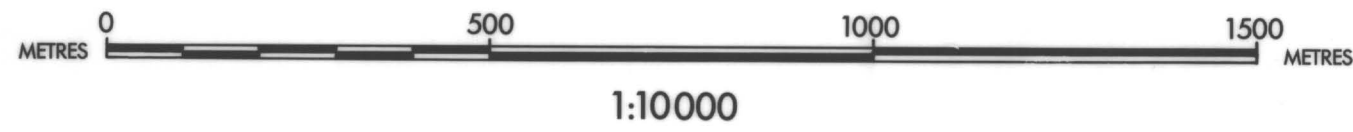


Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

SHEET 1
PRELIMINARY MAP 60
AUGUST 1985

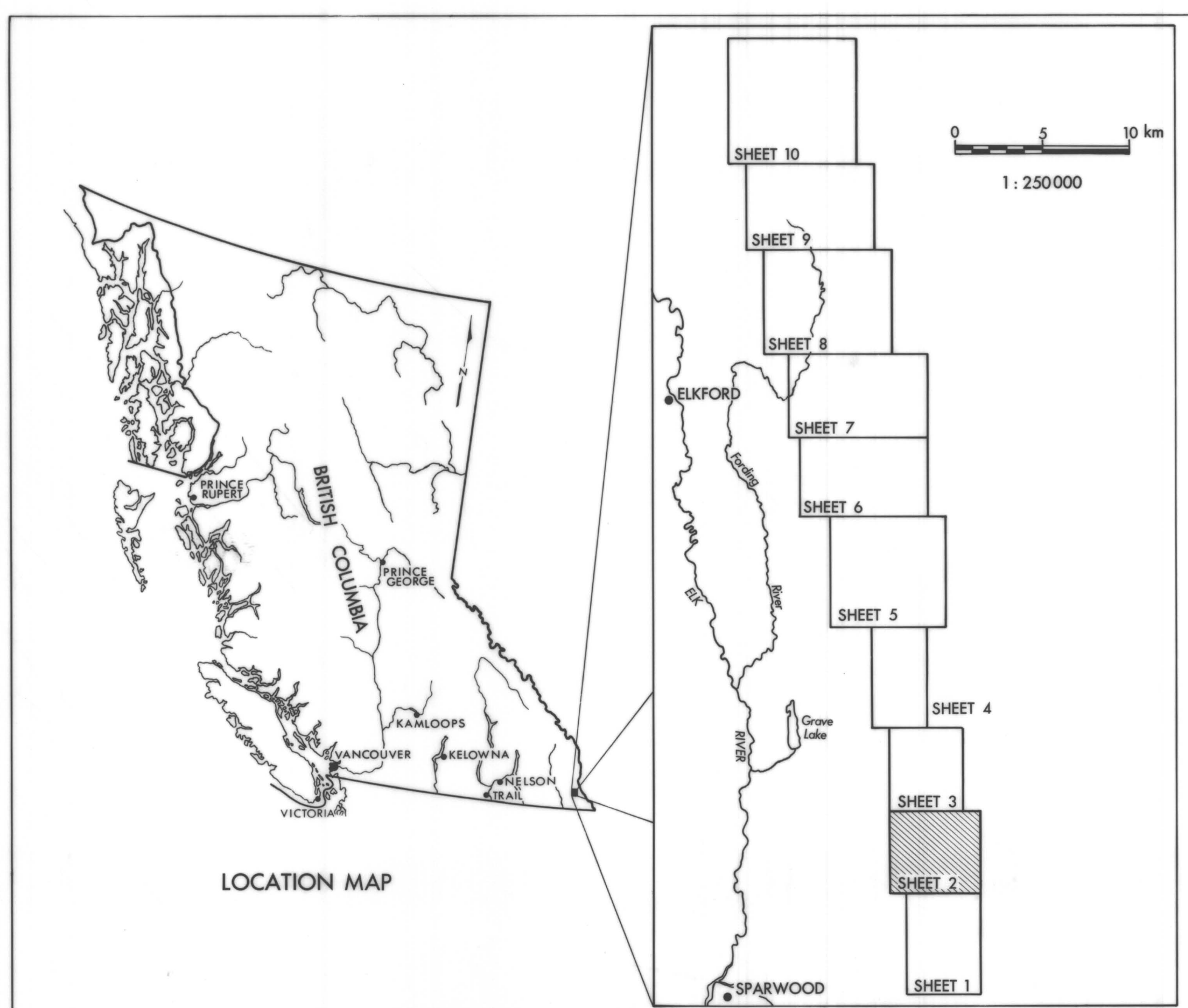
GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)



GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

SYMBOLS		EXPLANATION
MAP		
COAL SEAM (1 m THICKNESS): EXPOSED, ASSUMED		Jurassic-Cretaceous Woodmen Group exposures in the area between Kilmarnock Creek and Line Creek (mineral vein mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teague Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982).
SANDSTONE: EXPOSED, ASSUMED		Coal rights in the study area are owned by Crown West Resources Ltd., Westair Mining Ltd., and Fording Coal Ltd.
CONGLOMERATE		Data presented are based on examination of surface outcrops, roadcuts, and benches, and are supplemented by air-photograph interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seams pinch-out and wash-outs are common, however, and account for many of the discontinuities in seam traces.
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		The Mist Mountain and Elk Formations are distinguishable because the Elk lacks seams over 1 metre in thickness and contains algalite-rich sapropelic coals (see Kalkreuth, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.
ELK COAL EXPOSURE		The dominant structure in this portion of the Elk Valley Coalfield is the Alexander Creek syncline and associated thrust faults and folds. A depression in the area of the syncline occurs south of Even Creek (Dancing Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Blainmore Group crop out. The Even Pass thrust, in the west limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.
GRADATIONAL CONTACT		The Alexander Creek syncline is separated from the Greenhillia syncline by the west-dipping Erickson normal fault. Geology of the Greenhillia Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51. Geology of the Greenhillia Range, Elk Valley Coalfield.
FAULT (ORIENTATION UNKNOWN); APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)		Stratigraphic sections were measured using a combination of pegs, sticks, chains, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are shingles within seams that are less than 1 metre in thickness.
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHROWN PLATE)		The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R_m) of the nodular colesite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (E 51% - 54%, A 11.2%), high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.
HIGH ANGLE FAULT (U - UPTHROWN; D - DOWNTHROWN)		Base map for sheets 1, 2, 3 and 4 provided by Crown West Resources Ltd. We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Harrold, both of Crown West Resources Ltd.
BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN		REFERENCE
SYNCLINE: APPROXIMATE, ASSUMED		Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. <i>Can. J. Pet. Geol.</i> , Vol. 30, pp. 112-139.
ANTICLINE: APPROXIMATE, ASSUMED		NOTES
LIMIT OF INTERPRETATION		1. Most Elk Formation sandstones corraded.
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_m MAX)		2. Area of poor exposure.
SECTION		3. Resequence carbonaceous parting within Morrisey Formation.
PREDOMINANTLY SANDSTONE		4. Morrisey Formation conglomerate: here.
INTERBEDDED SANDSTONE AND SILTSTONE		5. Coal seam correlations across this sheet are based on those of Crown West Resources Ltd.
PREDOMINANTLY SILTSTONE AND FINER		6. Elk Formation anomalously carbonaceous in this area.
PREDOMINANTLY COAL		7. Exposures of the lower Weary Ridge Member of the Morrisey Formation.
COVERED INTERVAL		8. Mist Mountain-Elk contact cuts through the section in this area.
HEIGHT IN METRES ABOVE BASAL SANDSTONE		9. Occurrence of Blainmore Group limestone at this point.
THICKNESS OF SEAM IN METRES		10. Intense small-scale deformation in this area.
APPROXIMATE MIST MOUNTAIN-ELK CONTACT		
TABLE OF FORMATIONS		
LOWER CRETACEOUS		
BLAINMORE GROUP		
Kc CADOMIN FORMATION: CONGLOMERATE		
JURASSIC AND CRETACEOUS		
WOODMEN GROUP		
Jkm ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jkmm MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jf MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL		
JURASSIC		
PERINE GROUP		
Jf SHALE, INTERBEDDED SANDSTONE IN UPPER PART		

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

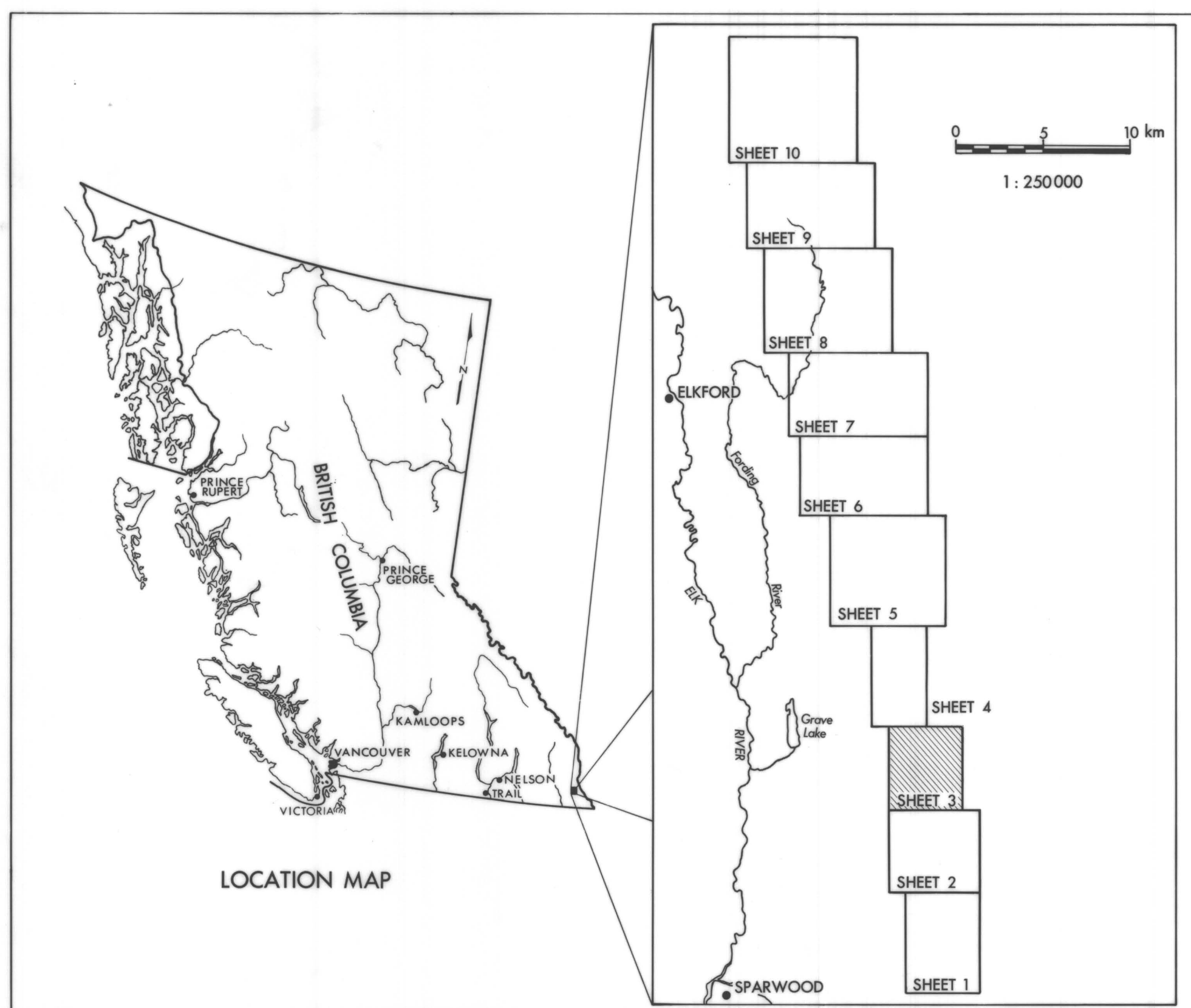
SHEET 2
PRELIMINARY MAP 60
AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

0 500 1000 1500 METRES
1:10000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

