

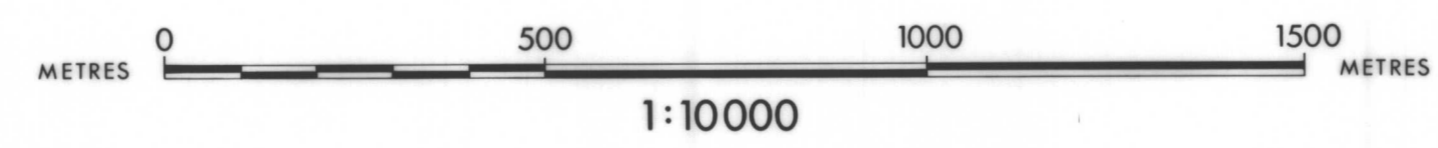
Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 1

PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART



GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA

SYMBOLS

MOOSE MOUNTAIN SANDSTONE	.....	M
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWNTHRUST SIDE)	.....
ANTICLINE	.....	50
SYNCLINE	.....
FERNIE FORMATION	.....	F
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	.....	100
THICKNESS OF SEAMS IN METRES	.....	2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _m)	.....	0.86

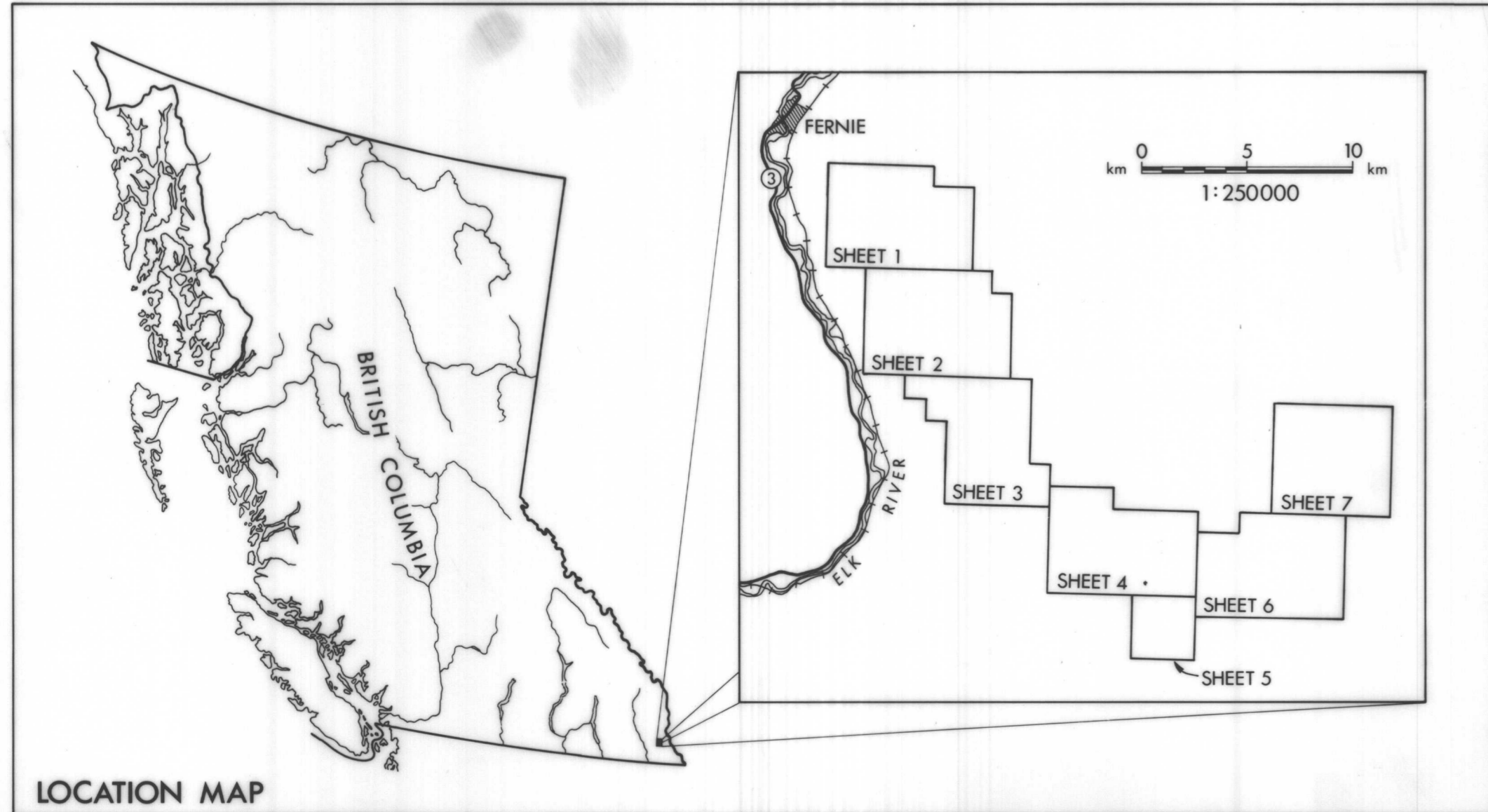
EXPLANATION

This map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group on the scarp slope of Morrissey Ridge. The coal measures lying between the basal sandstone and the overlying Elk Formation are about 620 metres thick. Coal forms about 8 per cent of the succession.

The rank of the coal has been determined by measuring in oil the mean maximum reflectance (R_m) of the coal maceral vitrinite. Values < 1.32 per cent indicate high volatile bituminous coals; values > 1.32 per cent indicate medium volatile bituminous. In this area of Morrissey Ridge only the upper coals have high volatile rank; all the others are of medium volatile rank. An increase in rank takes place southward along the strike of coal measures toward Morrissey Creek, whereas northward there is a decrease in rank toward Hooper Ridge.

Morrissey Ridge exposes a strike section of coal measures with the thickest development of the overlying Elk Formation in the Crowsnest Coalfield. Correlation of individual coal seams is usually difficult and often impossible in this section because of rapidly changing lithologies.

