones
- o Gates Formation, nonmarine sandstones, shales and coals.

Gates Formation

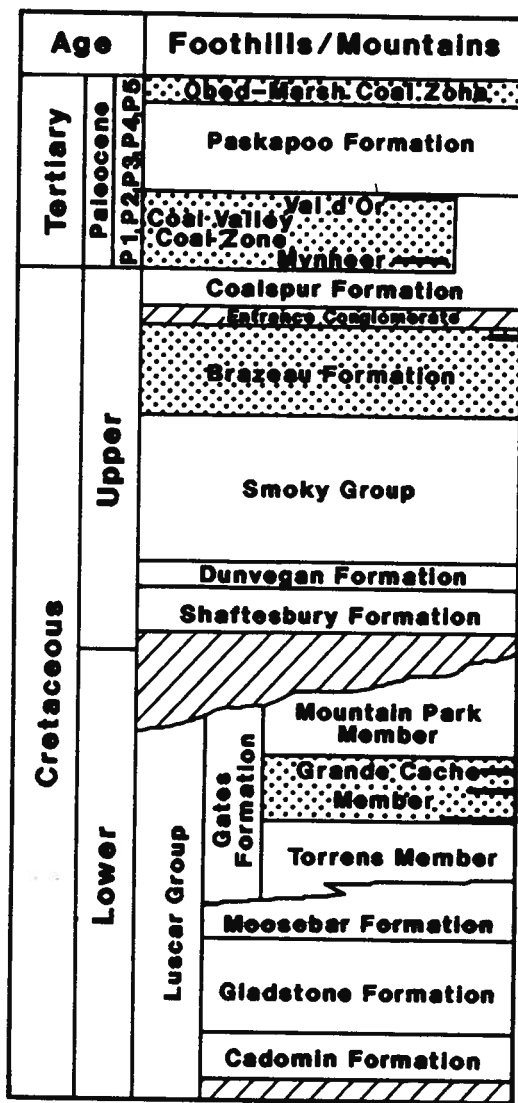
The Gates Formation can be divided into three members - the Torrens, Grande Cache and Mountain Park members. The Grande Cache Member contains the economic coal seams within the Luscar Group.

Within the mapsheet, up to eight seams are present within the Luscar Group. The seams have an average aggregate thickness of 21 meters and are contained within a 150+ meter-thick sedimentary sequence. Average seam thicknesses range from 1.5 to 3.5 meters. Seam correlations are preliminary.




Brazeau and Coalspur Formations

The Entrance Conglomerate which normally separates the Brazeau and Coalspur Formations has not been identified within the mapsheet area. For obvious reasons, it follows that the Brazeau and Coalspur Formations have not be positively differentiated on this mapsheet. Combined, the

Figure 2. Stratigraphic Nomenclature Adopted for the Coal Compilation Project
 (after Macdonald et. al. 1989)



LEGEND

-  Coal-bearing unit
-  Major seams
-  Hiatus or missing interval

Coal Valley Coal Zone	
Val d'Or	—
Arbour	—
McLeod	—
McPherson	—
Silkstone	—
Mynheer	—

two formations consist of primarily nonmarine sandstones, conglomerates, shales and (minor...?) coals; the formations lie conformably above the marine Wapiabi Formation.

Within the mapsheet area, three coal occurrences are believed to be from the Coalspur Formation (which contains the Coal Valley Coal Zone/Kakwa Coal Measures). The known coal occurrences include two outcrops, each 0.3 meters thick, and one 1.5 meter thick drillhole intersection. No correlations could be established for the Coalspur Formation coals.

No coal occurrences have been noted in the Brazeau Formation however, no coal exploration drilling has been done in the area of Brazeau sediments.

Structure

Strata of the Lower Cretaceous Luscar Group have been subjected to deformation which has produced northwesterly trending thrust faults and folds. As a result, the Luscar Group coal seams are now exposed in a series of northwest trending thrust sheets. Often the coal seams have been further locally folded and faulted. Depending on the severity of these local structural complexities, and acknowledging a general discontinuity of coal outcrops in the Inner Foothills, coal seam correlations and evaluations can be extremely difficult.

The undivided Upper Cretaceous Brazeau Formation is located in a series of gentle anticlines and synclines that trend in a northwesterly strike direction. In the northeastern part of the map area the Paleocene Coalspur and Paskapoo strata dip between 10 and 30 degrees towards the northeast.