SYMBOLS		EXPLANATION	
MAP			
COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED			
SANDSTONE: EXPOSED, ASSUMED			
CONGLOMERATE			
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)			
ELK COAL EXPOSURE			
GRADATIONAL CONTACT			
FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)			
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)			
HIGH ANGLE FAULT (U=UPTHURST, D=DOWNTHROWN)			
BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN			
SYNCLINE: APPROXIMATE, ASSUMED			
ANTICLINE: APPROXIMATE, ASSUMED			
LIMIT OF INTERPRETATION			
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _v MAX)	1.44%		
SECTIONS			
PREDOMINANTLY SANDSTONE			
INTERBEDDED SANDSTONE AND SILTSTONE			
PREDOMINANTLY SILTSTONE AND FINER			
PREDOMINANTLY COAL			
COVERED INTERVAL			
HEIGHT IN METRES ABOVE BASAL SANDSTONE	100		
THICKNESS OF SEAM IN METRES	3.5		
APPROXIMATE MIST MOUNTAIN-ELK CONTACT			
TABLE OF FORMATIONS			
LOWER CRETACEOUS			
BALMORISE GROUP			
Kc	CADOMIN FORMATION: CONGLOMERATE		
JURASSIC AND CRETACEOUS			
ROOFENAY GROUP			
Jkm	ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jkmm	MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jkm	MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL		
JURASSIC			
Ferris Group			
Jf	SHALE, INTERBEDDED SANDSTONE IN UPPER PART		
EXPLANATION			
Jurassic-Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teepee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.			
Coal rights in the study area are owned by Crown Resources Ltd., Westair Mining Ltd., and Fording Coal Ltd.			
Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by air-photograph interpretation. In many cases poor exposures have limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.			
The Mist Mountain and Elk Formations are distinguishable because the Elk lacks seams over 1 metre in thickness and contains alginolite-rich sapropelic coals labelled here as Elk coal (EC). Many, but not all, of the Elk coals are "ripple" coals (see Kalkreuth, 1982, Fig. 2) in general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.			
The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the axis of the syncline occurs south of Elk Creek (Fording Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Balmorise Group crops out. The East Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.			
The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.			
Stratigraphic sections were measured using a combination of pogo stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.			
The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R _v max) of the maceral vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (0.51% - 0.74% max - 1.12%); high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.			
Base map for sheets 1, 2, 3 and 4 provided by Crown Resources Ltd. We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Harshbarger, both of Crown Resources Ltd.			
REFERENCE			
Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. Can. Petr. Geol. Bull., Vol. 30, pp. 112-139.			
NOTES			
1. Most Elk Formation sandstones omitted.			
2. Area of poor exposure.			
3. Residual carbonaceous parting within Morrisey Formation.			
4. Morrisey Formation conglomerate here.			
5. Coal seam correlations across this creek are based on those of Crown Resources Ltd.			
6. Elk Formation anomalously carbonaceous in this area.			
7. Exposures of the lower Weary Ridge Member of the Morrisey Formation.			
8. Mist Mountain-Elk contact cuts through the section in this area.			
9. Occurrence of Balmorise Group limestone at this point.			
10. Intense small-scale deformation in this area.			



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

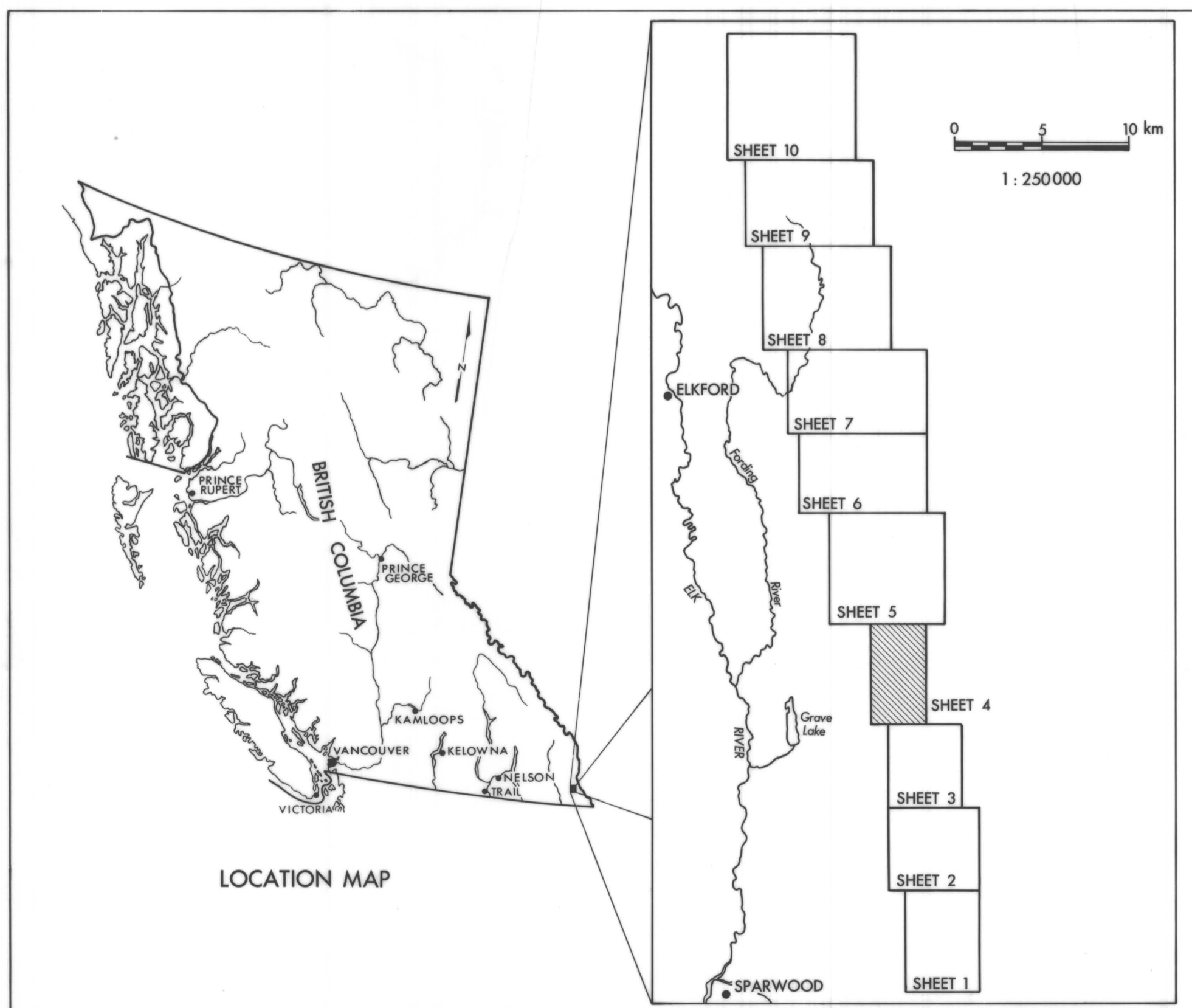
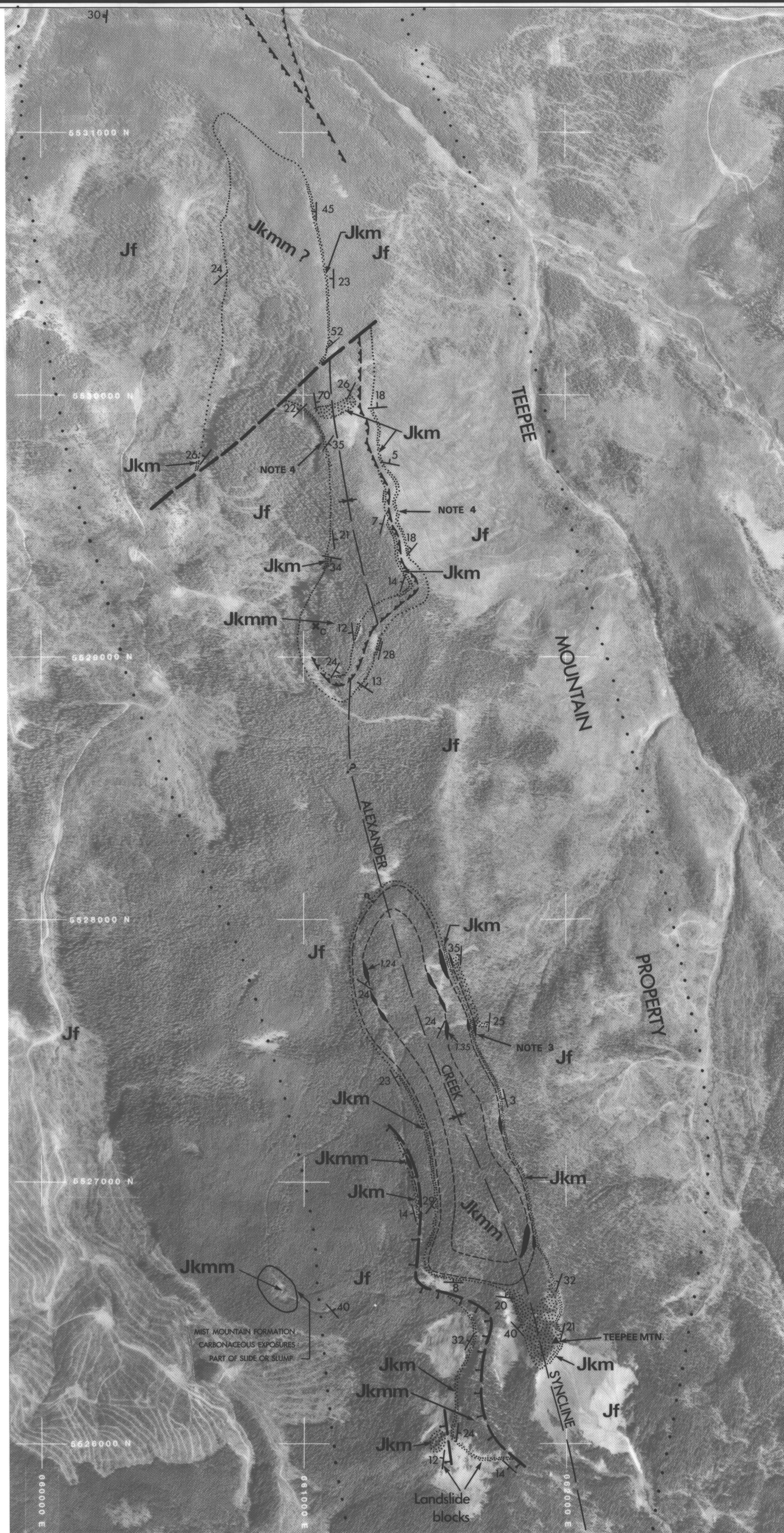
SHEET 3
PRELIMINARY MAP 60
AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

1:10000
METRES 0 500 1000 1500 METRES

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

SYMBOLS		EXPLANATION	
MAP	COAL SEAM (1-1 IN THICKNESS): EXPOSED, ASSUMED		<p>Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek mine-site were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teepee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.</p> <p>Coal rights in the study area are owned by Crown Resources Ltd., Western Mining Ltd., and Forcing Coal Ltd.</p> <p>Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by an oblique interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.</p> <p>The Mist Mountain and Elk Formations are distinguishable because the Elk beds seams over 1 metre in thickness and contain lignite-rich sapropelic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'residual' coals (see Kalkreuth, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.</p> <p>The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the axis of the syncline occurs south of East Creek (Forsing Bridge depression) where conglomerate of the Caston Formation of the Lower Cretaceous Blainmore Group crops out. The Even Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.</p> <p>The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, 'Geology of the Greenhills Range, Elk Valley Coalfield'.</p> <p>Stratigraphic sections were measured using a combination of pogo stick, chain, and clinometer. They were generalised for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.</p> <p>The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R_m max) of the maceral vitrinite in grid samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.51% - R_m max > 1.12%); high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.</p> <p>Base map for sheets 1, 2, 3 and 4 provided by Crown Resources Ltd.</p> <p>We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Flynn and Mr. T. Hannah, both of Crown Resources Ltd.</p> <p>REFERENCE</p> <p>Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. <i>Can. J. Geol.</i>, 19, 112-130.</p> <p>NOTES</p> <ol style="list-style-type: none"> 1. Most Elk Formation sandstones omitted. 2. Area of poor exposure. 3. Recessive carbonaceous parting within Morristay Formation. 4. Morristay Formation conglomerate rare. 5. Coal seam correlations across this creek are based on those of Crown Resources Ltd. 6. Elk Formation anomalously carbonaceous in this area. 7. Exposures of the lower Weary Ridge Member of the Morristay Formation. 8. Mist Mountain-Elk contact cuts through the section in this area. 9. Occurrence of Blainmore Group limestone at this point. 10. Intense small-scale deformation in this area.
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		C	
ELK COAL EXPOSURE		EC	
GRADATIONAL CONTACT			
FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)			
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)			
HIGH ANGLE FAULT (U=UPTHROWN; D=DOWNTHROWN)			
BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN			
SYNCLINE: APPROXIMATE, ASSUMED			
ANTICLINE: APPROXIMATE, ASSUMED			
LIMIT OF INTERPRETATION			
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _m MAX)		1.44%	
SECTIONS			
PREDOMINANTLY SANDSTONE			
INTERBEDDED SANDSTONE AND SILTSTONE			
PREDOMINANTLY SILTSTONE AND FINER			
PREDOMINANTLY COAL			
COVERED INTERVAL			
HEIGHT IN METRES ABOVE BASAL SANDSTONE		100	
THICKNESS OF SEAM IN METRES		3.5	
APPROXIMATE MIST MOUNTAIN-ELK CONTACT		→	
TABLE OF FORMATIONS			
LOWER CRETACEOUS			
BLAINMORE GROUP			
[Kc] CADOMIN FORMATION: CONGLOMERATE			
JURASSIC AND CRETACEOUS			
KOOTENAY GROUP			
[Jk] ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE			
[Jkm] MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE			
[Jkmm] MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL			
JURASSIC			
[Jf] FERRIE GROUP			
[Jf] SHALE; INTERBEDDED SANDSTONE IN UPPER PART			