drafting by J. St. Gelis



LOCATION MAP

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 2

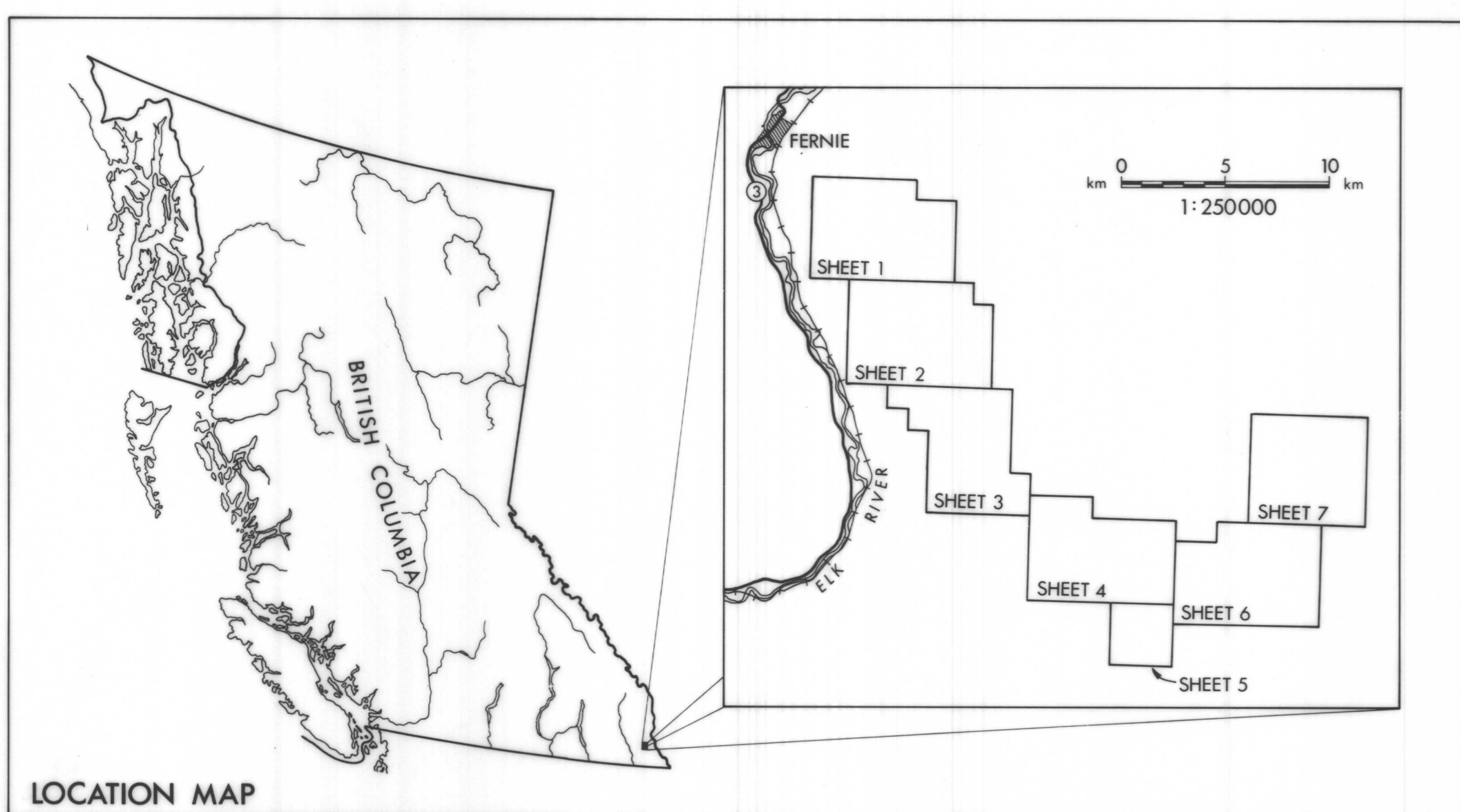
PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART

0 500 1000 1500 METRES
1:10000

GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA



SYMBOLS

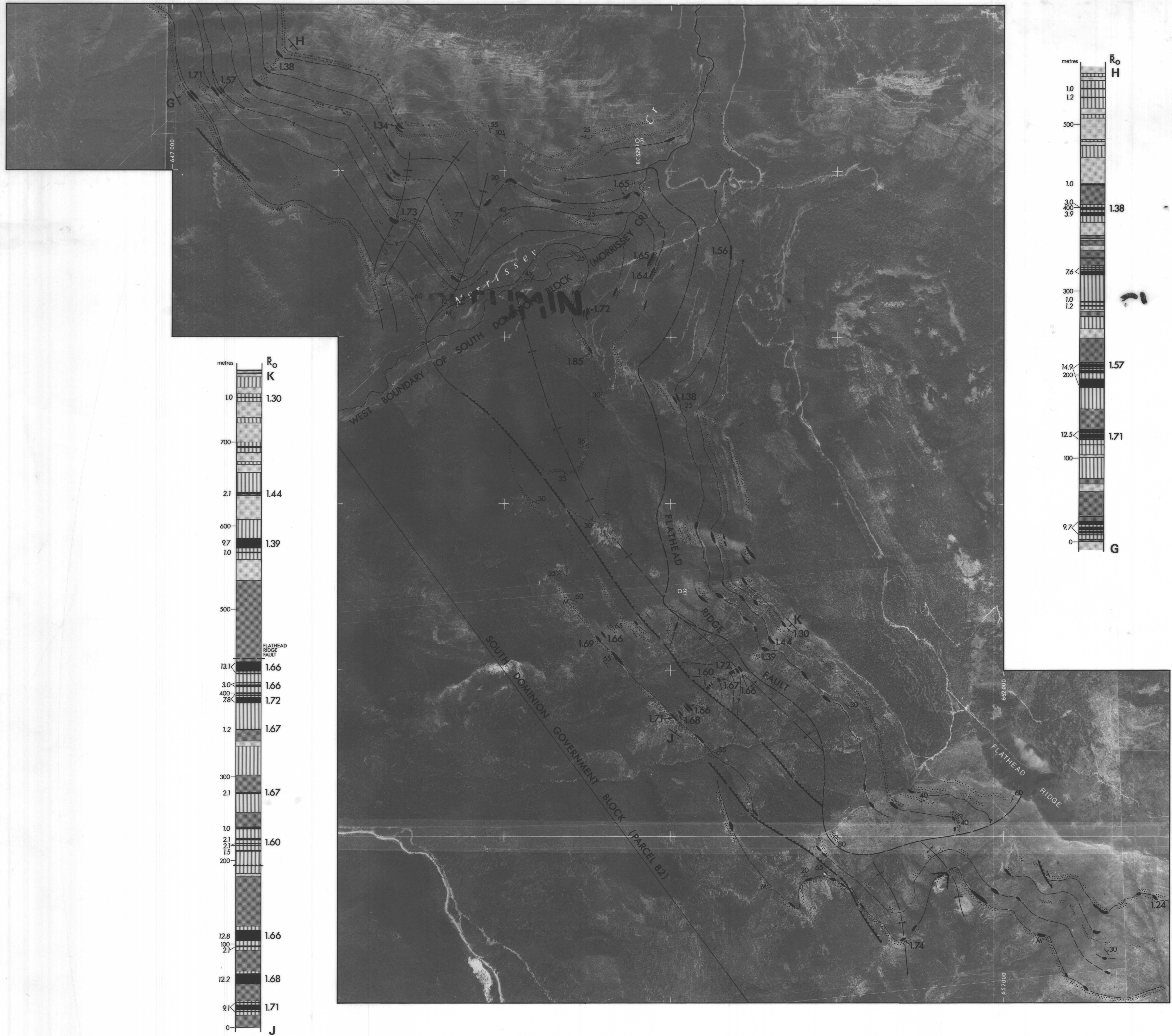
MOOSE MOUNTAIN SANDSTONE	.....
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UP THRUST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWN THROWN SIDE)	.....
BEDDING: TOPS KNOWN	.....
ANTICLINE	.....
SYNCLINE	.....
FERNIE FORMATION	.....
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	..... 100
THICKNESS OF SEAMS IN METRES	..... 2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_0)	..... 0.86

