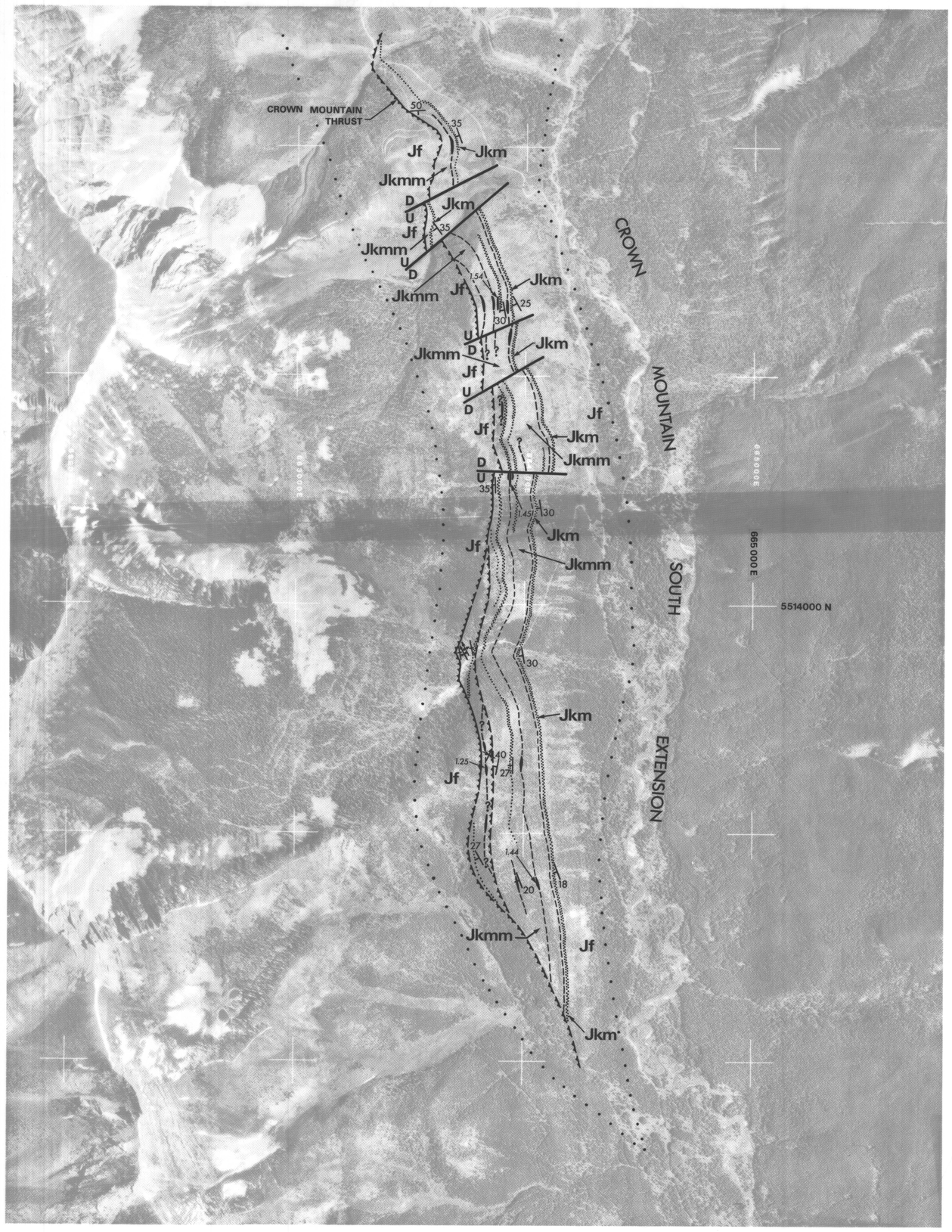

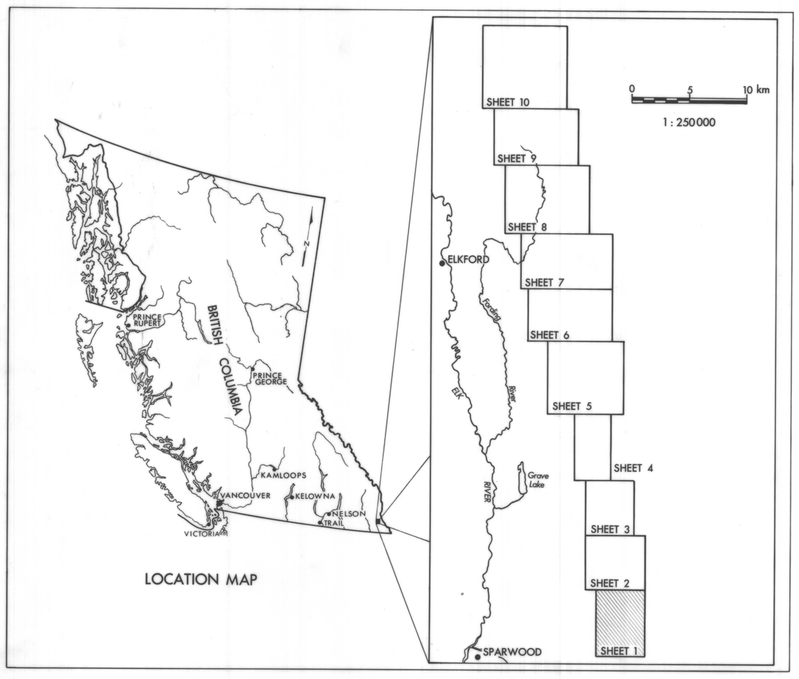

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

SHEET 1

PRELIMINARY MAP 60

AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD

SOUTHERN HALF

(KILMARNOCK CREEK TO ALEXANDER CREEK)

METRES 0 500 1000 1500 METRES

1:10000

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

SYMBOLS

MAP

COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED

SANDSTONE: EXPOSED, ASSUMED

CONGLOMERATE

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 UPTHRUST PLATE)

HIGH ANGLE FAULT (U = UPTHROWN; D = DOWNTHROWN) — U / D

BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN

SYNCLINE: APPROXIMATE, ASSUMED

ANTICLINE: APPROXIMATE, ASSUMED

LIMIT OF INTERPRETATION

MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_o 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

JKe — **ELK FORMATION:** SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE

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JKm — **MORRISSEY FORMATION:** SANDSTONE, LOCALLY CONGLOMERATIC; MINOR SHALE AND COAL

JURRASSIC

FERNIE GROUP

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EXPLANATION

Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek minesite 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.