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

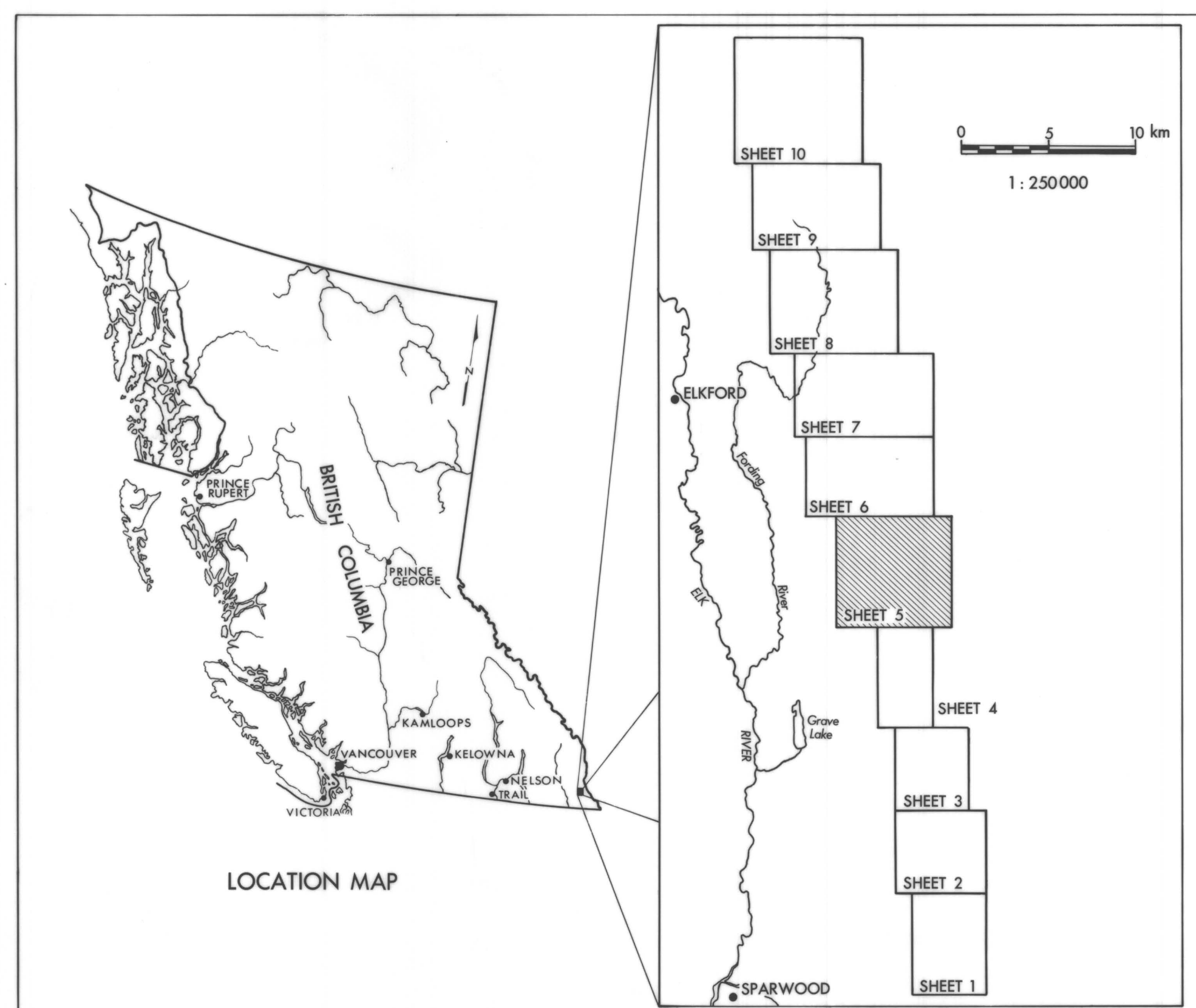
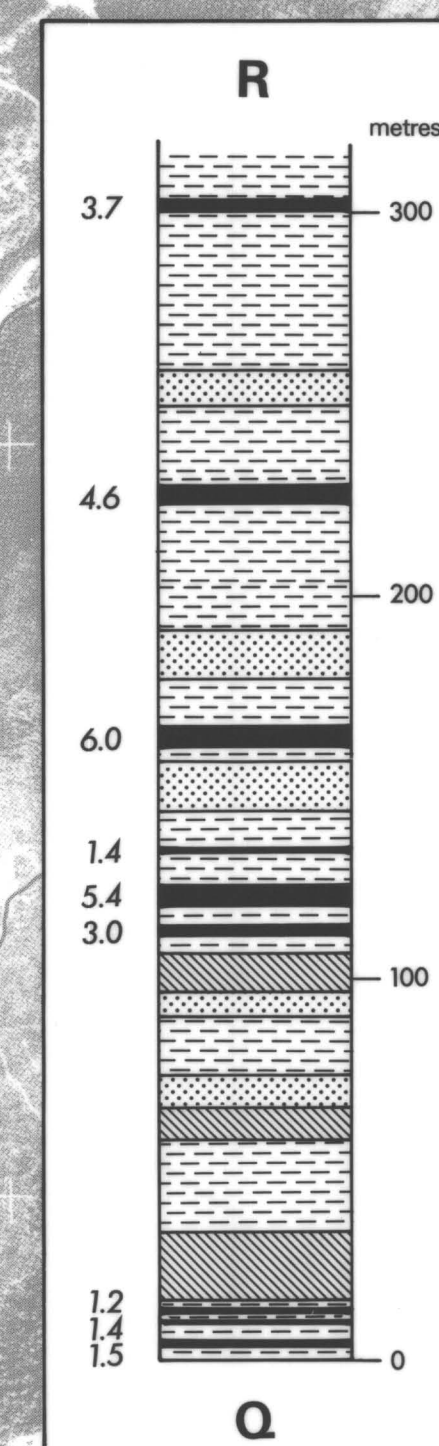
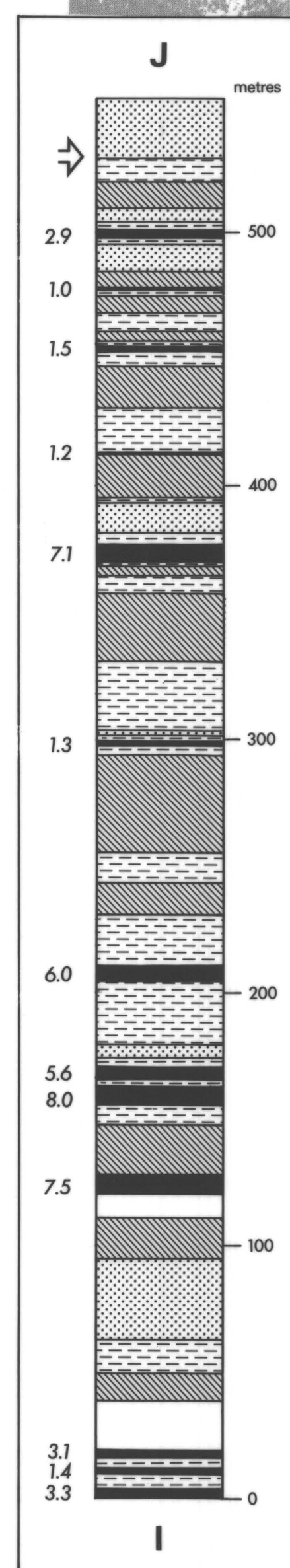
SHEET 4
PRELIMINARY MAP 60
AUGUST 1985


GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

0 500 1000 1500 METRES
1:10,000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

SYMBOLS		EXPLANATION
MAP	COAL SEAM (-1 m THICKNESS): EXPOSED, ASSUMED.	Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek, mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Tepee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.
	SANDSTONE: EXPOSED, ASSUMED.	Coal rights in the study area are owned by Crows Nest Resources Ltd., Wester Mining Ltd., and Forcing Coal Ltd.
	CONGLOMERATE.	Data presented are based on examination of surface outcrops, roadcuts, and benches, and are supplemented by an photogrammetric interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.
	COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN).	The Mist Mountain and Elk Formations are distinguishable because the Elk beds average over 1 metre in thickness and contain alginite-rich sapropelic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'resist' coals (see Kilmarnock, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.
	ELK COAL EXPOSURE.	The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the area of the syncline occurs south of Egan Creek (Flooding Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Blainmore Group crops out. The Egan Creek thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.
	GRADATIONAL CONTACT.	The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an epihercynian portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.
	FAULT ORIENTATION UNKNOWN; APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE).	Stratigraphic sections were measured using a combination of pogo stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.
	THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPRHURST PLATE).	The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R _m), most of the measured vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (E 51% - R _m max. - 1.12%), high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.
	HIGH ANGLE FAULT (U - UPTHROWN, D - DOWNTHROWN).	Base map for sheets 1, 2, 3 and 4 provided by Crows Nest Resources Ltd.
	BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN.	We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Harwin, both of Crows Nest Resources Ltd.
	SYNCLINE: APPROXIMATE, ASSUMED.	REFERENCE
	ANTICLINE: APPROXIMATE, ASSUMED.	Kilmarnock, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. <i>Can. Petr. Geol. Bull.</i> , Vol. 30, pp. 112-139.
	LIMIT OF INTERPRETATION.	NOTES
	MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _m , MAX.) 1.44%	1. Most Elk Formation sandstones omitted.
	SECTIONS	2. Area of poor exposure.
	INTERBEDDED SANDSTONE.	3. Recressive carbonaceous parting within Morrissey Formation.
	INTERBEDDED SANDSTONE AND SILTSTONE.	4. Morrissey Formation conglomerate here.
	PREDOMINANTLY SILTSTONE AND FINER.	5. Coal seam correlations across this creek are based on those of Crows Nest Resources Ltd.
	PREDOMINANTLY COAL.	6. Elk Formation anomalously carbonaceous in this area.
	COVERED INTERNAL.	7. Exposure of the lower Neary Ridge Member of the Morrissey Formation.
	HEIGHT IN METRES ABOVE BASAL SANDSTONE.	8. Mist Mountain-Elk contact cuts through the section in this area.
	THICKNESS OF SEAM IN METRES.	9. Occurrence of Blainmore Group limestone at this point.
	APPROXIMATE MIST MOUNTAIN-ELK CONTACT.	10. Intense small-scale deformation in this area.
	LOWER CRETACEOUS	
	BLAINMORE GROUP	
	CADOMIN FORMATION: CONGLOMERATE	
	JURASSIC AND CRETACEOUS	
	KOOTENAY GROUP	
	ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
	Jkmm	
	MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
	Jkm	
	MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL	
	Jf	
	JURASSIC	
	FERRIS GROUP	
	Jf	
	SHALE, INTERBEDDED SANDSTONE IN UPPER PART	