EXPLANATION

This map shows the distribution of coal seams of the Jurassic-Cretaceous-Kootenay Group on the steep slope of Morrissey Ridge. The coal measures lying between the basal sandstone and the overlying Elk Formation vary in thickness from 470 metres at the north end of the sheet to 580 metres in section E-F. The proportion of coal in the succession varies between 11 and 14 per cent.

The rank of the coal has been determined by measuring in oil the mean maximum reflectance (R_0) of the coal maceral vitrinite. Values <1.12 per cent indicate high volatile bituminous coals; values >1.12 per cent indicate medium volatile bituminous coals; above 1.81 per cent coals are of low volatile rank. In section C-D, only the coal directly beneath the base of the Elk is of high volatile rank; all other coals in that section are of medium volatile bituminous rank. In section E-F, however, there are no high volatile coals, but in contrast the lowest sequence of seams are of low volatile rank. Thus, moving south along the strike of the measures on Morrissey Ridge, there is an increase in rank, so that at the south end of the map sheet the coals exposed in the lower half of the succession are of low volatile rank.

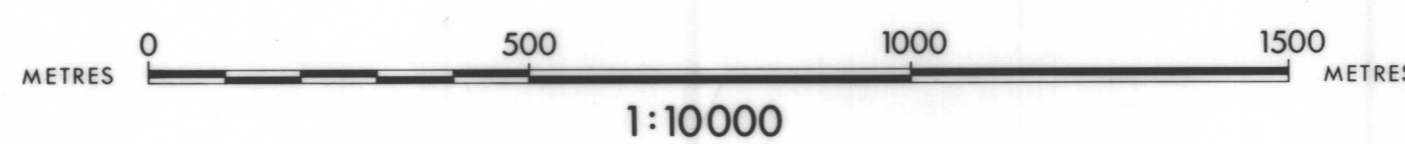
Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 3

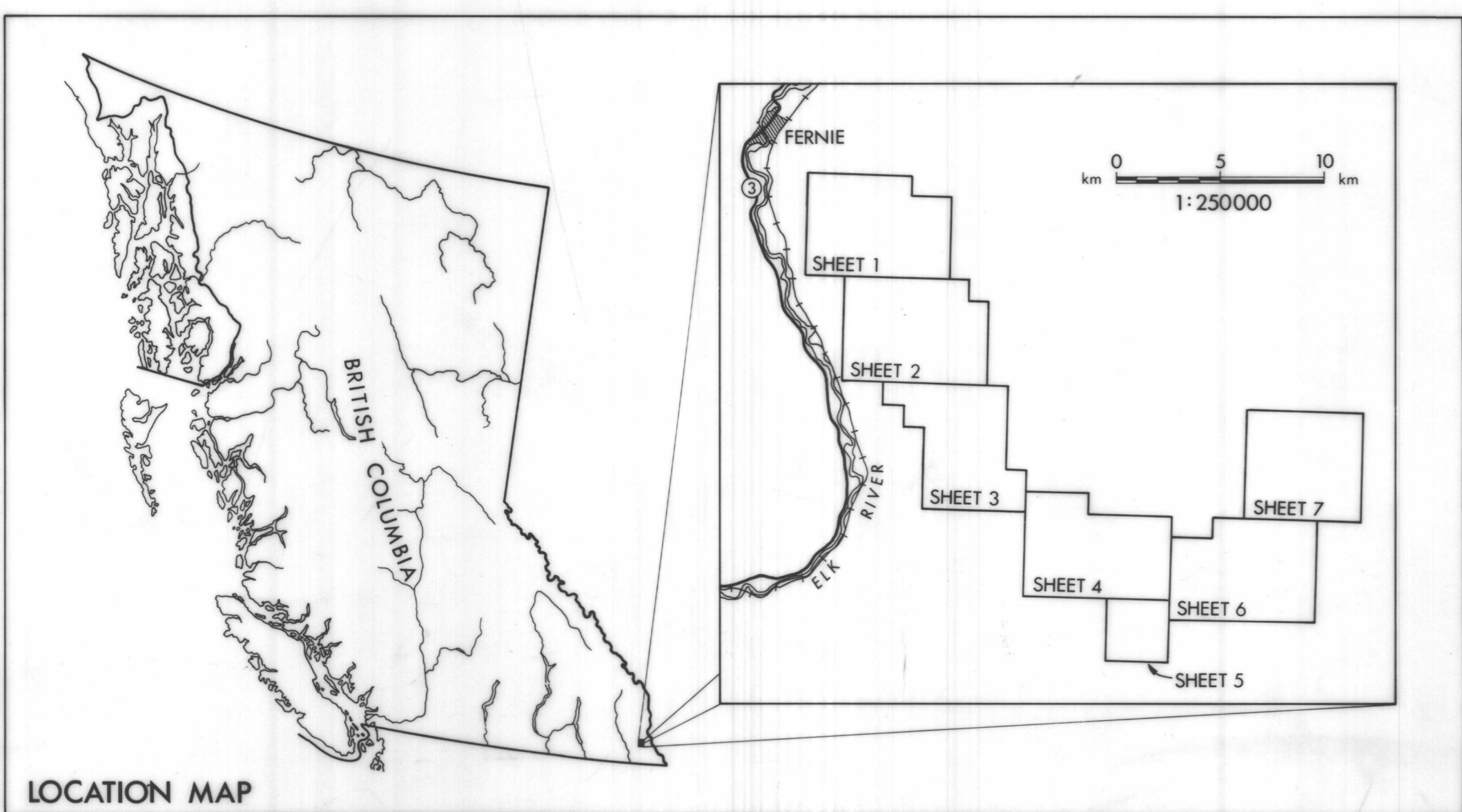
PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART



GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHO PHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA



SYMBOLS

MOOSE MOUNTAIN SANDSTONE	.....
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPHRUST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWNTHROWN SIDE)	.....
BEDDING: TOPS KNOWN	.....
ANTICLINE	.....
SYNCLINE	.....
FERNIE FORMATION	.....
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	..... 100
THICKNESS OF SEAMS IN METRES	..... 0.27
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R ₀)	..... 0.86

EXPLANATION

This map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group in the vicinity of Morrissey Creek and Flathead Ridge, across the western part of the South Dominion Coal Block (Parcel 82). At the south end of Morrissey Ridge (section G-H) the thickness of the coal measure is 500 metres, of which 10 per cent is coal; the structurally thickened section exposed on Flathead Ridge (K-J) is by contrast 770 metres thick, yet did not reach the overlying Elk Formation. Of this succession, 11 per cent is coal.