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PRELIMINARY MAP NO. 60

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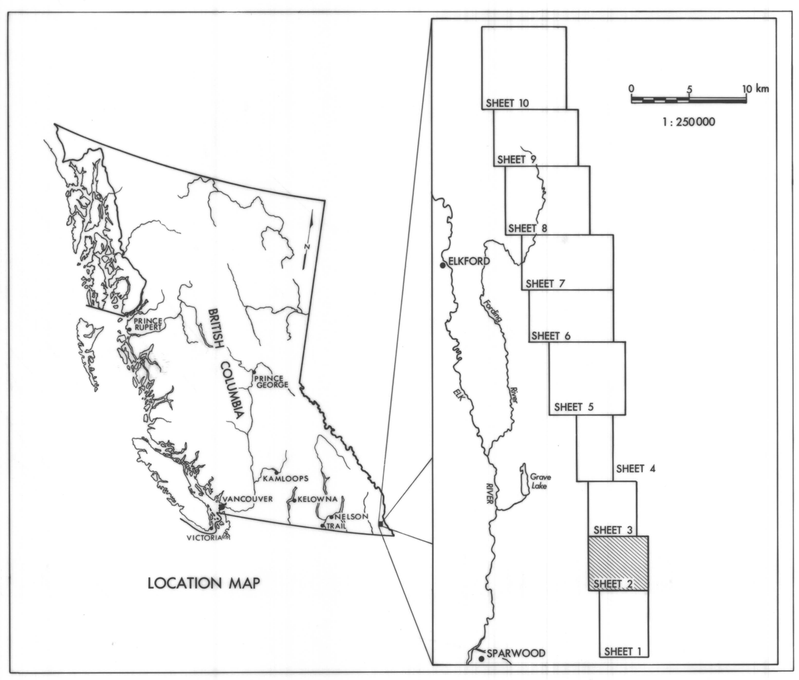
SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)

(N.T.S. 82G/15, 82J/2)

ISSUED AUGUST, 1985



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

SHEET 2

PRELIMINARY MAP 60

AUGUST 1985

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SOUTHERN HALF

(KILMARNOCK CREEK TO ALEXANDER CREEK)

METRES 0 500 1000 1500 METRES

1:10000

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

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- 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 UPTHRUST PLATE) — U
- HIGH ANGLE FAULT (U = UPTHROWN; D = DOWNTHROWN) — D
- BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN
- SYNCLINE: APPROXIMATE, ASSUMED
- ANTICLINE: APPROXIMATE, ASSUMED
- LIMIT OF INTERPRETATION
- MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL (R_o 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

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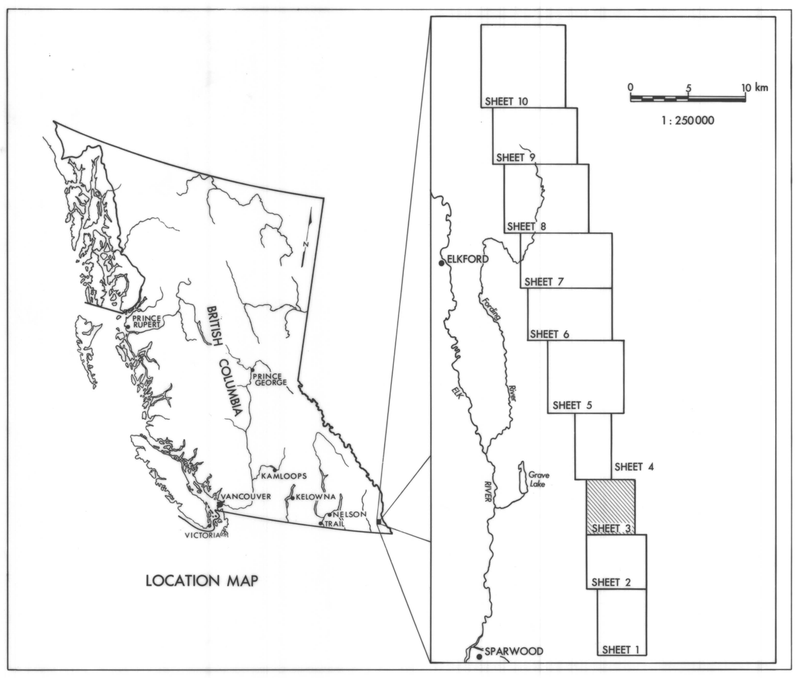
SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)

(N.T.S. 82G/15, 82J/2)

ISSUED AUGUST, 1985



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

SHEET 3

PRELIMINARY MAP 60

AUGUST 1985

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SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)

0 500 1000 1500 METRES

1:10000

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

SYMBOLS

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LIMIT OF INTERPRETATION
MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL ($\bar{R}_o$ 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