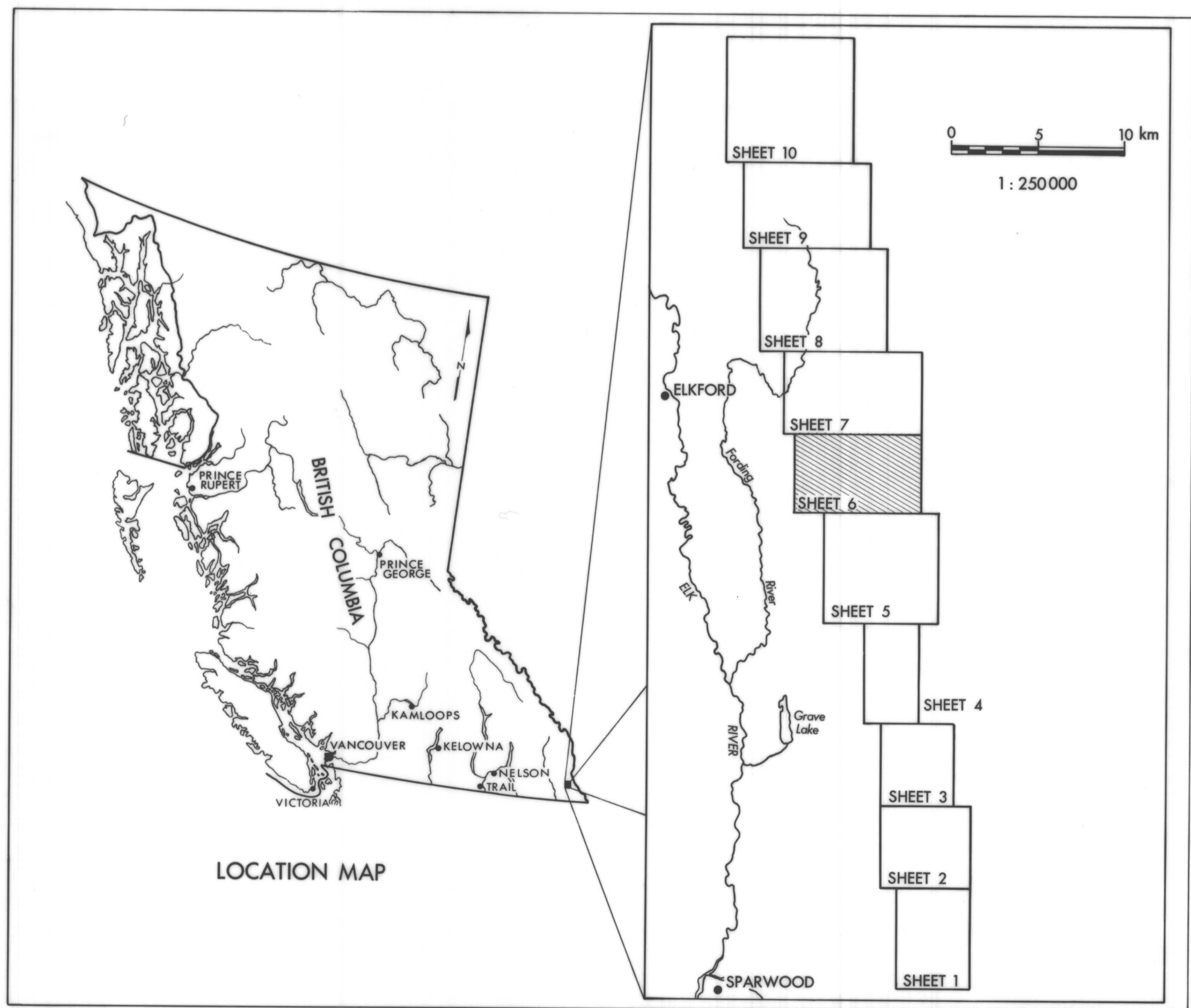
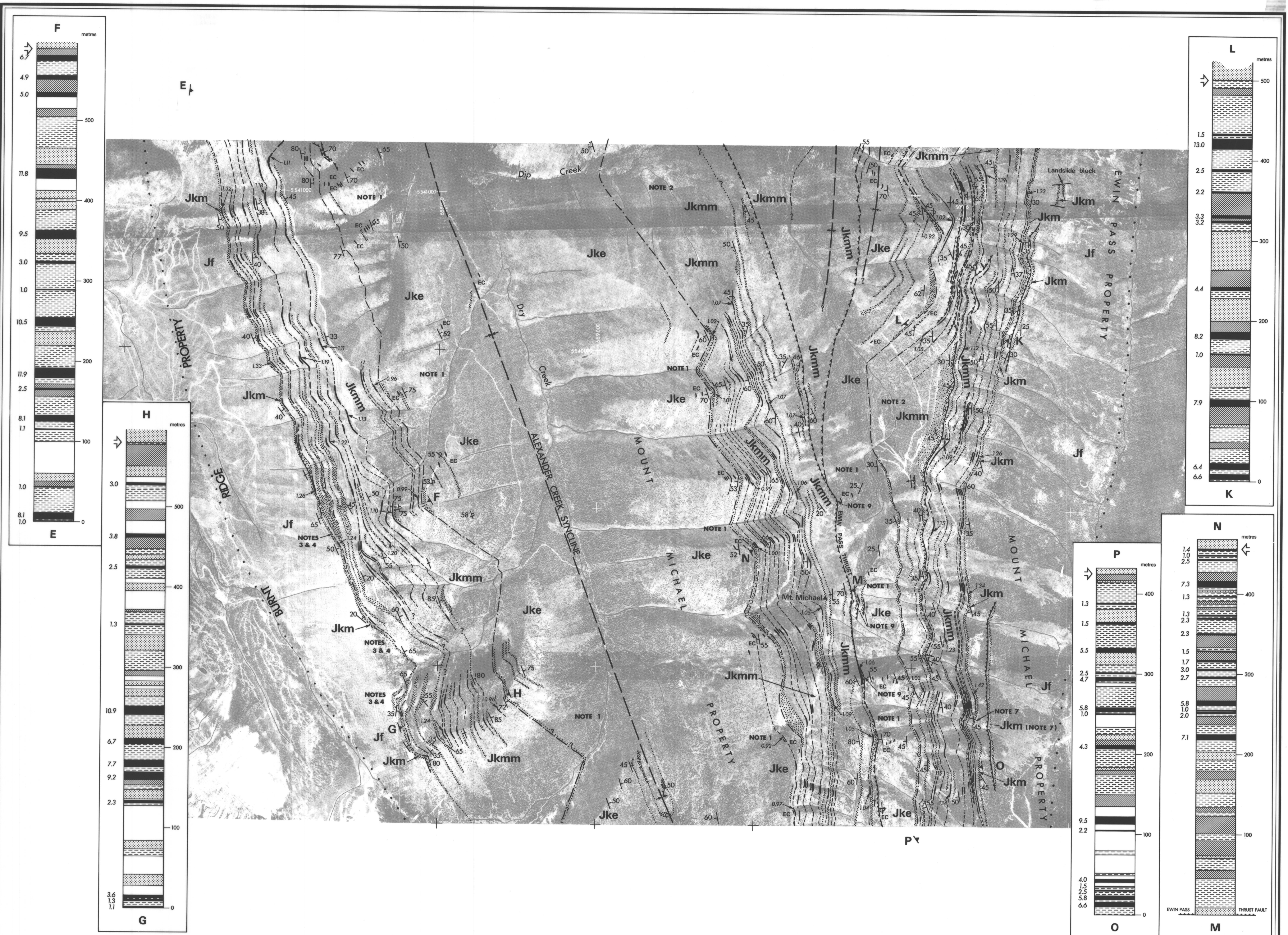

 Province of British Columbia
 Ministry of Energy, Mines and Petroleum Resources
 SHEET 5
 PRELIMINARY MAP 60
 AUGUST 1985
GEOLOGY OF THE ELK VALLEY COALFIELD
SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)



GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHOTO PRODUCED BY
 MAP PRODUCTION DIVISION
 MINISTRY OF THE ENVIRONMENT
 VICTORIA

SYMBOLS		EXPLANATION	
MAP	COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED		Coal rights in the study area are owned by Crow's Nest Resources Ltd., Wester Mining Ltd., and Forcing Coal Ltd.
	SANDSTONE: EXPOSED, ASSUMED		Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by an orthophoto interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.
	CONGLOMERATE		The Mist Mountain and Elk Formations are distinguishable because the Elk lacks seams over 1 metre in thickness and contains significant sapropelic coals labeled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'mealy' coals (see Kalkreuth, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.
	COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the east of the syncline occurs south of Elk Creek (Fording Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Blairmore Group crops out. The Elk Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.
	GRADATIONAL CONTACT		The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Enticore normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published, in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.
	FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHROW SIDE)		Stratigraphic sections were measured using a combination of page stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings which seamers as less than 1 metre in thickness.
	THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPRHURST PLATE)		The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R _m) of the macerals vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.8% R _m max - 1.12%); high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.
	HIGH ANGLE FAULT (U=UPTHROWN; D=DOWNTHROWN)		Base maps for sheets 1, 2, 3 and 4 provided by Crow's Nest Resources Ltd. We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Harrah, both of Crow's Nest Resources Ltd.
	BEDDING: UPRIGHT; OVERTURNED; VERTICAL; HORIZONTAL		REFERENCE
	TOPS UNKNOWN		Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. <i>Can. J. Pet. Geol.</i> , Vol. 30, pp. 112-135.
	SYNCLINE: APPROXIMATE, ASSUMED		NOTES
	ANTICLINE: APPROXIMATE, ASSUMED		1. Most Elk Formation sandstones omitted.
	LIMIT OF INTERPRETATION		2. Area of poor exposure.
	MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _m MAX)		3. Resective carbonaceous parting within Morrissey Formation.
	SECTIONS		4. Morrissey Formation conglomerates here.
	PREDOMINANTLY SANDSTONE		5. Coal seam correlations across this creek are based on those of Crow's Nest Resources Ltd.
	INTERBEDDED SANDSTONE AND SILTSTONE		6. Elk Formation anomalously carbonaceous in this area.
	PREDOMINANTLY SILTSTONE AND FINER		7. Exposures of the lower Weary Ridge Member of the Morrissey Formation.
	PREDOMINANTLY COAL		8. Mist Mountain-Elk contact cuts through the section in this area.
	COVERED INTERVAL		9. Occurrence of Blairmore Group limestone at the point.
	HEIGHT IN METRES ABOVE BASAL SANDSTONE		10. Intense small-scale deformation in this area.
	THICKNESS OF SEAM IN METRES		
	APPROXIMATE MIST MOUNTAIN-ELK CONTACT		
	TABLE OF FORMATIONS		
	LOWER CRETACEOUS		
	BLAIRMORE GROUP		
	CADOMIN FORMATION: CONGLOMERATE		
	JURASSIC AND CRETACEOUS		
	KOOTENAY GROUP		
	ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
	MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
	MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL		
	JURASSIC		
	FERRIC GROUP		
	SHALE; INTERBEDDED SANDSTONE IN UPPER PART		