The rank of coal has been determined by measuring in all the mean maximum reflectance (R₀) of the coal macerals vitrinite. Values >1.81 per cent indicate low volatile bituminous coal; values <1.51 per cent indicate medium volatile bituminous coal. All coals exposed on Morrissey Creek valley are of low volatile rank; all coals exposed beneath the Flathead Ridge fault are low volatile in rank. Medium volatile coals are restricted to the structural plate rising on the Flathead Ridge fault, though they are also present on the eastern margin of the map sheet close to the ridge crest.

The rank of coal changes down-dip of seams. For example, the seam at 400 metres elevation above the basal sandstone with R₀ maximum of 1.38 per cent shown in section G-H has increased in reflectance in Morrissey Creek valley to 1.86 per cent R₀. This is because much of the coalification in this area of the coalfield occurred subsequent to folding and tilting.

Flathead Ridge fault, which cuts across the hinge zones of a syncline-anticline couplet at the south margin of the sheet, is a post-coalification structure that separates coal of markedly different rank. Overturned, contractional structures at the southern extremity of the fault may indicate a thrust component prior to normal movement of about 1000 metres (vertical).

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 4

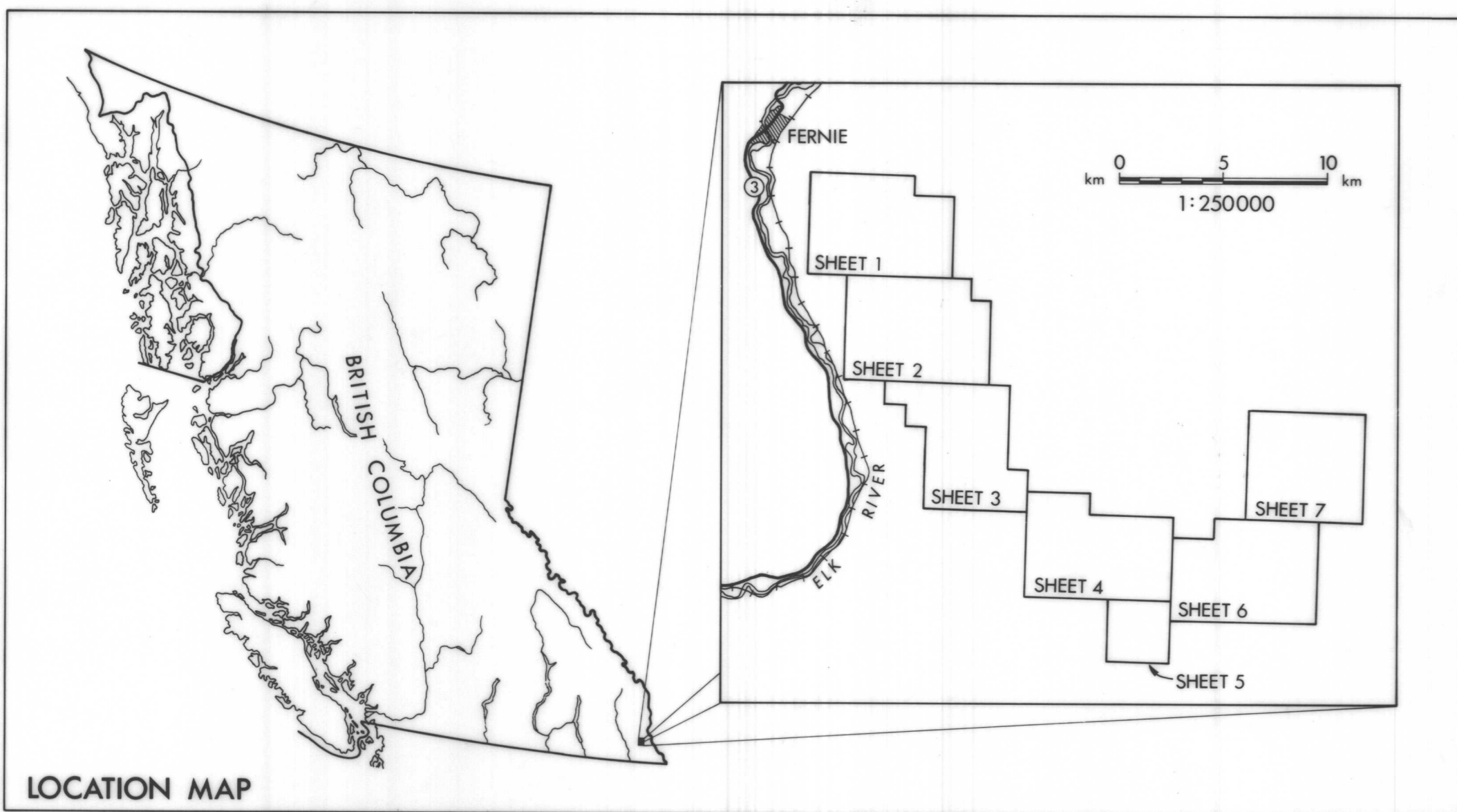
PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART

0 500 1000 1500 METRES
1:10000

GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA



SYMBOLS

MOOSE MOUNTAIN SANDSTONE	.....
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPRHURST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWNTHROWN SIDE)	.....
BEDDING: TOPS KNOWN	.....
ANTICLINE	.....
SYNCLINE	.....
FERNIE FORMATION	F
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	100
THICKNESS OF SEAMS IN METRES	2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _o)	0.86