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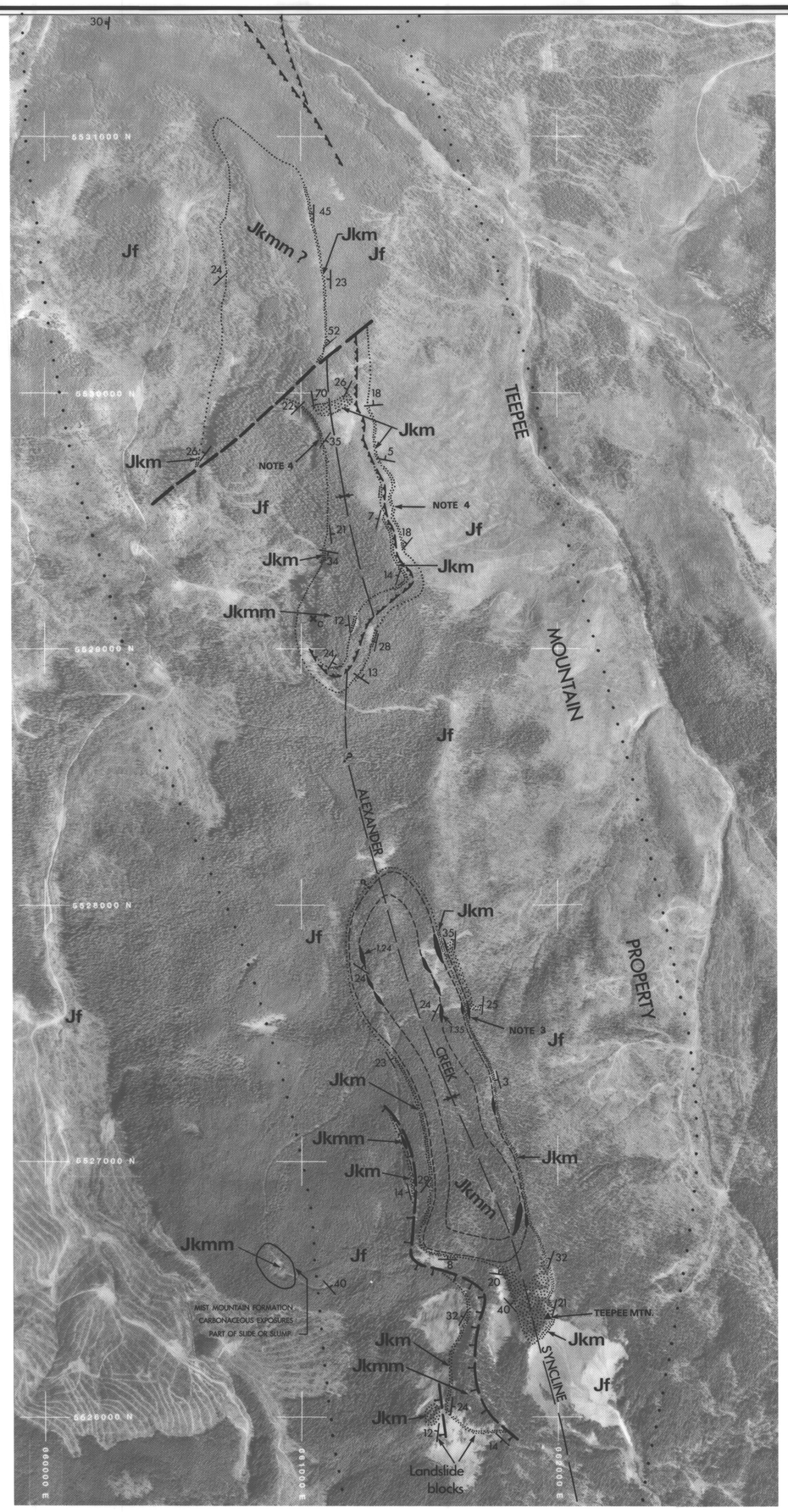