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

SHEET 6
 PRELIMINARY MAP 60
 AUGUST 1985

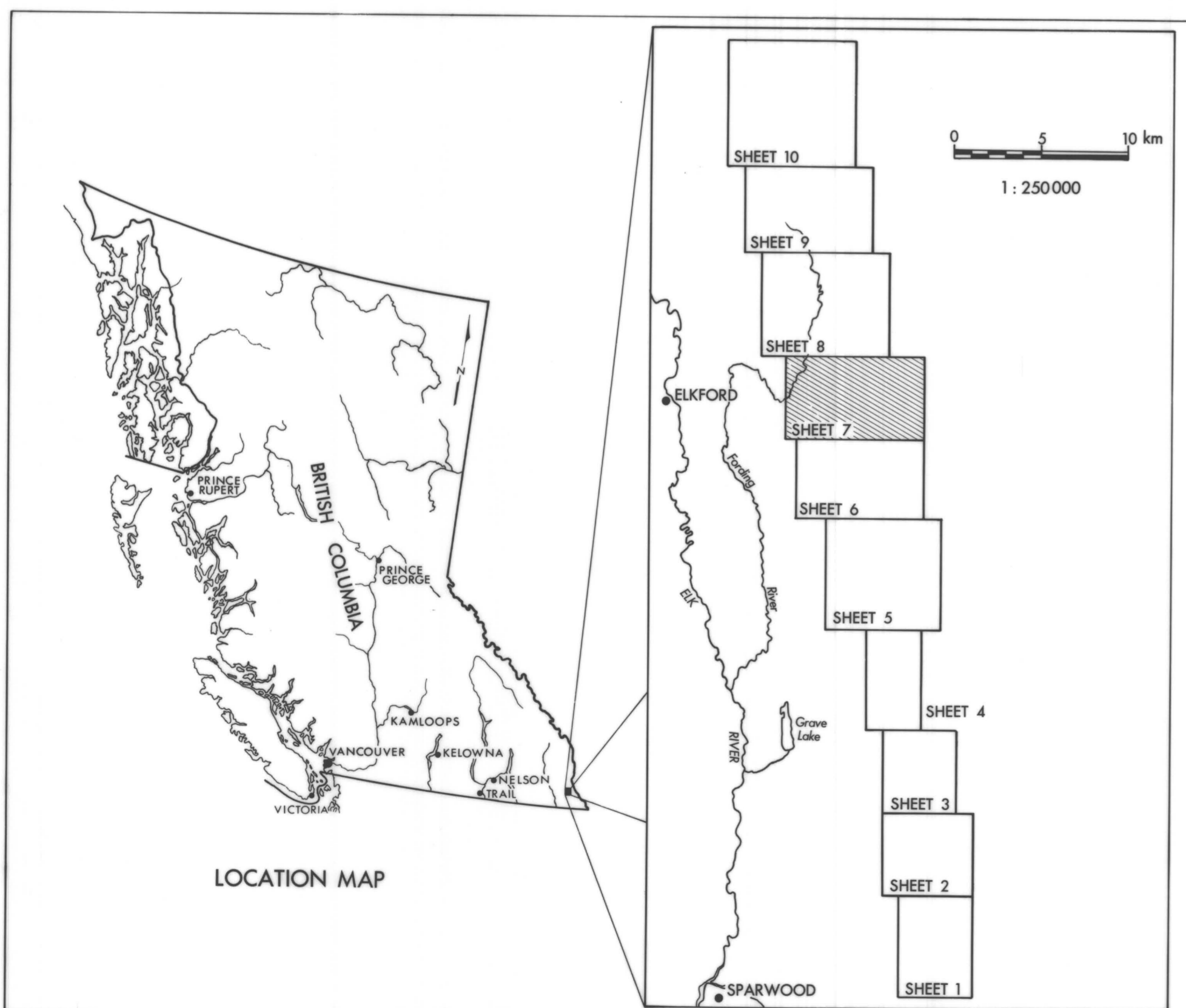
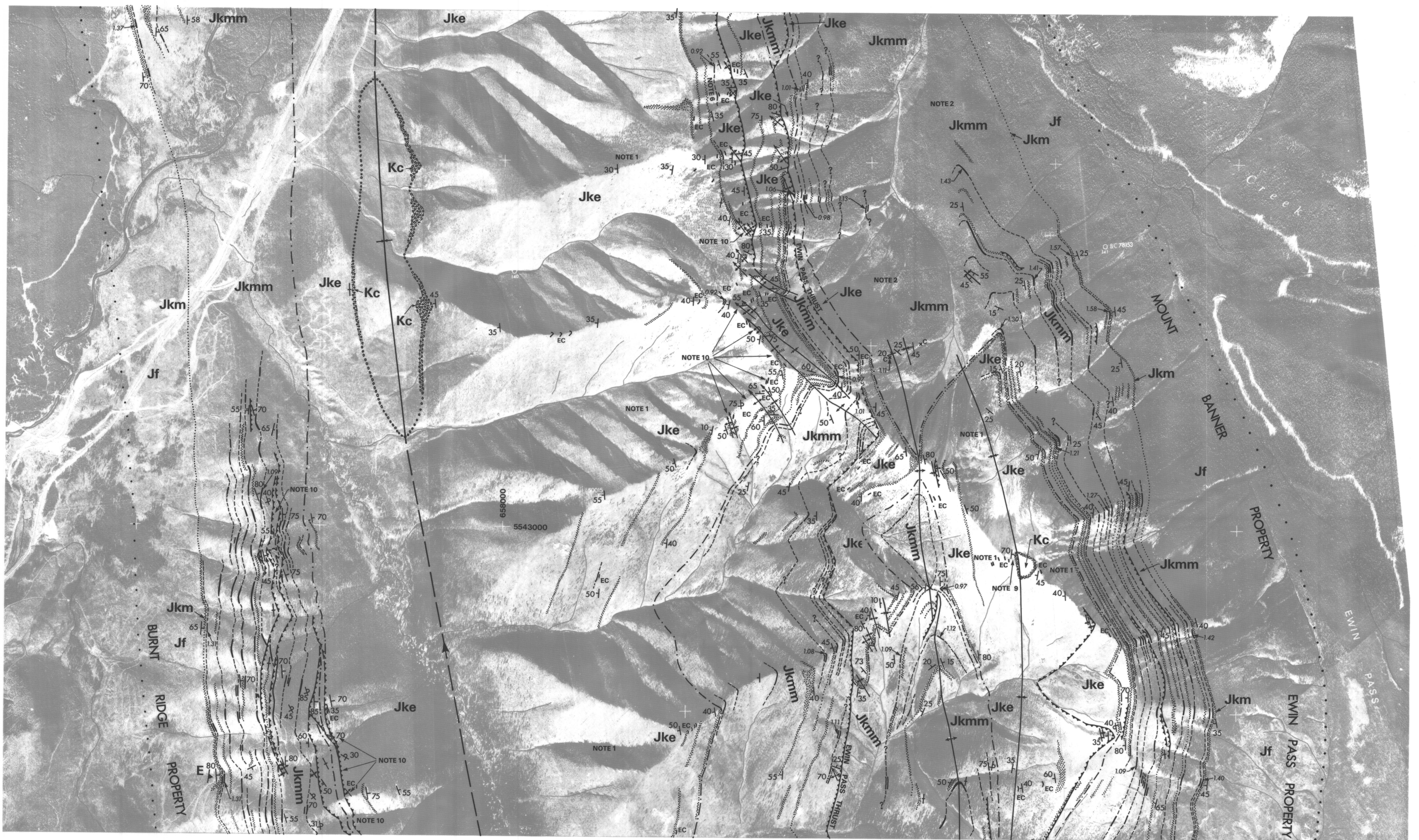
GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

1:10000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHOTO PRODUCED BY
 MAP PRODUCTION DIVISION
 MINISTRY OF THE ENVIRONMENT
 VICTORIA

SYMBOLS		
COAL SEAM (>1 m THICKNESS); EXPOSED, ASSUMED		
SANDSTONE; EXPOSED, ASSUMED		
CONGLOMERATE		
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		X C
ELK COAL EXPOSURE		EC
GRADATIONAL CONTACT		
FAULT (ORIENTATION UNKNOWN); APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)		
THRUST FAULT; APPROXIMATE, ASSUMED (TEETH ON UPHRUST PLATE)		
TOPS UNKNOWN		
HIGH ANGLE FAULT (U=UPTHROWN; D=DOWNTHROWN)		
BEDDING: UPRIGHT; OVERTURNED, VERTICAL, HORIZONTAL		
SYNCLINE; APPROXIMATE, ASSUMED		
ANTICLINE; APPROXIMATE, ASSUMED		
LIMIT OF INTERPRETATION		
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _v MAX)		1.44%
SECTIONS		
PREDOMINANTLY SANDSTONE		
INTERBEDDED SANDSTONE AND SILTSTONE		
PREDOMINANTLY SILTSTONE AND FINER		
PREDOMINANTLY COAL		
COVERED INTERVAL		
HEIGHT IN METRES ABOVE BASAL SANDSTONE		100
THICKNESS OF SEAM IN METRES		3.5
APPROXIMATE MIST MOUNTAIN-ELK CONTACT		
TABLE OF FORMATIONS		
LOWER CRETACEOUS		
BLAIRMORE GROUP		
JURASSIC AND CRETACEOUS		
KOOTENAY GROUP		
JKE ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jkm MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
Jkmm MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL		
JURASSIC		
Jf FERRIS GROUP		
Jf SHALE, INTERBEDDED SANDSTONE IN UPPER PART		
NOTES		
1. Most Elk Formation sandstones omitted.		
2. Area of poor exposure.		
3. Resequence carbonaceous parting within Morrissey Formation.		
4. Morrissey Formation conglomeratic here.		
5. Coal seam correlations across this creek are based on those of Crows Nest Resources Ltd.		
6. Elk Formation anomalously carbonaceous in this area.		
7. Exposures of the lower Werby Ridge Member of the Morrissey Formation.		
8. Mist Mountain-Elk contact cuts through the section in this area.		
9. Occurrence of Blairmore Group limestone at this point.		
10. Intense small-scale deformation in this area.		
EXPLANATION		
Jurassic-Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek minefields were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teepee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.		
Coal rights in the study area are owned by Crows Nest Resources Ltd., Westair Mining Ltd., and Fornding Coal Ltd.		
Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by photogeological interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.		
The Mist Mountain and Elk Formations are distinguishable because the Elk beds average over 1 metre in thickness and contain significant isotropic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'hard' coals (see Kuhnert, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.		
The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the axis of the syncline occurs south of Line Creek (Fornding Bridge depression) where conglomerate of the Caledonian Formation of the Lower Cretaceous Blairmore Group crops out. The Ewin Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.		
The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published, in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, 'Geology of the Greenhills Range, Elk Valley Coalfield'.		
Stratigraphic sections were measured using a combination of pipe stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.		
The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R _v) of many of the measured vitrinite grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (0.81% R _v max - 1.12%); high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.		
Base map for sheets 1, 2, 3 and 4 provided by Crows Nest Resources Ltd.		
We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Harnish, both of Crows Nest Resources Ltd.		
REFERENCE		
Kilbourn, W. D. (1982): Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. Can. Petr. Geol., Bull., Vol. 30, pp. 112-139.		



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

SHEET 7
PRELIMINARY MAP 60
AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

0 500 1000 1500 METRES
1:10000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA

SYMBOLS		EXPLANATION
MAP		
COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED.		
SANDSTONE: EXPOSED, ASSUMED.		
CONGLOMERATE		
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		
ELK COAL EXPOSURE		
GRADATIONAL CONTACT		
FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHRUST SIDE)		
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHURST PLATE)		
HIGH ANGLE FAULT (U=UPTHURST; D=DOWNTHRUST)		
TOPS UNKNOWN		
BEDDING: UPRIGHT; OVERTURNED, VERTICAL, HORIZONTAL.		
SYNCLINE: APPROXIMATE, ASSUMED		
ANTICLINE: APPROXIMATE, ASSUMED		
LIMIT OF INTERPRETATION		
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _v MAX)	1.44%	
SECTIONS		
PREDOMINANTLY SANDSTONE		
INTERBEDDED SANDSTONE AND SILTSTONE		
PREDOMINANTLY SILTSTONE AND FINER		
PREDOMINANTLY COAL		
COVERED INTERVAL		
HEIGHT IN METRES ABOVE BASAL SANDSTONE	100	
THICKNESS OF SEAM IN METRES	3.5	
APPROXIMATE MIST MOUNTAIN-ELK CONTACT		
TABLE OF FORMATIONS		
LOWER CRETACEOUS		
BLAIRMORE GROUP		
Kc	CADOMIN FORMATION: CONGLOMERATE	
JURASSIC AND CRETACEOUS		
KOOTENAY GROUP		
Jkmm	ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
Jkm	MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
Jf	MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC, MINOR SHALE AND COAL	
JURASSIC		
Jf	PERNE GROUP	
Jf	SHALE, INTERBEDDED SANDSTONE IN UPPER PART	

EXPLANATION

Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek, northwest were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teepee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.

Coal rights in the study area are owned by Crows Nest Resources Ltd., Wester Mining Ltd., and Fording Coal Ltd.

Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by an orthophoto interpretation. In many cases poor exposures have limited the amount of data and has restricted the ability to correlate seams. Seam thickness and seam-out are common, however, and account for many of the discontinuities in seam trace.

The Mist Mountain and Elk Formations are distinguishable because the Elk beds average over 1 metre in thickness and contain significant sapropelic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'meandering' coals (see Kalkreuth, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.

The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the axis of the syncline occurs south of East Creek (Fording Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Blairmore Group crops out. The East Creek thrust, in the west limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.

The Alexander Creek syncline is separated from the Greenhills syncline by the east-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.