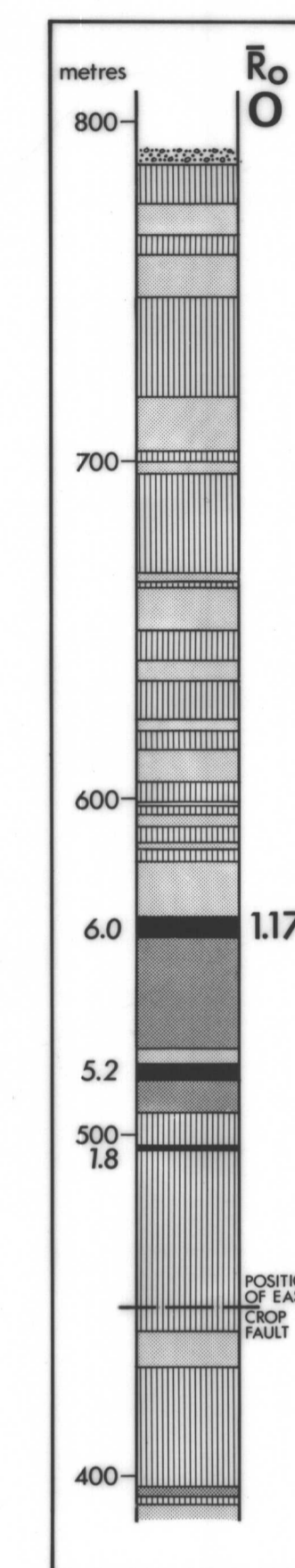
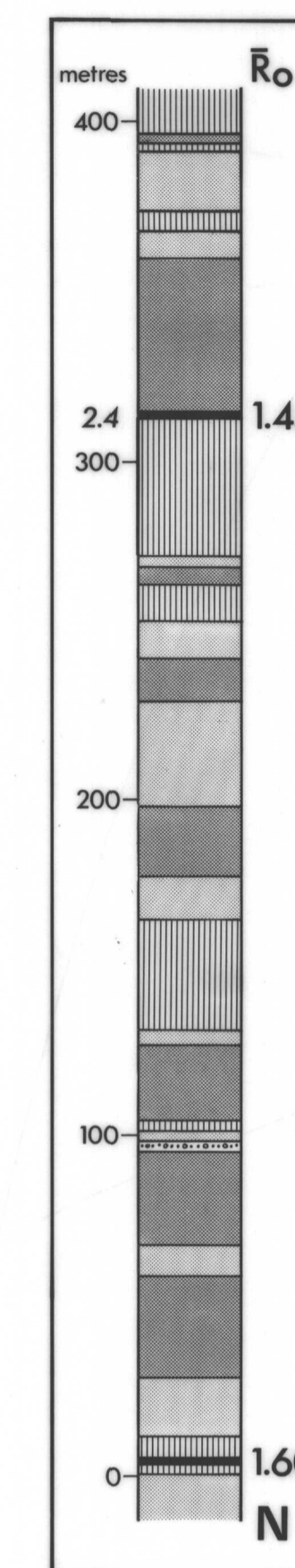
EXPLANATION

This map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group on the scarp slope of Flathead Ridge on the east side of the South Dominion Coal Block (Parcel 82). The coal measures lying about the basal sandstone in the pipeline section are about 500 metres thick. No definitive Elk Formation was recognized. Coal forms about 7 per cent of the succession.

The rank of the coal has been determined by measuring in oil the mean maximum reflectance (R_o) of the coal maceral vitrinite. Values >1.51 per cent indicate low volatile bituminous coal; values <1.51 per cent indicate medium volatile bituminous coal; values <1.12 per cent indicate high volatile bituminous coal. Along the section of Flathead Ridge, the lowest exposed seams are of low volatile rank whereas the uppermost seam is of high volatile rank. The rank of most of the exposed seams is medium volatile bituminous.

With the exception of the seam sitting directly on the basal sandstone, the lower seams are difficult to trace and correlate because of their lenticular character.

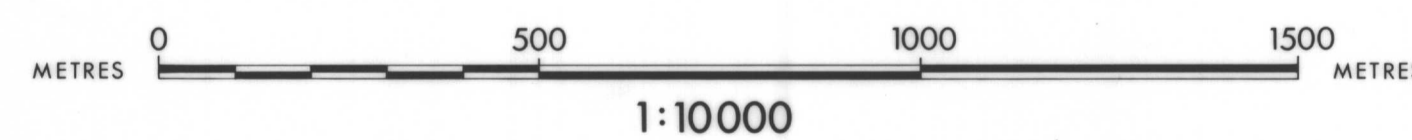
Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 5

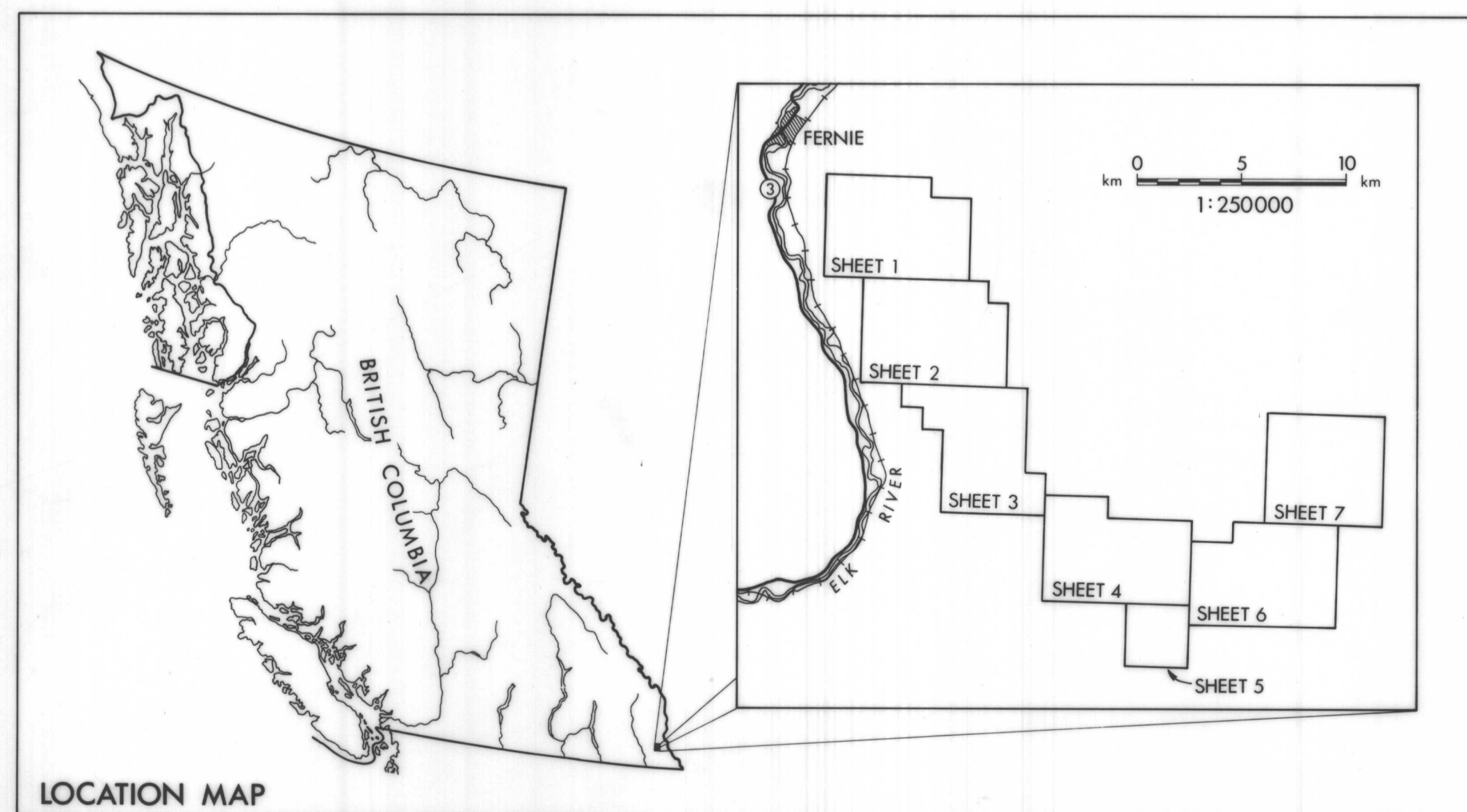
PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART



GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA



SYMBOLS

MOOSE MOUNTAIN SANDSTONE	.....
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWNTHROWN SIDE)	.....
BEDDING: TOPS KNOWN	.....
ANTICLINE	.....
SYNCLINE	.....
FERNIE FORMATION	.....
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	..... 100
THICKNESS OF SEAMS IN METRES	..... 2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_o)	..... 0.86

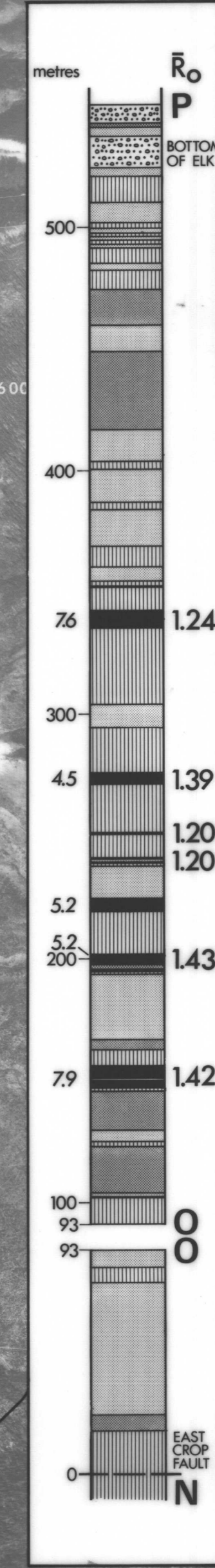
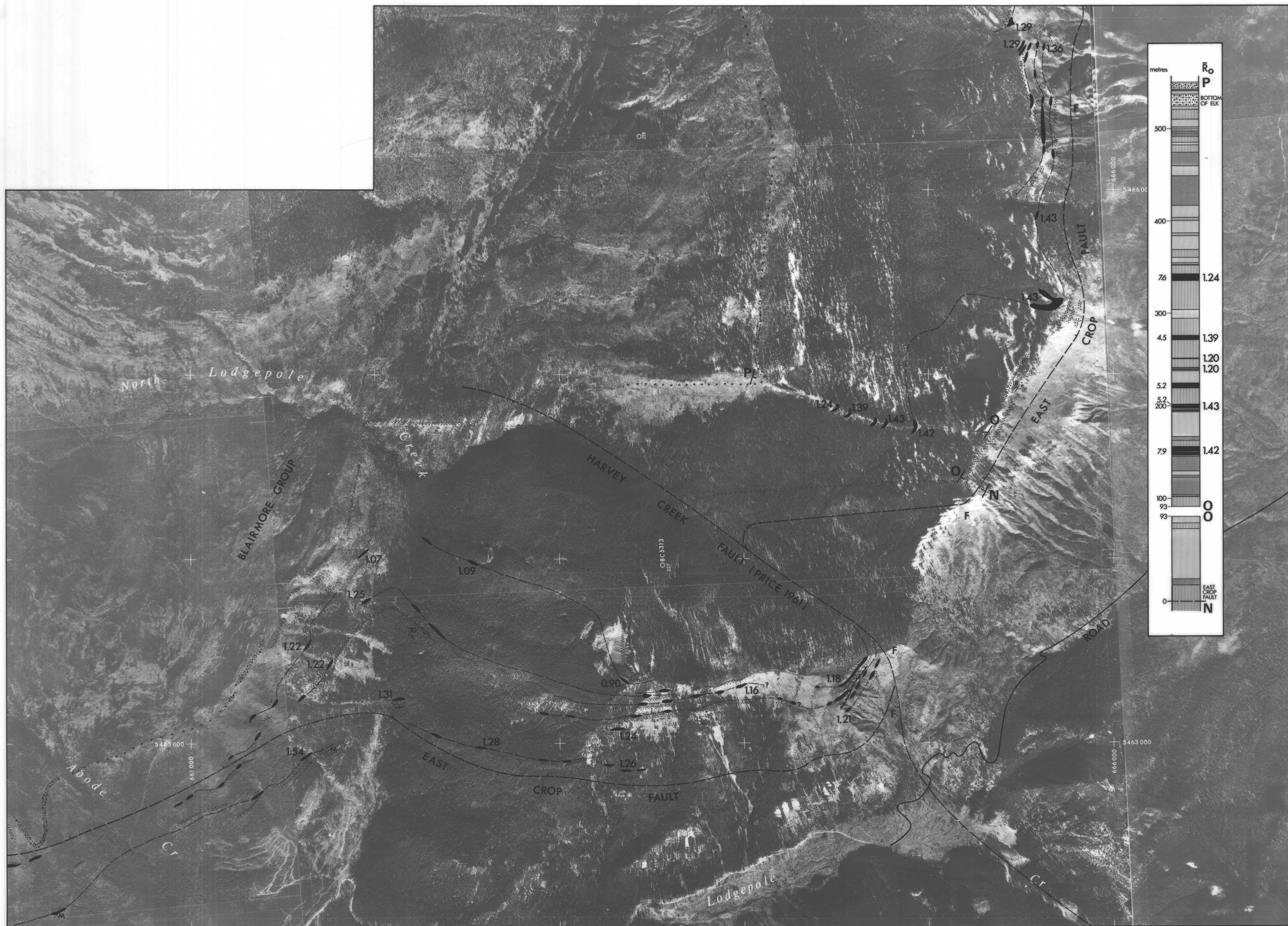
EXPLANATION

This small map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group at the south end of the Crowsnest Coalfield. The area is important, however, as it shows the locus of the East Crop fault. From the basal sand to the base of the Blairmore (shown on the map as -C-C-) is about 850 metres but this is a structurally modified section (N-O) across the East Crop fault. Only 1.5 per cent of the succession is coal, and this is an unusually small proportion.