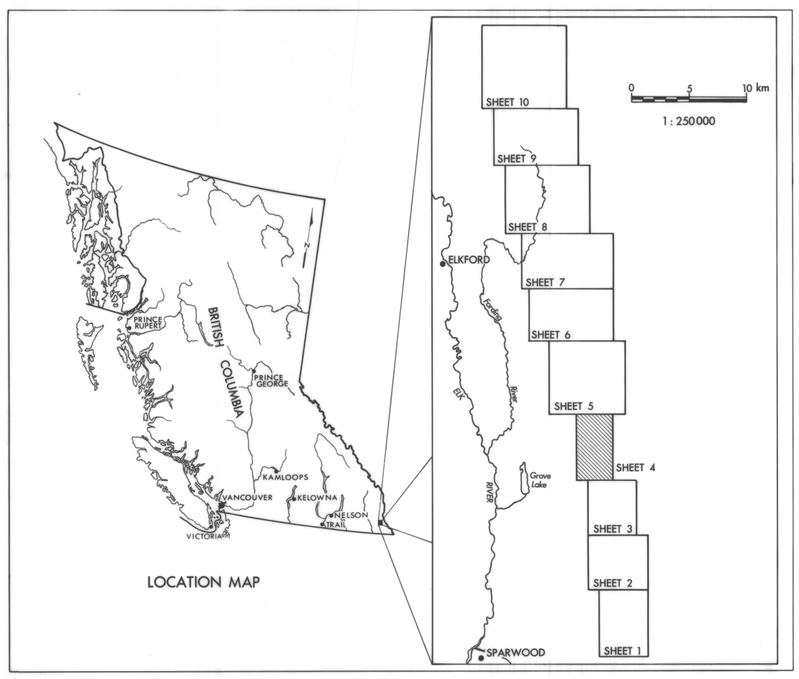

LOCATION MAP

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

SHEET 4

PRELIMINARY MAP 60

AUGUST 1985

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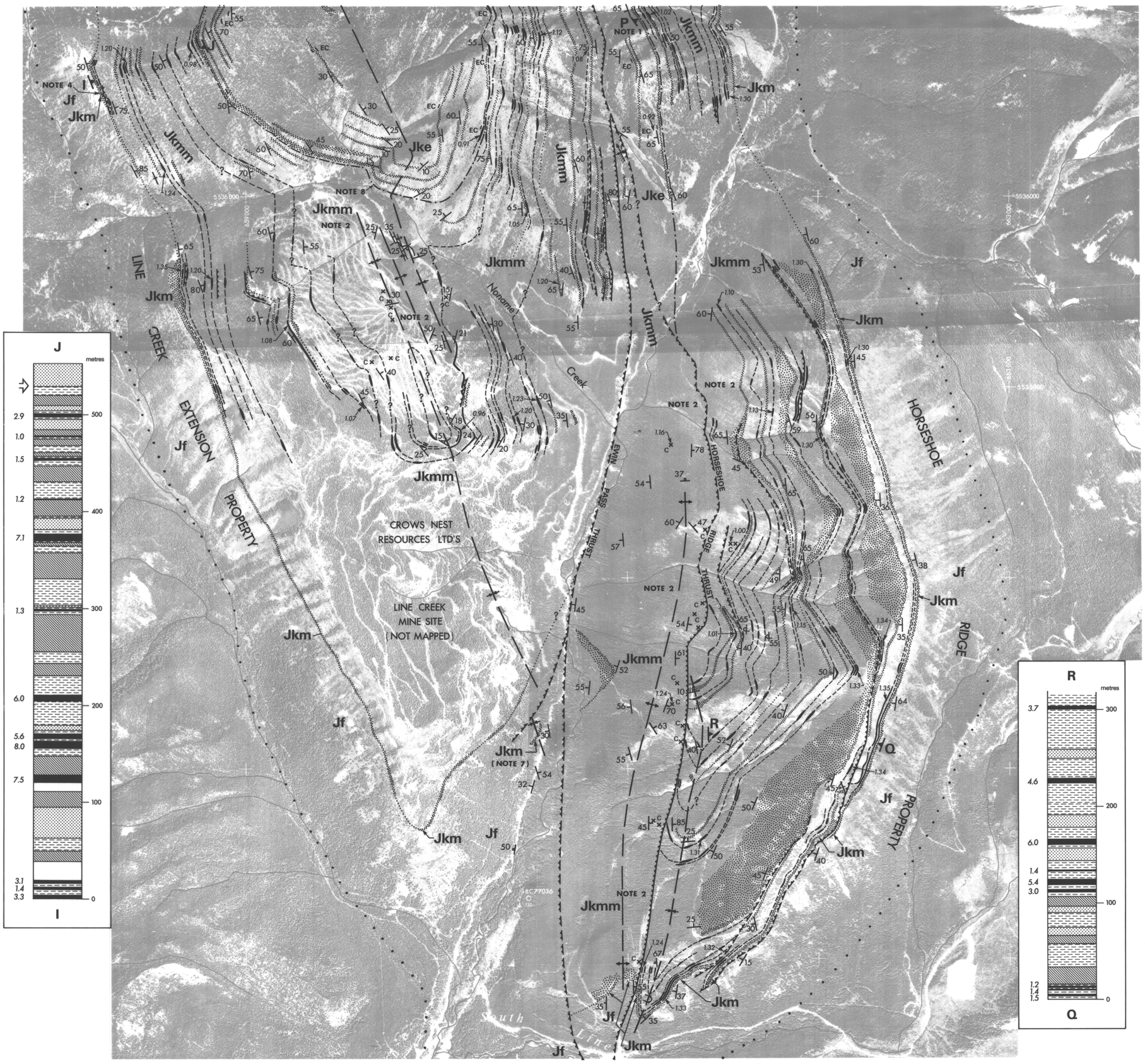

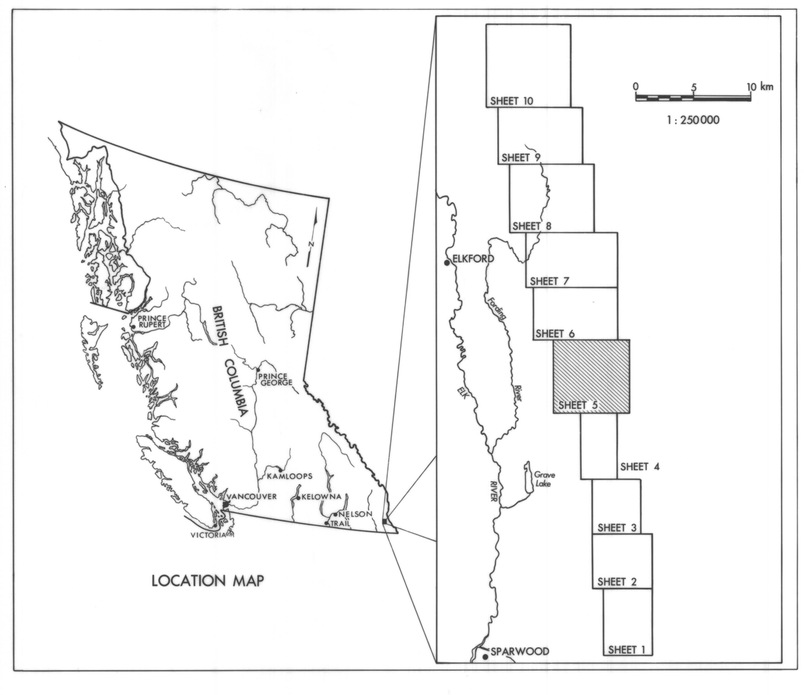

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

SHEET 5

PRELIMINARY MAP 60

AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD

SOUTHERN HALF

(KILMARNOCK CREEK TO ALEXANDER CREEK)