Environmental Setting

Integrated Resource Plans (IRP's)

Almost all of the mapsheet 83E/15 is located within the Berland IRP; Willmore Wilderness Provincial Park, located in the extreme southwest corner of the mapsheet, is not part of the Berland IRP. A separate IRP, for the Willmore Wilderness Provincial Park area, may be undertaken at some time in the future.

In the January, 1990 edition of Planning in Progress (Volume 7 Number 1), the status of the Berland IRP was capsuled by the following statement...

'This plan has been deferred until completion of other projects in progress and resolution of the timber/caribou issue(s). An update will be sent to the public when the project resumes. (Contact: John Brownlee, Manager)'.

See also Figure 3 for locations/outlines of IRP's in the surrounding vicinity. On Figure 3, a bracketed letter trails the name of the IRP; this letter identifies the status of the IRP as

- o (C); completed
- o (P); in-progress or
- o (F); future.

Resource Management

Coal Dispositions

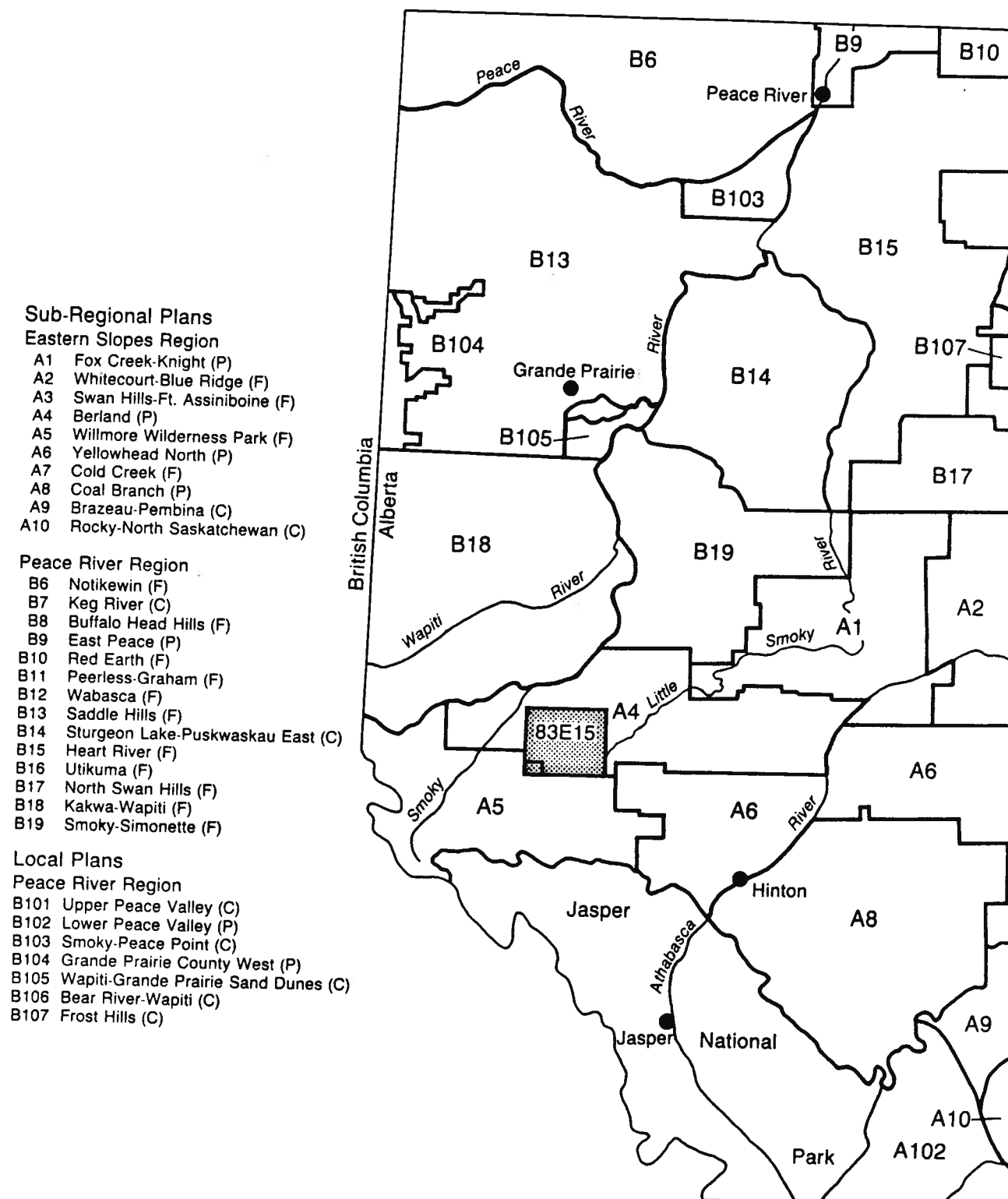
The status of the rights_to_coal within an area can generally be categorized into one of the following

- o Crown coal lease
- o Crown coal lease under application
- o Areas with registered right of first refusal
- o Freehold coal rights
- o Coal withdrawn from disposition.