The rank of the coal has been determined by measuring in oil the mean maximum reflectance (R_o) of the coal maceral vitrinite. Values <1.12 per cent indicate high volatile bituminous coal; values >1.12 per cent indicate medium volatile bituminous coal; values >1.56 per cent indicate low volatile bituminous coal. In this section the lowest coal is of low volatile bituminous rank; the uppermost seams are close to high volatile rank; most of the succession is of medium volatile bituminous rank.

The rank gradient beneath the East Crop fault is 0.05 per cent R_o /100 metres. If the same gradient exists above the fault, separation across this structure is of the order of 400 metres downthrow on the upper plate. Constriction structures on the upper plate imply a period of compression prior to normal movement, and this suggests that the fault was earlier a thrust surface. An addition of 400 metres of section prior to normal movement on the East Crop fault would indicate a 1 200-metre-thick Kootenay succession in this area. Such a thickness is not compatible with adjacent areas and is another line of evidence suggesting structural thickening, that is, thrusting, across a structure which is now recognized as the East Crop fault. These data are compatible with the thesis that coalification occurred prior to normal movement on this fault but subsequent to the speculated thrusting.

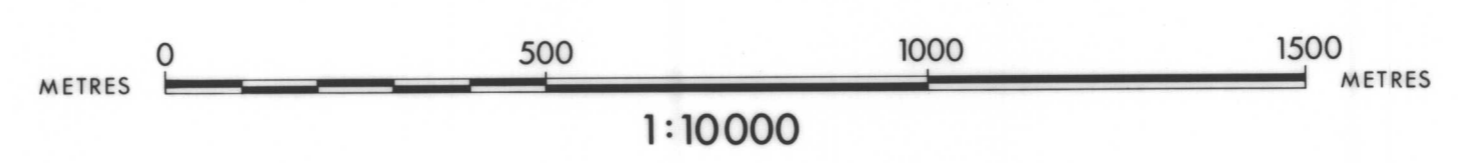
Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 6

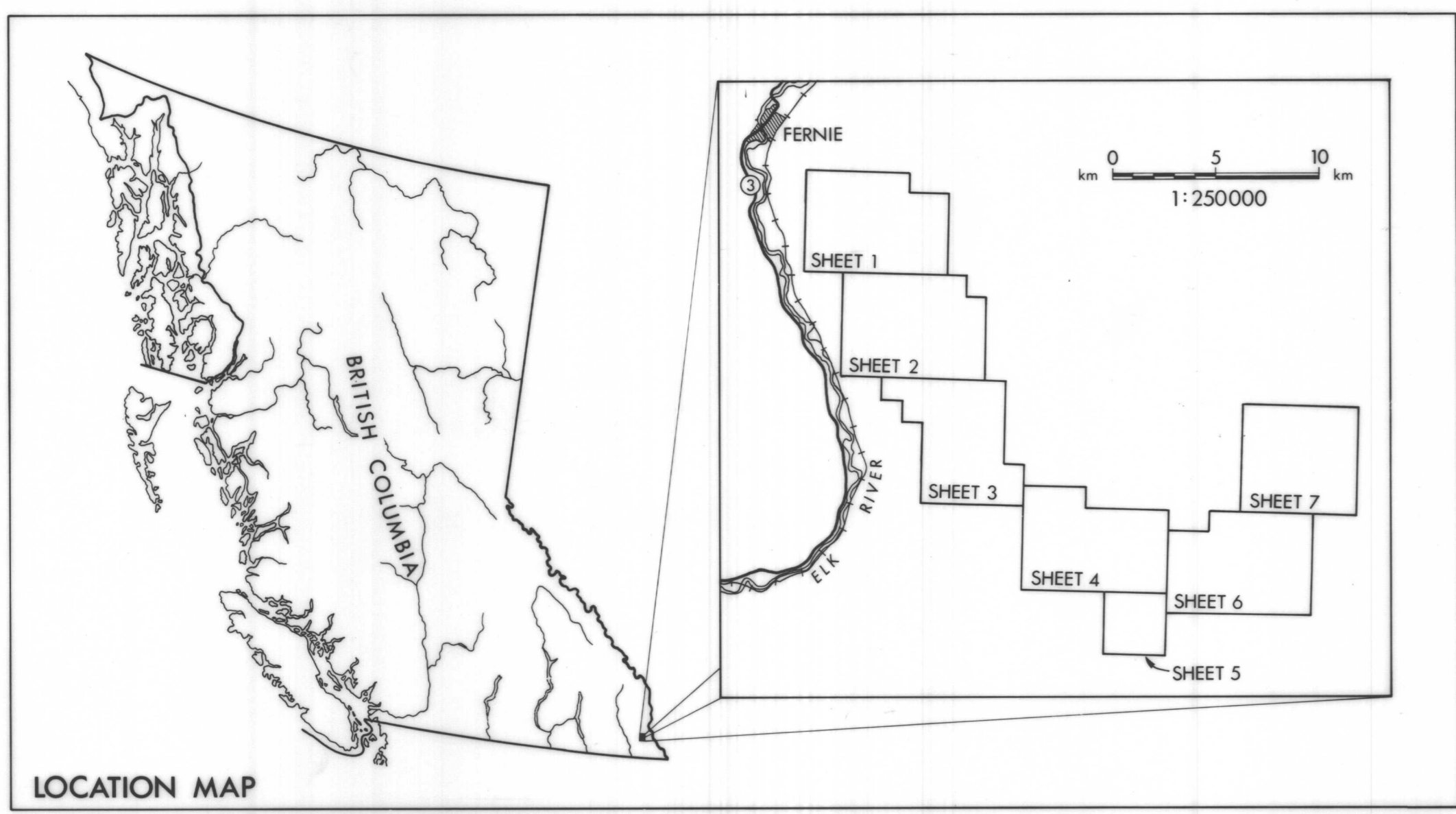
PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWSNEST COALFIELD SOUTHERN PART



GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA



SYMBOLS	
MOOSE MOUNTAIN SANDSTONE	.....
COAL SEAM: EXPOSED, ASSUMED	.....
CONGLOMERATE: EXPOSED, ASSUMED	.....
SANDSTONE: EXPOSED, ASSUMED	.....
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)	.....
FAULT: APPROXIMATE (BAR ON DOWNTHROWN SIDE)	.....
BEDDING: TOPS KNOWN	.....
ANTICLINE	.....
SYNCLINE	.....
ERNIE FORMATION	.....
NO EXPOSURE	.....
SILTSTONE	.....
SANDSTONE	.....
COAL	.....
HEIGHT IN METRES ABOVE BASAL SAND	..... 100
THICKNESS OF SEAMS IN METRES	..... 2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R ₀)	..... 0.86

EXPLANATION	
This map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group in the vicinity of Lodgepole Creek and the south end of McLaughlin Ridge, in the southeast corner of Crowsnest Coalfield. The East Crop fault structurally thins successions on this map sheet, but 500 metres of Kootenay Group rocks sits on this structure in section N-P. The largest sandstone exposed at the base of this section is not regarded as the basal Kootenay sandstone as carbargillites are exposed beneath it.	
The rank of the coal has been determined by measuring in oil the mean maximum reflectance (R ₀) of the coal maceral vitrinite. Values >1.51 per cent indicate low volatile bituminous coal; values <1.51 per cent indicate medium volatile bituminous coal; values <1.12 per cent indicate high volatile bituminous coal. Beneath the East Crop fault, all coals possess low volatile rank. Riding on this structure there are both medium and high volatile coals.	
The East Crop fault cuts down section in a short distance; at the west margin of the map sheet the basal Elk conglomerate lies structurally close to the Moose Mountain sandstone, yet at the approximate position of Lodgepole Creek the basal sandstone is cut out. The late normal fault referred to as the Harvey Creek fault (Price, 1961) possesses normal movement on the East Crop fault.	