METRES 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

MAP

- COAL SEAM (>1 m THICKNESS): EXPOSED, ASSUMED
- SANDSTONE: EXPOSED, ASSUMED
- CONGLOMERATE
- COAL OCCURRENCE (CORRELATION OR TRACE UNKNOWN) — C
- ELK COAL EXPOSURE — EC
- GRADATIONAL CONTACT
- FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)
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- HIGH ANGLE FAULT (U = UPTHROWN; D = DOWNTHROWN) — U / D
- BEDDING: UPRIGHT, OVERTURNED, VERTICAL, HORIZONTAL, TOPS UNKNOWN
- SYNCLINE: APPROXIMATE, ASSUMED
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- LIMIT OF INTERPRETATION
- MEAN MAXIMUM REFLECTANCE OF VITRINITE IN OIL ($\bar{R}_o$ 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

Kc — **BLAIRMORE GROUP**
CADOMIN FORMATION: CONGLOMERATE

JURASSIC AND CRETACEOUS

JKe — **KOOTENAY GROUP**
ELK FORMATION: SANDSTONE, SILTSTONE, SHALE, COAL, MINOR CONGLOMERATE

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Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek minesite 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.

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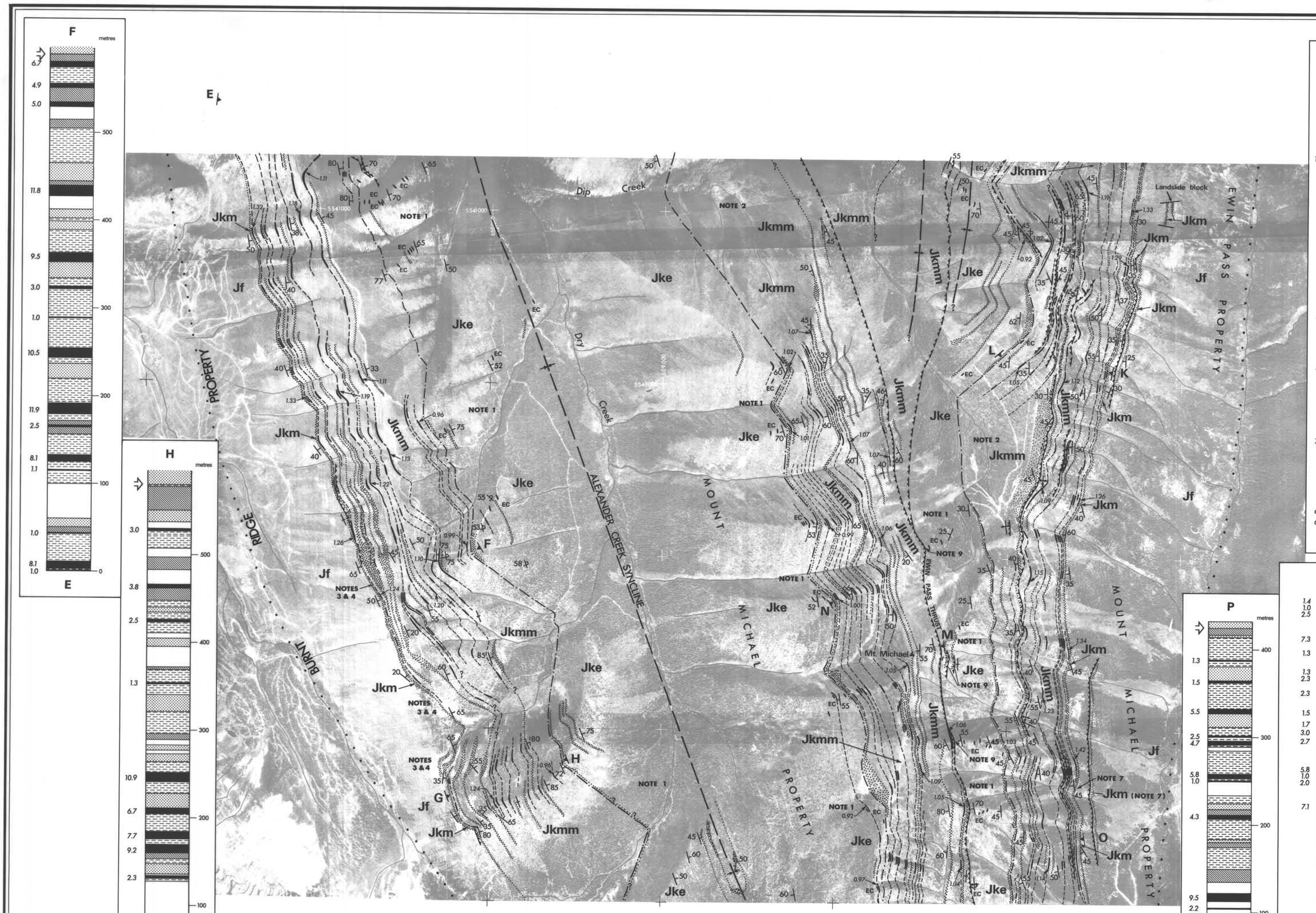