According to a recent (1989-05-09) Alberta Energy Coal Disposition Map of 83E/15, the following 4 companies are involved in one or more of the above activities

- o Manalta Coal Ltd.
- o Petro-Canada Resources Inc.
- o Seaton-Jordan & Associates
- o Smoky River Coal Limited

Figure 3. Locations/Outlines of IRP's In the Surrounding Vicinity (1989)



It should be noted that most of the corporate coal lease activity is concentrated on the first two categories.

Established Coal Resources and Reserves

Coal resources and reserves have been calculated by the ERCB (1989) for the whole of Alberta.

The present mapsheet contains the:

- o A La Peche Lake Coal Field
- o Susa Creek coal deposit; a 'Small Isolated Deposit' located in the west-central part of the mapsheet.

Both of the above are located within the ERCB-designated 'Mountain Region'.

Only the Coal Field outline has been shown on the GIS plot.

Exploration History

Coal

Coal Exploration Drillholes

Some 86 coal exploration holes have been drilled by 3 companies between 1966 and 1981. Of the holes drilled, 72 holes (84%) intersected coal as per the defined criteria (see Hughes et al., 1988); it follows that 14 holes (16%) did not intersect coal. Hole depths ranged from 14 to 492 meters in depth.

Coal exploration drilling activities were carried out by a number of companies. A summary follows:

<u>COMPANY</u> _____	<u>NUMBER OF HOLES DRILLED</u>
Consolidation Coal Company of Canada	36
Manalta Coal Ltd.	49
Union Oil Company of Canada Limited	1

Based on the April, 1989 version of the ERCB Coal Hole File, details of the coal exploration drillholes are given in Appendix 1 and includes information on:

- o SITID; the assigned Site Identification Number within the AGS Coal Database
- o CAT_ID; the assigned Catalogue Identification Number within the ERCB Coal Hole File (April, 1989 version)
- o ORIG; the Original Identification Number of the Datapoint (ie, drillhole number)
- o EDITED; within the ERCB Coal Hole File, the equivalent to ORIG has been limited to 6 spaces; this, in some cases, has not been sufficient to record the ORIGINAL corporate assigned drillhole number; within the AGS Coal Database, ORIG has been allocated 11 spaces; a 'X' in the EDITED column identifies those drillholes whose ORIG's were truncated; drillholes listed in the ORIG column of the listing have been edited and now reflect the 'true' Original Identification Numbers.
- o NCinDH; a 'NC' in the column indicates that no coal thicker than 0.5m was intersected in the drillhole; this implies that thin coal seams less than 0.5m may be present.
- o M; Meridian
- o T; Township
- o R; Range
- o S; Section
- o RSEC; Reference Section
- o RCNR; Reference Corner
- o METN; Metres north or south from the reference corner
- o METE; meters east or west from the reference corner
- o ELEV; Ground or surface elevation of the datapoint (drillhole)

- o TD; Total depth of drillhole reported in meters
- o CORPNUM; the assigned Corporation Number within the AGS Coal Database
- o CPDT; completion date of the datapoint (drillhole); date coded as yymmdd
- o COMPANY; identifies the company that generated the datapoint (drillhole).

Coal Exploration Trenches/Hand Trenches

During 1982, Union Oil Company of Canada Limited conducted a field mapping program on the Sterne Creek Project area. The program was located, in part, on the mapsheet 83E/15. Seventeen hand-dug trenches were excavated to expose coal seams within the mapsheet area.

Trench locations have been shown on the GIS plot.

Oil and Gas Wells

Within the study area, 9 oil and gas wells have been drilled. Of the wells drilled,

- o 3 have been abandoned
- o 4 are capped gaswells
- o 2 are suspended gaswells.

See Appendix 2 for additional data. The Appendix is based on queries from the ERCB oil and gas database (April, 1989 version).

Coal Occurrences

Coal Exploration Drillholes

On both Appendix 1 and the map, coal exploration drillholes have been identified as either

- o coal thicker than 0.5m intersected in the drillhole

or

- o no coal thicker than 0.5m intersected in the drillhole.