Stratigraphic sections were measured using a combination of logs, stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.

The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R_v max) of the macerals vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.61% R_v max - 1.12%), high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.

Base map for sheets 1, 2, 3 and 4 provided by Crows Nest Resources Ltd.

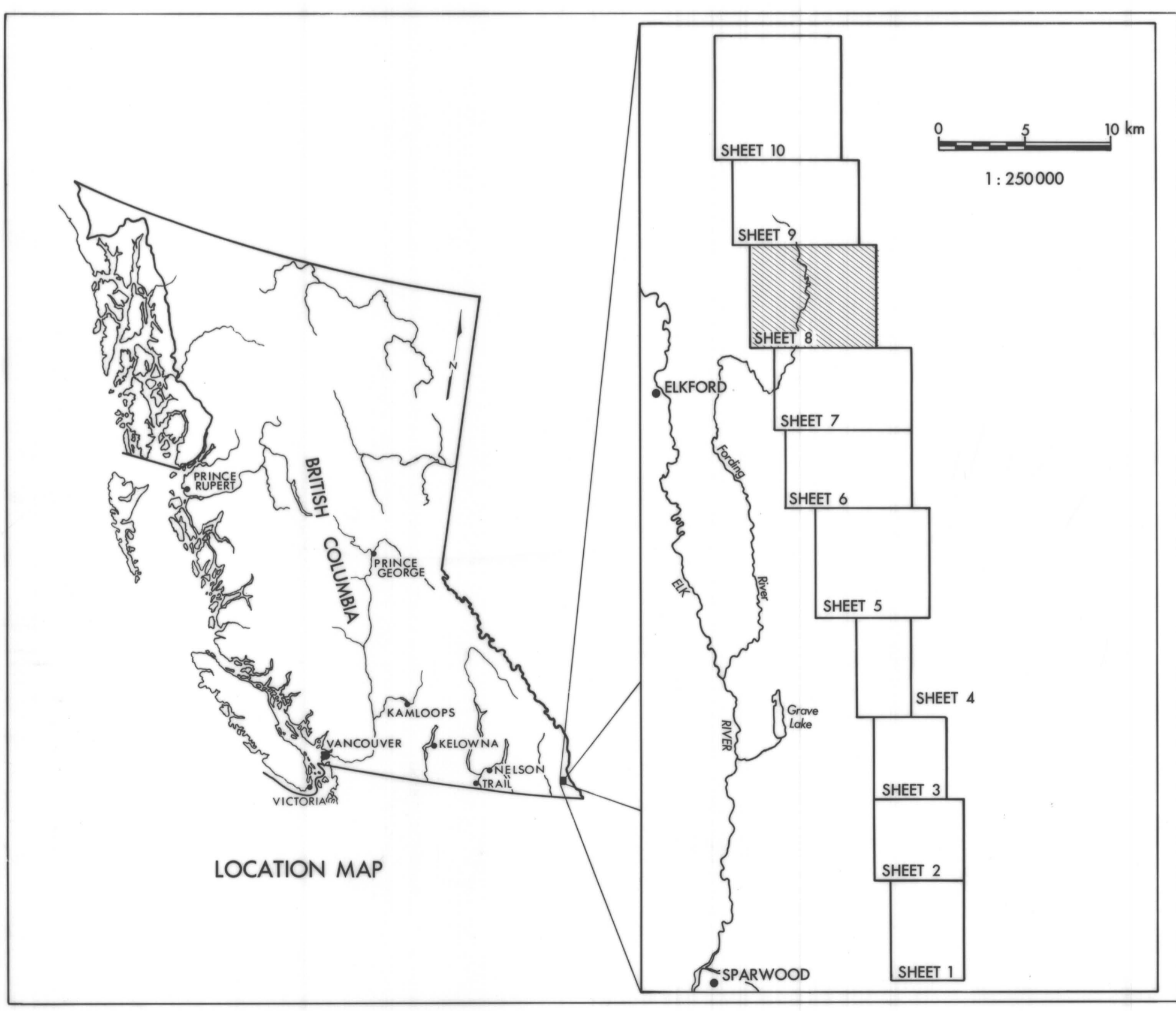
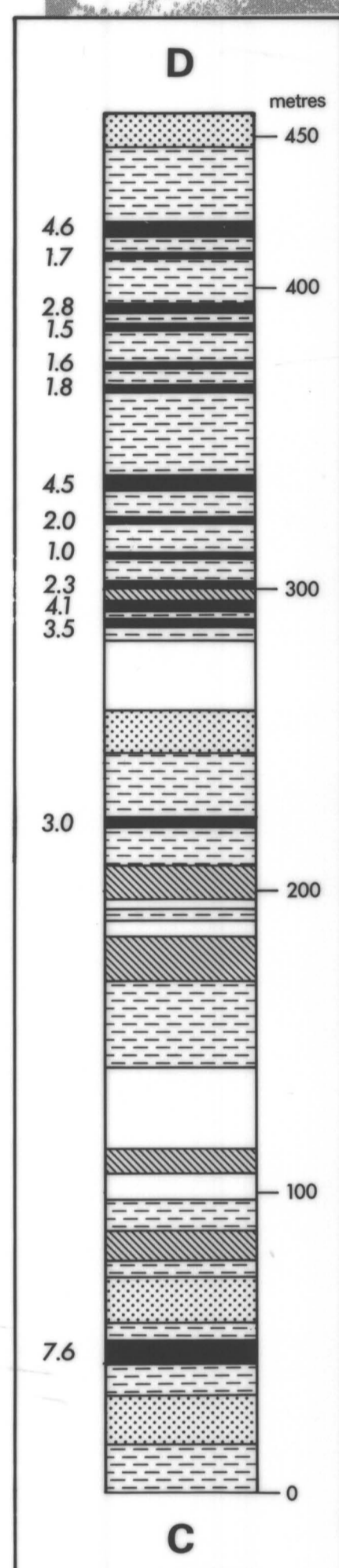
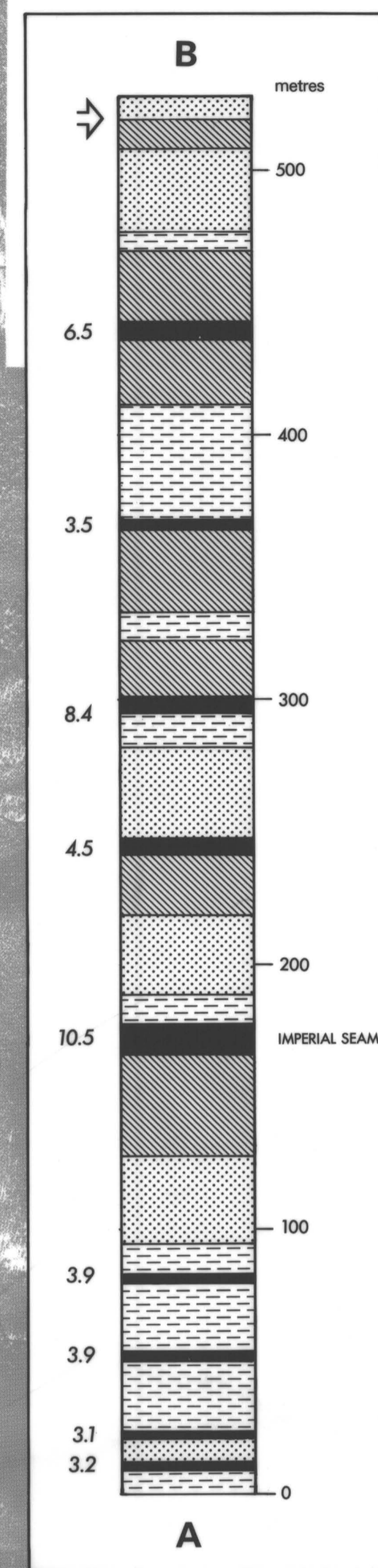
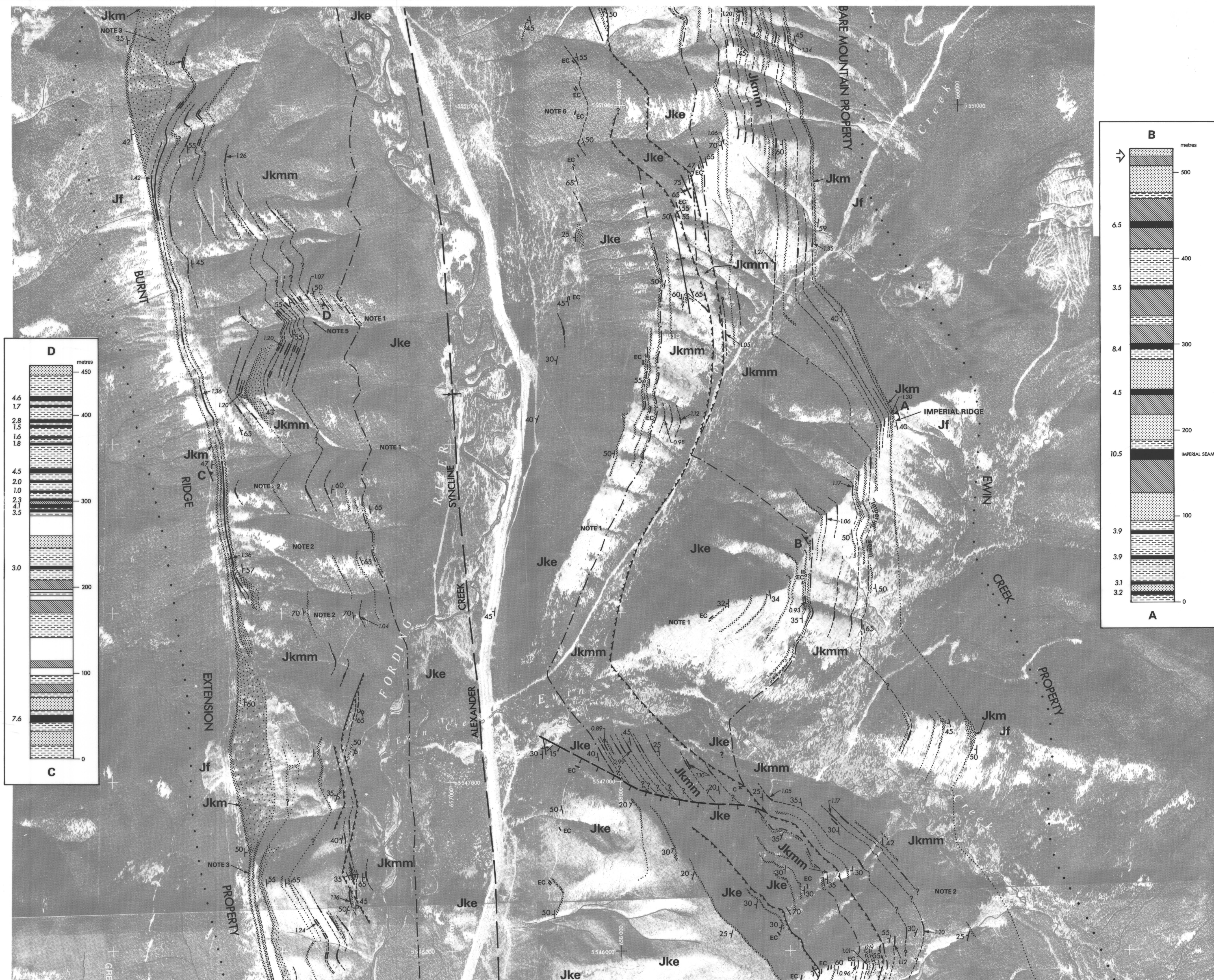
We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Hannah, both of Crows Nest Resources Ltd.


REFERENCE

Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. *Can. J. Geol. Bull.*, Vol. 30, pp. 112-139.

NOTES

1. Most Elk Formation sandstones omitted.
2. Area of poor exposure.
3. Respective carbonaceous parting within Morrissey Formation.
4. Morrissey Formation conglomeratic here.
5. Coal seam correlations across the creek are based on those of Crows Nest Resources Ltd.
6. Elk Formation anomalously carbonaceous in this area.
7. Exposures of the lower Weary Ridge Member of the Morrissey Formation.
8. Mist Mountain-Elk contact cuts through the section in this area.
9. Occurrence of Blairmore Group limestone at this point.
10. Intense small-scale deformation in this area.