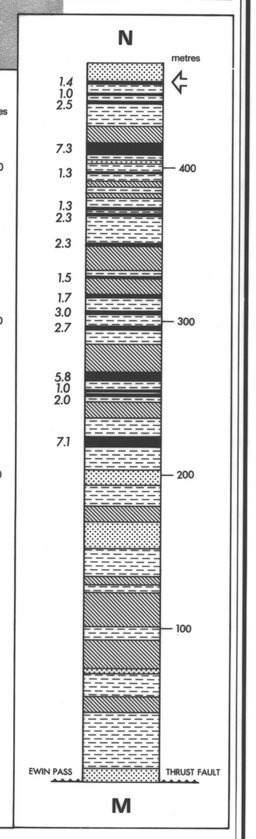

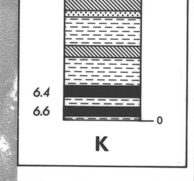

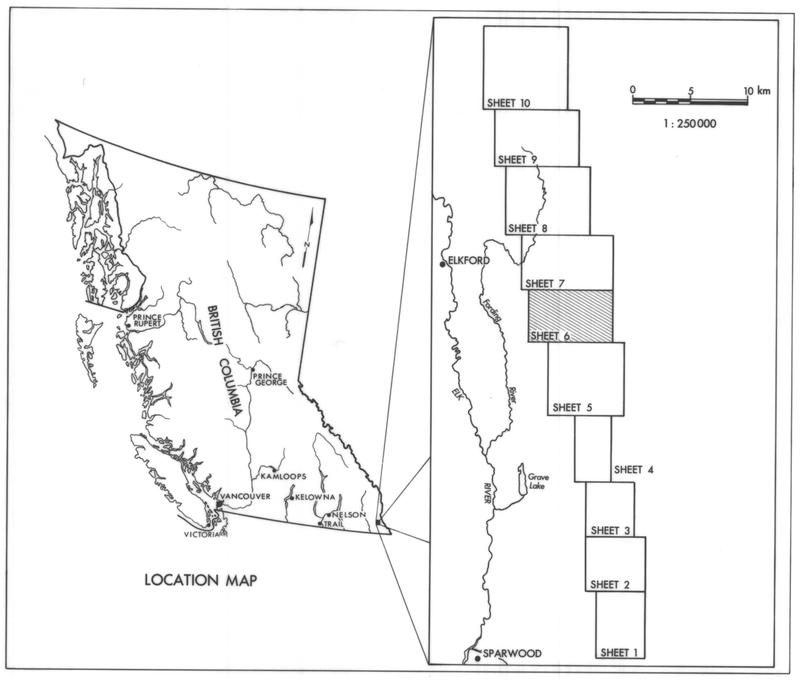

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

SHEET 6

PRELIMINARY MAP 60

AUGUST 1985

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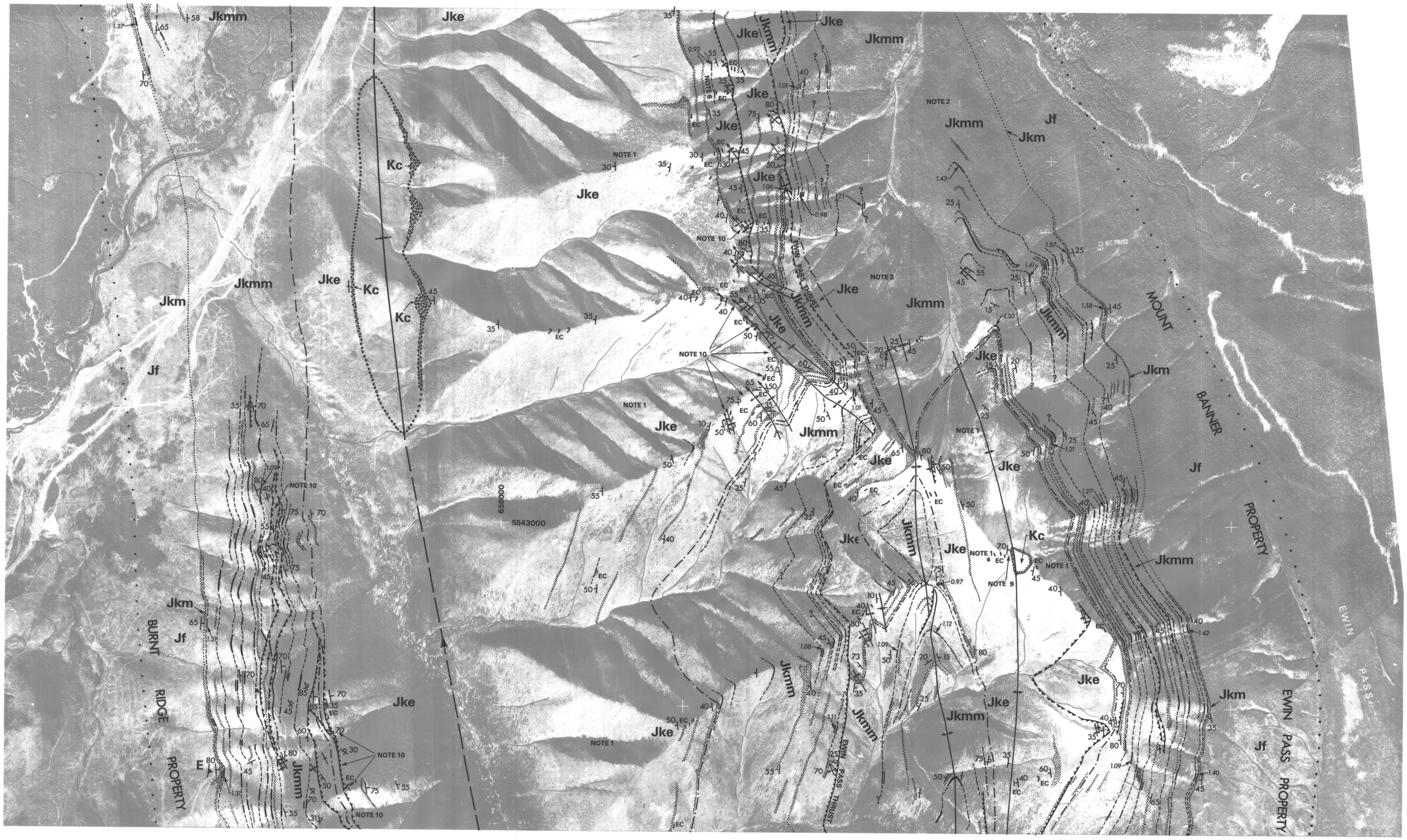