Coal is defined as greater than 50% carbonaceous material by weight and more than 70% carbonaceous material by volume as estimated from geophysical logs. The exclusion of coal seams thinner than 0.5m is consistent with Hughes et al. (1988), who exclude seams thinner than 0.5m in resource determination.

Coal intersections, per coal exploration drillhole, have been included in Appendix 3. The listing includes

- o SITID; the AGS Coal Database identification number
- o CAT_ID; the ERCB catalogue identification number
- o ORIG; the original company-assigned drillhole number
- o M T R S ; Dominion Land Survey (DLS) information; ie, Meridian, Township, Range and Section
- o TOP DEPTH; depth to top of coal in meters
- o BOT DEPTH; depth to bottom of coal in meters
- o THICK; thickness of the coal seam in meters
- o SEAM; Correlated Coal Seam Name/Number (if known); a '0' indicates that the seam has not been correlated
- o MIN; Mineral Matter content of the coal (often a best-estimate from geophysical log interpretation); a '0' indicates that the mineral matter of the coal was not available and/or not derived.
- o REGOLITH; thickness, in meters, of the regolith
- o PIKNUM; the geological pick identification number as stored in the AGS Coal Database
- o REMARKS.

Coal Exploration Trenches/Hand Trenches

Seventeen hand-dug trenches were excavated to expose coal seams within the mapsheet 83E/15. Trench locations have been shown on the GIS plot.

Thicknesses of the coal seams exposed within the trenches range from 1.7 to 5.7 meters.

Coal Outcrops

Some sixty four coal outcrops have been identified within the mapsheet 83E/15. Coal seam outcrop locations have been identified on the GIS plot.

The maximum thickness of coal in outcrop is 5+ meters.

Coal Quality Summary

Coal Rank

Within the mapsheet 83E/15, the rank of the coal varies from

- o high volatile bituminous C in the Paleocene Coalspur Formation (and/or Kakwa Coal Measures) to
- o low to medium volatile bituminous in the Lower Cretaceous Luscar Group.

No coal quality information is available for coal of the Upper Cretaceous Brazeau Formation (and/or Cutbank Coal Measures) which is believed to be deposited within the mapsheet area. The rank of that coal, if present, would likely be high volatile bituminous C.

Coal Exploration Drillholes

No drillholes, within the mapsheet 83E/15, contain raw coal quality information.

One drillhole, however, does contain 1 sample of washed coal. Coal quality data generated from the washed sample includes

- o 1 complete Proximate Analysis
- o 1 analysis of Sulphur

- o 1 analysis of Heating Value (air-dried basis)
- o 1 analysis of Heating Value (dry basis)
- o 1 analysis of Equilibrium Moisture.

Coal Outcrops

Forty nine outcrops, within the mapsheet 83E/15, have been sampled. Coal quality data generated from the samples include:

- o 55 analyses of vitrinite reflectance from 47 outcrops; samples were collected by the ARC/AGS and GSC/ISPG (1988-89) and Union Oil Company of Canada Limited (1982); reflectance values range between 0.64 and 1.58%.
- o 2 analyses of palynology from 2 outcrops; information is limited to location only; samples were collected by Union Oil Company of Canada Limited during the 1980 field season.

Coal Exploration Trench/Hand Trench Data

In 1982, Union Oil Company of Canada Limited conducted a field mapping program on their Sterne Creek Project area. Within the mapsheet 83E/15, 11 hand-dug coal trenches were sampled. Coal quality data generated from the trench samples include

- o Proximate Analysis from 9 trenches
- o Sulphur analysis from 9 trenches
- o Heating Value determinations from 9 trenches
- o FSI values from 9 trenches
- o Vitrinite reflectance values from 11 trenches
- o Petrographic analysis from 4 trenches.

Operating and Abandoned Coal Mines

There are no operating or abandoned coal mines within the mapsheet.

Coal Resource Development Potential

A semiquantitative and subjective evaluation of the potential of coal development in the map area is based on limited data. It is based on mainly geological criteria and does not take into account governmental restrictions on coal development or evaluate actual economic constraints to development now or in the future. The three criteria that have been used are Coal Potential, Mining Potential, and Data Availability (discussed in more detail below). Areas in Green on the companion map (thematic inset 'Coal Development Potential') reflect higher level of knowledge and potential for development of coal than the blue (medium) or red areas (low). Areas rated in blue indicate more information is needed to determine the coal development potential. Areas colored red indicate some potential for development. The remaining uncolored areas have no data available often because the coal, if present, is at depth under non coal-bearing rocks.