 Province of British Columbia
 Ministry of Energy, Mines and Petroleum Resources
SHEET 8
 PRELIMINARY MAP 60
 AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHOTO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA

SYMBOLS	
MAP	
COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED	
SANDSTONE: EXPOSED, ASSUMED	
CONGLOMERATE	
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)	
ELK COAL EXPOSURE	
GRADATIONAL CONTACT	
FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BUT ON DOWNTHROW SIDE)	
THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPRIGHT PLATE)	
HIGH-ANGLE FAULT (U = UPRIGHT, D = DOWNTHROW)	
BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN	
SYNCLINE: APPROXIMATE, ASSUMED	
ANTICLINE: APPROXIMATE, ASSUMED	
LIMIT OF INTERPRETATION	
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _v MAX)	1.44%
SECTIONS	
PREDOMINANTLY SANDSTONE	
INTERBEDDED SANDSTONE AND SILTSTONE	
PREDOMINANTLY SILTSTONE AND FINER	
PREDOMINANTLY COAL	
COVERED INTERVAL	
HEIGHT IN METRES ABOVE BASAL SANDSTONE	
THICKNESS OF SEAM IN METRES	
APPROXIMATE MIST MOUNTAIN-ELK CONTACT	
TABLE OF FORMATIONS	
LOWER CRETACEOUS	
BLAIRMORE GROUP	
CADOMIN FORMATION: CONGLOMERATE	
JURASSIC AND CRETACEOUS	
KOOTENAY GROUP	
ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE	
MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC, MINOR SHALE AND COAL	
JURASSIC	
FERRIE GROUP	
SHALE, INTERBEDDED SANDSTONE IN UPPER PART	

EXPLANATION

Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek minefields were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Teesee Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.

Coal rights in the study area are owned by Crowe Nest Resources Ltd., Western Mining Ltd., and Fording Coal Ltd.

Data presented are based on examination of surface outcrops, roadcuts, and roadcuts, and are supplemented by air-photograph interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate strata. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam maps.

The Mist Mountain and Elk Formations are distinguishable because the Elk lacks seams over 1 metre in thickness and contains algal-rich siltstone coals labeled here as Elk coal (EC). Many but not all of the Elk coals are "rocker" coals (see Kalkreuth, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.

The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. A depression in the axis of the syncline occurs south of Ewin Creek (Fording Bridge depression) where conglomerate of the Cadomin Formation of the Lower Cretaceous Blairmore Group crops out. The Ewin Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Michael property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.

The Alexander Creek syncline is separated from the Greenfield syncline by the west-dipping Erickson normal fault. Geology of the Greenfield Range, an isolated portion of the south half of the Elk Valley Coalfield, is published, in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenfield Range, Elk Valley Coalfield.

Stratigraphic sections were measured using a combination of pegs, sticks, chains, and clinometers. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings with seams that are less than 1 metre in thickness.

The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R_v max) of the mineral vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.51% - R_v max - 1.12%). High-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.

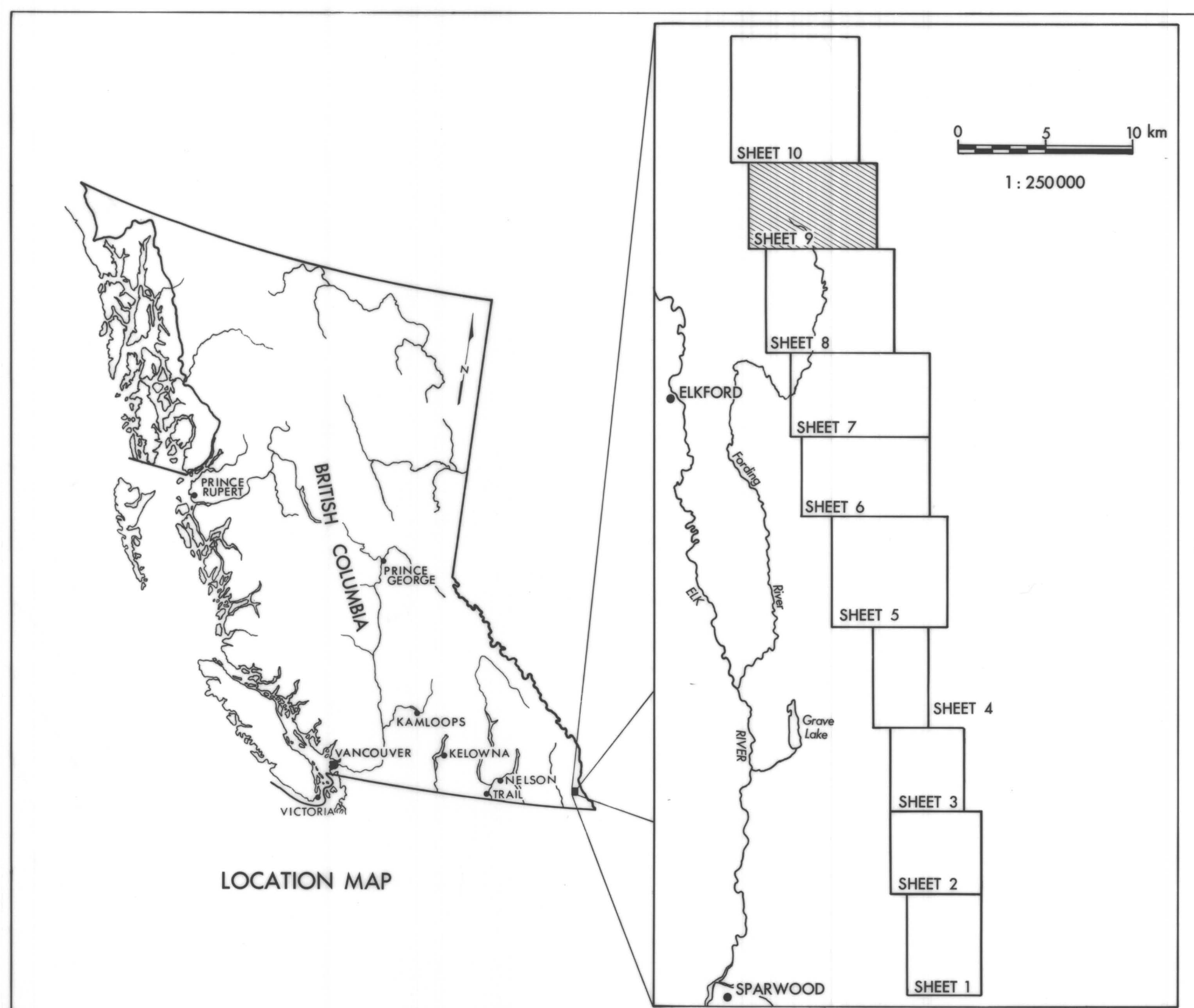
Base map for sheets 1, 2, 3 and 4 provided by Crowe Nest Resources Ltd. We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the maps, we wish to single out Dr. B. Ryan and Mr. T. Harsh, both of Crowe Nest Resources Ltd.


REFERENCE

Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. *Can. J. Geol.*, **Bull.**, **Vol.** 30, pp. 115-139.

NOTES

- Mist Elk Formation sandstones omitted.
- Area of poor exposure.
- Recessive carbonaceous parting within Morrissey Formation.
- Morrissey Formation conglomerate here.
- Coal seam correlations across this creek are based on those of Crowe Nest Resources Ltd.
- Elk Formation anomalously carbonaceous in this area.
- Exposures of the lower Wessley Ridge Member of the Morrissey Formation.
- Mist Mountain-Elk contact cuts through the section in this area.
- Occurrence of Blairmore Group limestone at this point.
- Intense small-scale deformation in this area.



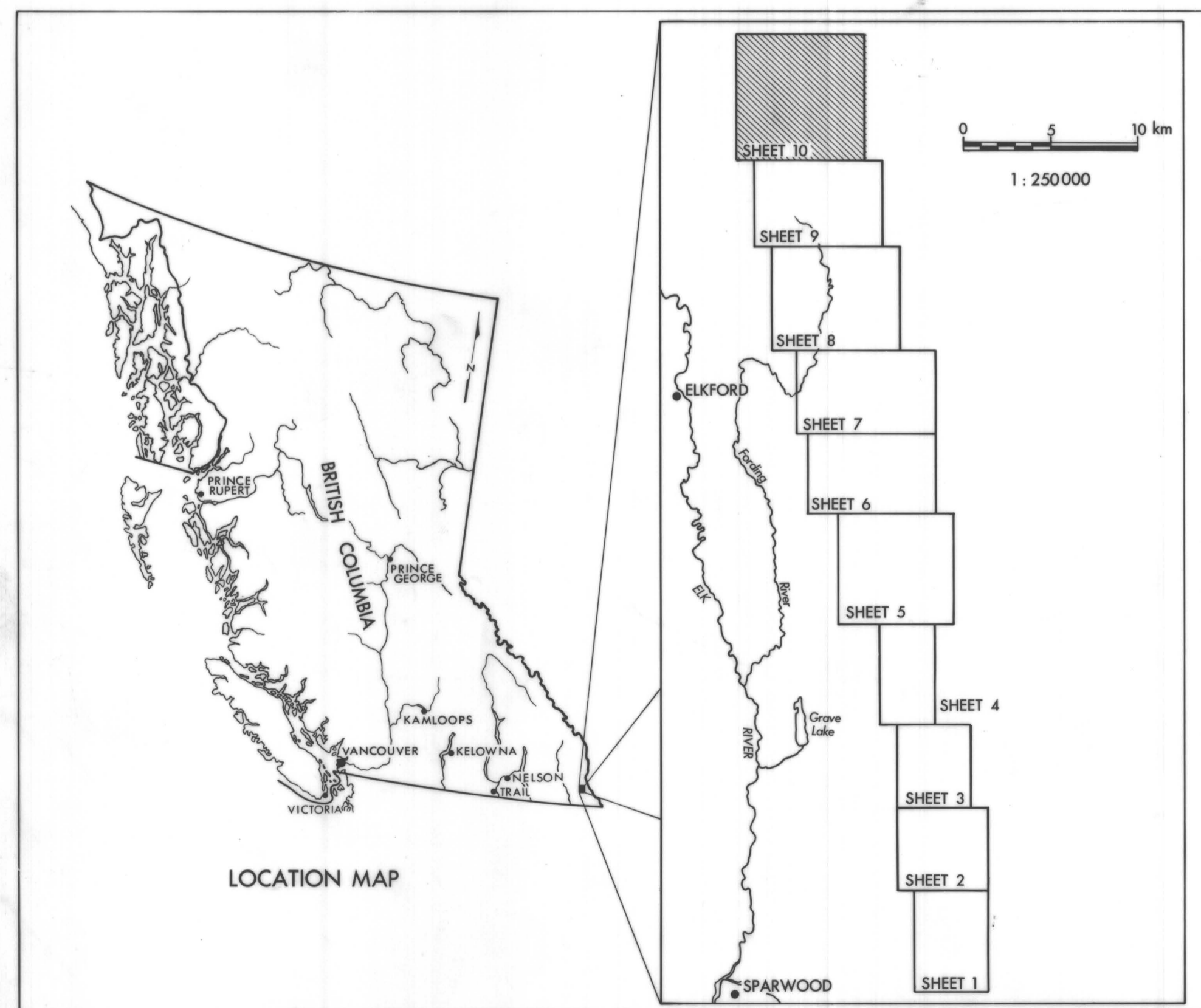
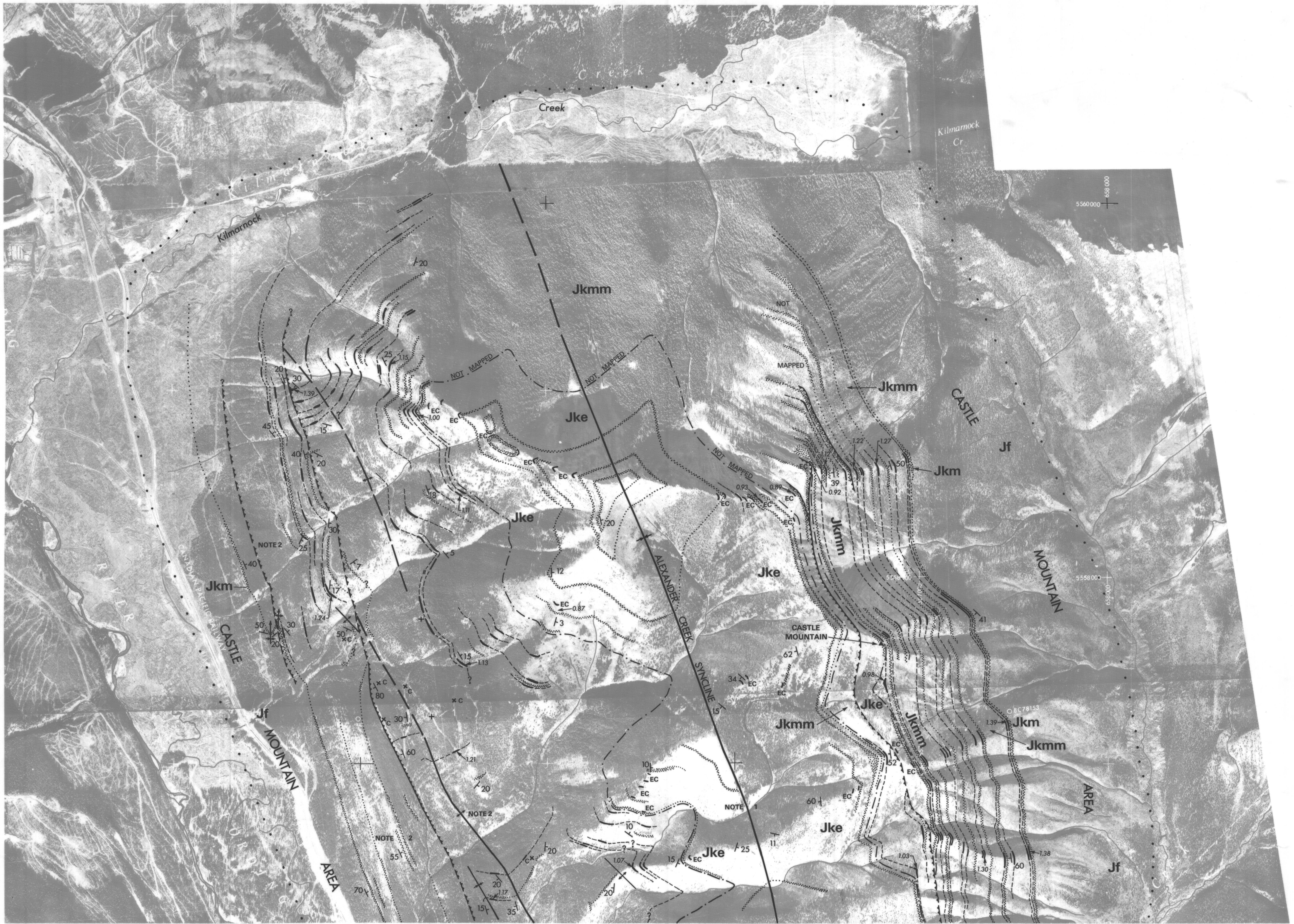