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



SHEET 7

PRELIMINARY MAP 42
FEBRUARY 1981

GEOLOGY OF CROWNEST COALFIELD SOUTHERN PART

0 500 1000 1500 METRES
1:10000

GEOLOGY BY: DAVID E. PEARSON DAVID A. GRIEVE

ORTHO PHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA

SYMBOLS

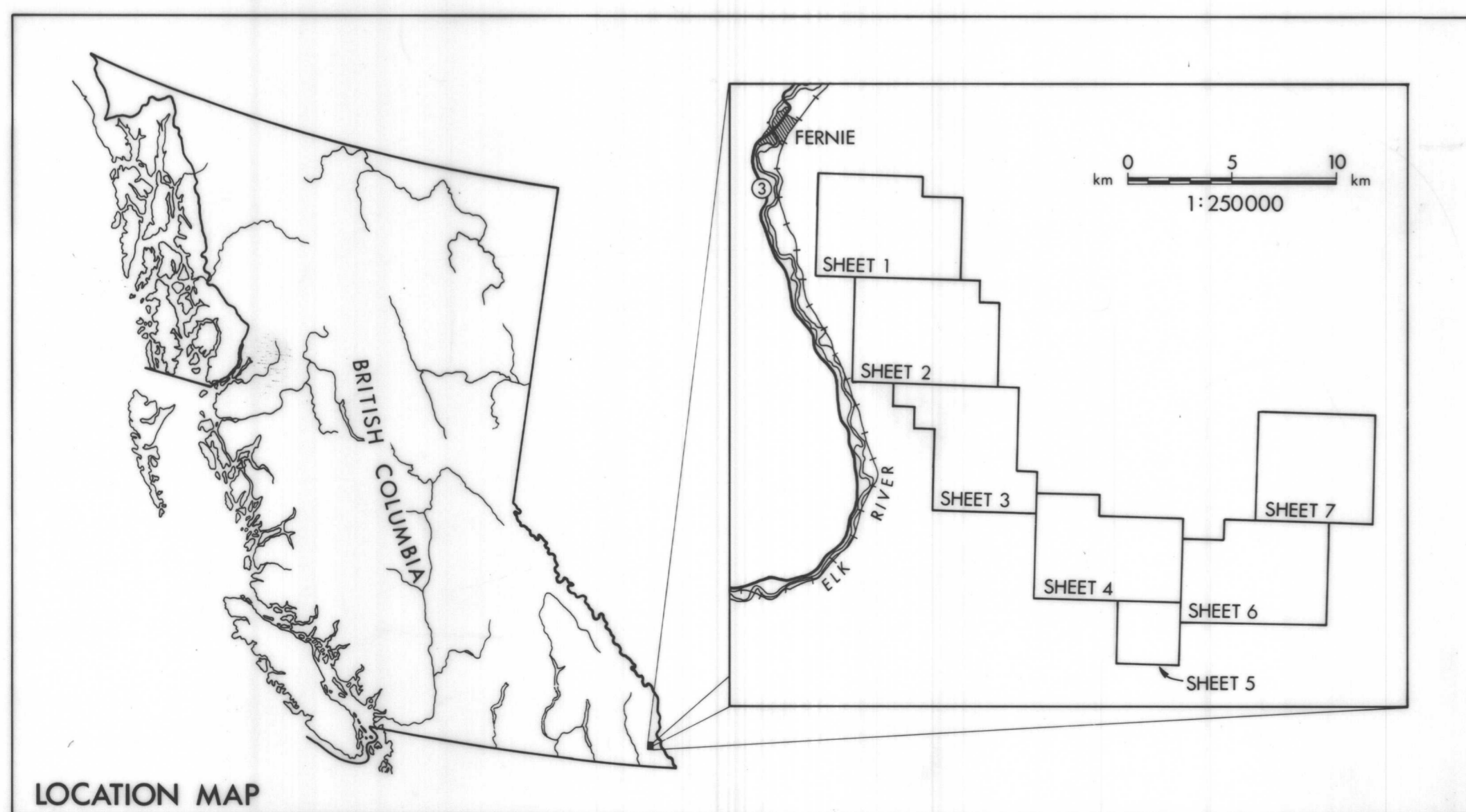
MOOSE MOUNTAIN SANDSTONE	
COAL SEAM: EXPOSED, ASSUMED	
CONGLOMERATE: EXPOSED, ASSUMED	
SANDSTONE: EXPOSED, ASSUMED	
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)	
FAULT: APPROXIMATE (BAR ON DOWNTHROWN SIDE)	
BEDDING: TOPS KNOWN	
ANTICLINE	
SYNCLINE	
FERNIE FORMATION	
NO EXPOSURE	
SILTSTONE	
SANDSTONE	
COAL	
HEIGHT IN METRES ABOVE BASAL SAND	100
THICKNESS OF SEAMS IN METRES	2.7
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R ₀)	0.86

EXPLANATION

This map shows the distribution of coal seams of the Jurassic-Cretaceous Kootenay Group along McLauchie Ridge in the southeast part of Crownest Coalfield. The thickness of the exposed succession in this section are about 500 metres, but it is believed that the lower part of the succession has been structurally attenuated by normal movements on the East Crop fault.

The rank of coal has been determined by measuring in all the main maximum reflectance (R₀) of the coal meseral vitrinite. Values >1.12 per cent indicate medium volatile bituminous coal; values <1.12 per cent indicate high volatile bituminous coal. Coals of the lower half of the exposed succession are of medium volatile bituminous rank; those exposed in the upper half are of high volatile bituminous rank.

In the measured section (Q-T), two extensive conglomerates separated by about 50 metres are overlain by a nodular carbonate bed (C-C-C) which elsewhere in the coalfield has been used as the base of the overlying Blairmore Group. The Elk Formation therefore appears to be quite thin here with the lowermost conglomerate facies regarded as its base.



LOCATION MAP