Coal Potential

Resources

The amount of data is too small for a quantitative evaluation of coal resources except in those limited areas with drilling. The ERCB (1989) provides estimates of in-place resources for the A La Peche Lake Coal Field and for the 'small isolated deposit' of Susa Creek.

Coal Quality

Very little coal quality data is available but where test results are present the potential of the coal for development is strengthened. In general where a sample has been collected and analyzed the coal has an inherent development potential.

Mining Potential

Overburden

An evaluation of overburden for surface mining and depth for underground mining has been

made. (The 'Mining Potential' criteria did not take into account governmental restrictions on coal development or evaluate actual economic constraints to development now or in the future.)

Geotechnical

Geotechnical considerations included an evaluation of structural setting, both simple and complex, with the possibility of structurally thickened seams. Consideration was given to infrastructural concerns related to site, environment and potential mining problems.

Data Availability

Very little coal data is available in the map area but where present the potential of the coal for development is strengthened. In general, where a sample, drillhole, trench or outcrop is present the coal has an increased development potential. Some value was given to areas containing sediments that typically include coal.

Future Work

In general, from a coal resource/exploration point of view, the map area has been superficially examined. Additional coal quality data needs to be collected throughout the map area. Only two areas, the ERCB's A La Peche Lake Coal Field and the Sterne Creek area (north half of Township 56 and south half of Township 57, Range 7, W6) have a good exploration database but structural geology studies are needed for both areas. The Sterne Creek area includes the ERCB Susa Creek coal deposit; described as a 'Small Isolated Deposit'. Within the Sterne Creek area, seams # 3, 4, and 10 from the Grande Cache area can be identified and traced. Seam 3 can also be identified in the La Peche Lake area and from the Sterne Creek area southeast to the Muskeg River. More work will be needed to trace the other seams within the Luscar Formation outside the Sterne Creek area. The Luscar Formation within the Willmore Wilderness in the extreme southwest portion of the map has no data available although one coal outcrop has been identified.

Little data is available and the coal development potential is uncertain for most of the remaining map area, particularly in the northeast where the Brazeau Formation (containing the Cutbank Coal Measures) and the Coalspur Formation (which contains the Coal Valley Coal Zone/Kakwa Coal Measures) have been projected. A promising area for future work is the Coal Valley Coal Zone trend in the east part (Pierre Greys Lakes, Lone Teepee and Burleigh Creeks area) of the

map area where a preglacial valley may mean lower overburden than along trend to the northwest. Additional subsurface geological studies, including the construction of regional cross-sections and seam correlations, are needed in the eastern and Sterne Creek/A La Peche Lake regions of the map area.

References

Alberta Forestry, Lands and Wildlife - Resource Planning Branch. 1990-01. Planning in Progress newsletter (Volume 7, Number1).

Alberta Energy. 1989. Coal Dispositions, May 9, 1989 version (Coal Leases and Applications et.al.) Map - 83E NE. Scale 1: 125 000.

Allan, J.A. and Carr, J.L. 1946. Geology and Coal Occurrences of the Wapiti-Cutbank Area, Alberta. Research Council of Alberta, Report 48.

* Bell, D. E. 1978. 1978 Coal Geological Work, Grande Cache, Alberta. Report prepared for Pacific Petroleum Ltd., Calgary, Alberta. Report contains 1: 20 000 regional geological map. Outline identified as 6 on GIS plot.

Bell, D.E. Personal communications with regard to the study area.

* Blakeney, R.S. 1981-01. West of Sixth Project - Thermal Coal Acreage-Geological Evaluation Based on 1980 Field Mapping Program. Union Oil Company of Canada Limited. 4 Volumes. Report contains detailed regional geological maps. Scale 1: 25 000. Outline identified as 3 on GIS plot.

Campbell, J.D. Coal Mines and Coal Leases, Alberta Rocky Mountains and Foothills. Research Council of Alberta. Report 66-5.

Carter Mapping Limited. 1988-04-03. Adams Lookout mapsheet - 83E10 & 15 (oil and gas well locations). Scale 1: 50 000.

* David E. Pearson and Associates Ltd. Prepared for Union Oil Company of Canada Limited. 1982-12. Report on 1982 Program Sterne Creek Project. 2 Volumes. Report contains 1: 12500 geological maps (3) and cross-sections (7). Outline identified as 8 on GIS plot.

* David E. Pearson and Associates Ltd. Prepared for Union Oil Company of Canada Limited. 1982-11. Petrography of Sterne Creek Trench Samples. Outline identified as 9 on GIS plot.