 Province of British Columbia
 Ministry of Energy, Mines and Petroleum Resources
SHEET 9
 PRELIMINARY MAP 60
 AUGUST 1985
GEOLOGY OF THE ELK VALLEY COALFIELD
SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)

METRES 0 500 1000 1500 METRES
 1:10 000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHO TO PRODUCED BY
 MAP PRODUCTION DIVISION
 MINISTRY OF THE ENVIRONMENT
 VICTORIA

SYMBOLS		EXPLANATION
MAP		
COAL SEAM (>1 m THICKNESS); EXPOSED, ASSUMED		Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Tepepa Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.
SANDSTONE; EXPOSED, ASSUMED		Coal rights in the study area are owned by Crows Nest Resources Ltd., Western Mining Ltd., and Fording Coal Ltd.
CONGLOMERATE		Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by air-photograph interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		The Mist Mountain and Elk Formations are distinguishable because the Elk coals seams over 1 metre in thickness and contain alginite-rich asporopitic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'heavier coals' (see Kuhnlein, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.
ELK COAL EXPOSURE		The dominant structures in this portion of the Elk Valley Coalfield are the Alexander Creek syncline and associated thrust faults and folds. An depression in the axis of the syncline occurs south of Ewin Creek (Fording Bridge depression) where conglomerate of the Caddam Formation of the Lower Cretaceous Blainmore Group crops out. The Bain Pass thrust, in the east limb of the syncline, is the most significant thrust fault. Vertical displacement on the order of 700 metres (estimated) has occurred on the Mount Mist Mountain property. As a result, a nearly complete section of Mist Mountain Formation overlies a complete Elk Formation section.
GRADATIONAL CONTACT		The Alexander Creek syncline is separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as B.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.
FAULT (ORIENTATION UNKNOWN); APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)		Stratigraphic sections were measured using a combination of pogo stick, chain, and clinometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.
THRUST FAULT; APPROXIMATE, ASSUMED (TEETH ON UPRIGHT PLATE)		The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R _m) of the maceral vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.51% - R _m max = 1.15%), high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.
HIGH ANGLE FAULT (U - UPRHTHROWN; D - DOWNTHROWN); TOPS UNKNOWN		Base map for sheets 1, 2, 3 and 4 provided by Crows Nest Resources Ltd.
BEDDINGS UPRIGHT; OVERTURNED, VERTICAL, HORIZONTAL		We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Fryer and Mr. T. Hannah, both of Crows Nest Resources Ltd.
SYNCLINE; APPROXIMATE, ASSUMED		
ANTICLINE; APPROXIMATE, ASSUMED		
LIMIT OF INTERPRETATION		
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R _m MAX)	1.44%	
SECTIONS		
PREDOMINANTLY SANDSTONE		
INTERBEDDED SANDSTONE AND SILTSTONE		
PREDOMINANTLY SILTSTONE AND FINER		
PREDOMINANTLY COAL		
COVERED INTERVAL		
HEIGHT IN METRES ABOVE BASAL SANDSTONE	100	
THICKNESS OF SEAM IN METRES	3.5	
APPROXIMATE MIST MOUNTAIN-ELK CONTACT		
TABLE OF FORMATIONS		
LOWER CRETACEOUS		
BLAINMORE GROUP		
[Cc] CADDAM FORMATION: CONGLOMERATE		
JURASSIC AND CRETACEOUS		
KOOTENAY GROUP		
[Jke] ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
[Jkmm] MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE		
[Jkm] MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC, MINOR SHALE AND COAL		
JURASSIC		
[Jf] FERNE GROUP		
SHALE, INTERBEDDED SANDSTONE IN UPPER PART		
REFERENCE		
Kuhnlein, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. Can. Pet. Geol. Bull., Vol. 30, pp. 113-139.		
NOTES		
1. Most Elk Formation sandstones omitted. 2. Area of poor exposure. 3. Reservoir carbonaceous parting within Morrissey Formation. 4. Morrissey Formation conglomerate here. 5. Coal seam correlations across this creek are based on those of Crows Nest Resources Ltd. 6. Elk Formation intrinsically carbonaceous in this area. 7. Exposures of the lower Weary Ridge Member of the Morrissey Formation. 8. Mist Mountain Elk contact cuts through the section in this area. 9. Occurrence of Blainmore Group limestone at this point. 10. Intense small-scale deformation in this area.		



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

SHEET 10
PRELIMINARY MAP 60
AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD SOUTHERN HALF (KILMARNOCK CREEK TO ALEXANDER CREEK)

1:10000

GEOLOGY BY: DAVID A. GRIEVE, JANINE M. FRASER

ORTHOPHO TO PRODUCED BY
MAP PRODUCTION DIVISION
MINISTRY OF THE ENVIRONMENT
VICTORIA

SYMBOLS		EXPLANATION	
COAL SEAM ($\sim 1\text{ m}$ THICKNESS); EXPOSED, ASSUMED		Jurassic-Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek illustrate were mapped by D. A. Grieve in 1981 and 1982. The remainder of the area, including Horseshoe Ridge, Castle Mountain, and Crown Mountain, was mapped by Janine M. Fraser in 1982.	
SANDSTONE; EXPOSED, ASSUMED		Coal rights in the study area are owned by Crows Nest Resources Ltd., Westair Mining Ltd., and Forcing Coal Ltd.	
CONGLOMERATE		Data presented are based on examination of surface outcrops, roadcuts, and trenches, and are supplemented by air-photograph interpretation. In many cases poor exposure has limited the amount of data and has restricted the ability to correlate seams. Seam pinch-outs and wash-outs are common, however, and account for many of the discontinuities in seam traces.	
COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN)		The Mt. Mountain and Elk Formations are distinguishable because the Elk lacks seams over 1 metre in thickness and contains argillite-rich micropelite coals (see Elk coal EC1, Map 5) but not all of the Elk coals are "road" coals (see Kilmarnock, 1982, Fig. 2). In general the Elk Formation has a higher ratio of sandstone to siltstone, although this is not a diagnostic field criterion.	
ELK COAL EXPOSURE		The Mt. Mountain and Elk Formations are separated from the Greenhills syncline by the west-dipping Erickson normal fault. Geology of the Greenhills Range, an adjacent portion of the south half of the Elk Valley Coalfield, is published in the same format as this map, as S.C. Ministry of Energy, Mines and Petroleum Resources Preliminary Map 51, Geology of the Greenhills Range, Elk Valley Coalfield.	
GRADATIONAL CONTACT		Stratigraphic sections were measured using a combination of logs, stick, chain, and chronometer. They were generalized for publication. In particular, coal seams less than 1 metre in thickness are not indicated, nor are partings within seams that are less than 1 metre in thickness.	
FAULT (ORIENTATION UNKNOWN); APPROXIMATE, ASSUMED (BAR ON DOWNTHROW SIDE)		The rank of the coals has been determined petrographically by measuring the mean maximum reflectance in oil (R_m max) of the maceral vitrinite in grab samples collected in the field. Coals in the study area are predominantly medium-volatile bituminous in rank (1.51% R_m max - 1.12%); high-volatile A bituminous coals are common and low-volatile bituminous coals occur locally.	
THRUST FAULT; APPROXIMATE, ASSUMED (TEETH ON UPTHROW PLATE)		Base map for sheets 1, 2, 3 and 4 provided by Crows Nest Resources Ltd. We wish to thank coal company staff for their invaluable cooperation and logistical support. Of the many, we wish to single out Dr. B. Ryan and Mr. T. Hamish, both of Crows Nest Resources Ltd.	
HIGH ANGLE FAULT (U = UPTHROWN; D = DOWNTHROWN)		REFERENCE	
BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN		Kalkreuth, W. D. (1982). Rank and petrographic composition of selected Jurassic-Lower Cretaceous coals of British Columbia, Canada. <i>Can. J. Geol. Bull.</i> , Vol. 20, pp. 119-139.	
SYNCLINE: APPROXIMATE, ASSUMED		NOTES	
ANTICLINE: APPROXIMATE, ASSUMED		1. Most Elk Formation sandstones omitted.	
LIMIT OF INTERPRETATION		2. Area of poor exposure.	
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_m MAX)		3. Necessary carbonaceous parting within Morrison Formation.	
SECTIONS		4. Morrison Formation conglomerate has not been mapped.	
PREDOMINANTLY SANDSTONE		5. Coal seam correlations across this creek are based on those of Crows Nest Resources Ltd.	
INTERBEDDED SANDSTONE AND SILTSTONE		6. Elk Formation anomalously carbonaceous in this area.	
PREDOMINANTLY SILTSTONE AND FINER		7. Exposure of the lower Neary Ridge Member of the Morrison Formation.	
PREDOMINANTLY COAL		8. Mt. Mountain-Elk contact runs through the section in this area.	
COVERED INTERVAL		9. Occurrence of Blainmore Group limestones at this point.	
HEIGHT IN METRES ABOVE BASAL SANDSTONE		10. Intense small-scale deformation in this area.	
THICKNESS OF SEAM IN METRES			
APPROXIMATE MIST MOUNTAIN-ELK CONTACT			
LOWER CRETACEOUS			
BLAINMORE GROUP			
CADOMIN FORMATION: CONGLOMERATE			
JURASSIC AND CRETACEOUS			
KOOTENAY GROUP			
ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE			
MIST MOUNTAIN FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE			
MORRISSEY FORMATION: SANDSTONE, LOCALLY CONGLOMERATIC, MINOR SHALE AND COAL			
JURASSIC			
FERRIE GROUP			
SHALE, INTERBEDDED SANDSTONE IN UPPER PART			