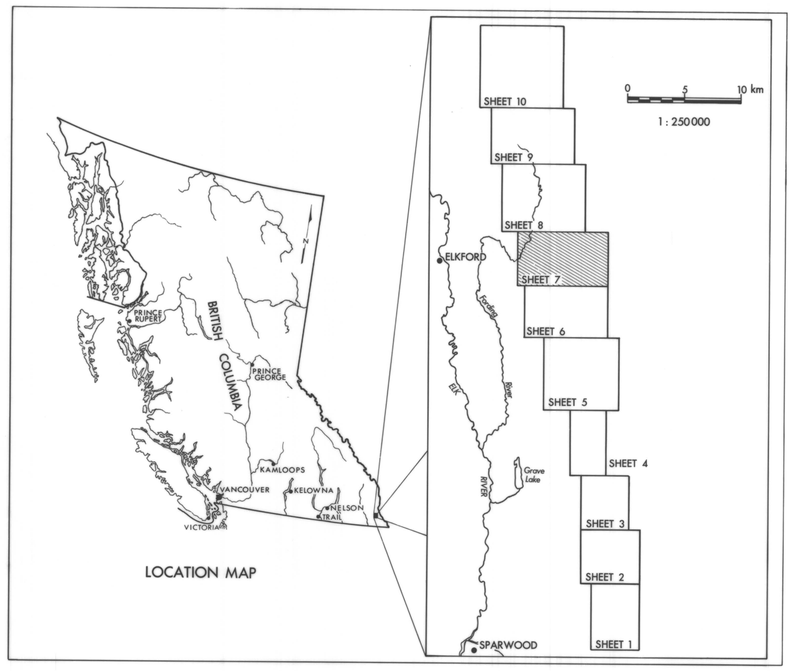

LOCATION MAP

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

SHEET 7

PRELIMINARY MAP 60

AUGUST 1985

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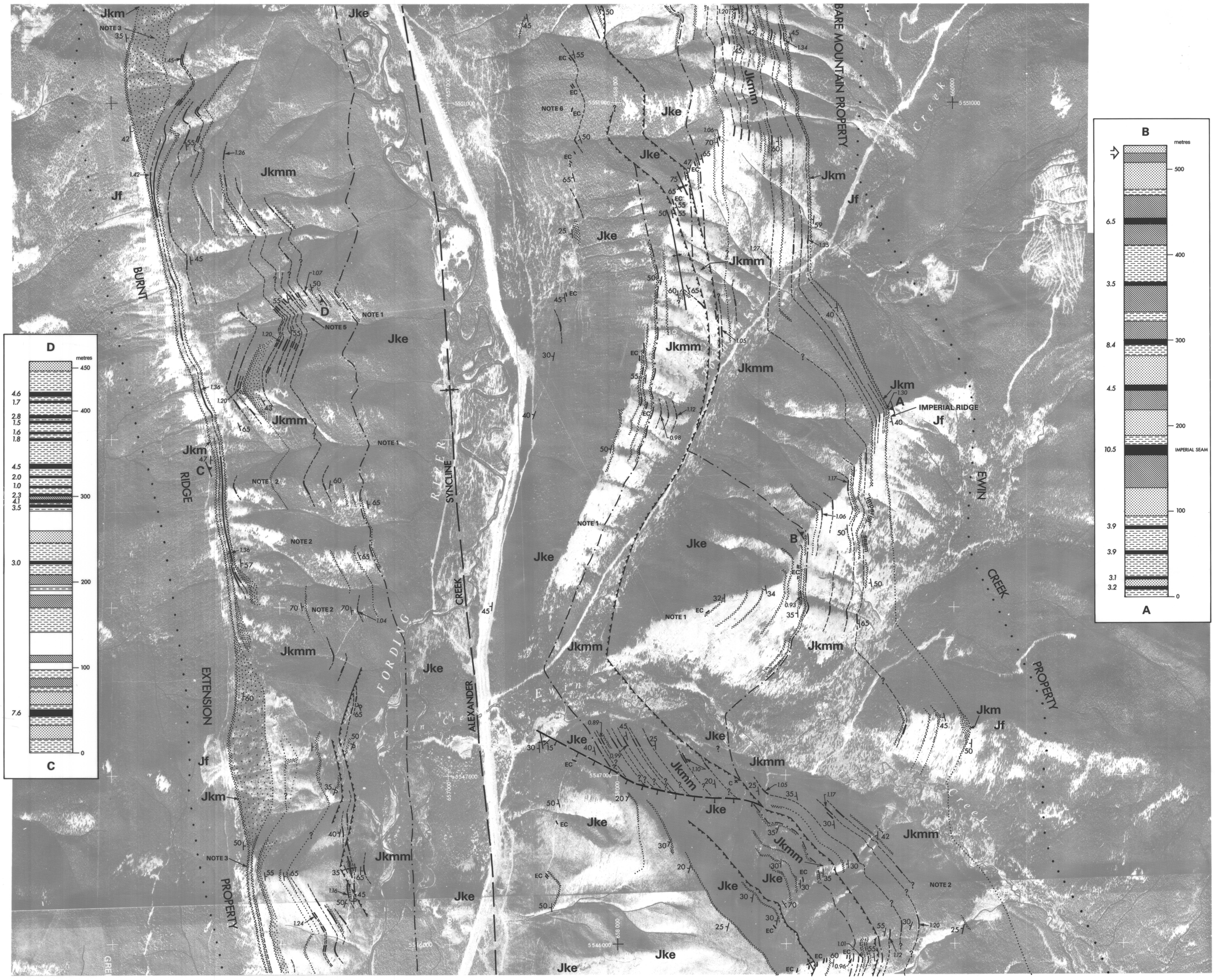

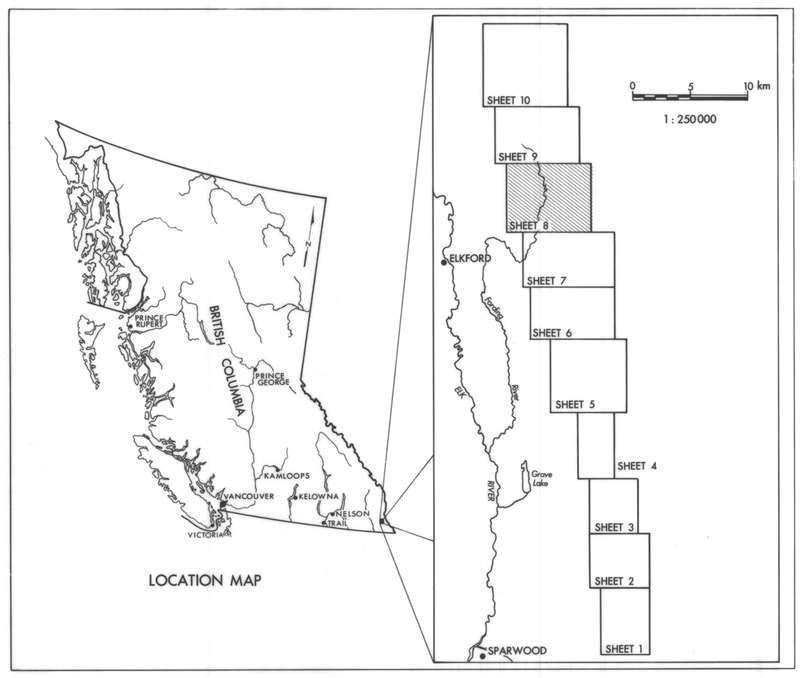

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SHEET 8

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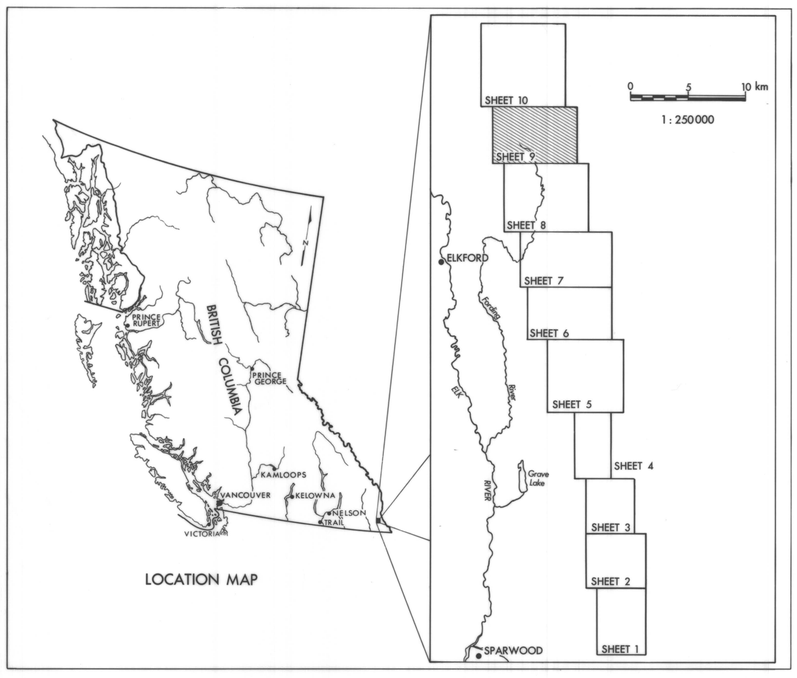
9. Occurrence of Blairmore Group limestone at this point.
10. Intense small-scale deformation in this area.

PRELIMINARY MAP NO. 60
GEOLOGY OF THE ELK VALLEY COALFIELD
SOUTHERN HALF
(KILMARNOCK CREEK TO ALEXANDER CREEK)
(N.T.S. 82G/15, 82J/2)
ISSUED AUGUST, 1985



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

1:10000

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) — C
- ELK COAL EXPOSURE — EC
- GRADATIONAL CONTACT
- FAULT (ORIENTATION UNKNOWN): APPROXIMATE, ASSUMED (BAR ON DOWNTHROWN SIDE)
- THRUST FAULT: APPROXIMATE, ASSUMED (TEETH ON UPTHRUST PLATE) — U / D
- 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 ($\bar{R}_o$ 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

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

JURRASSIC

FERNIE GROUP

Jf SHALE; INTERBEDDED SANDSTONE IN UPPER PART

EXPLANATION

Jurassic/Cretaceous Kootenay Group exposures in the area between Kilmarnock Creek and Line Creek minesite 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., Westar 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 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 lacks seams over 1 metre in thickness and contains alginite-rich sapropelic coals labelled here as 'Elk coal' (EC). Many, but not all, of the Elk coals are 'needle' 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 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 ($\bar{R}_o$ 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% >$\bar{R}_o$ 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.

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NOTES

1. Most Elk Formation sandstones omitted.
2. Area of poor exposure.
3. Recessive carbonaceous parting within Morrissey Formation.
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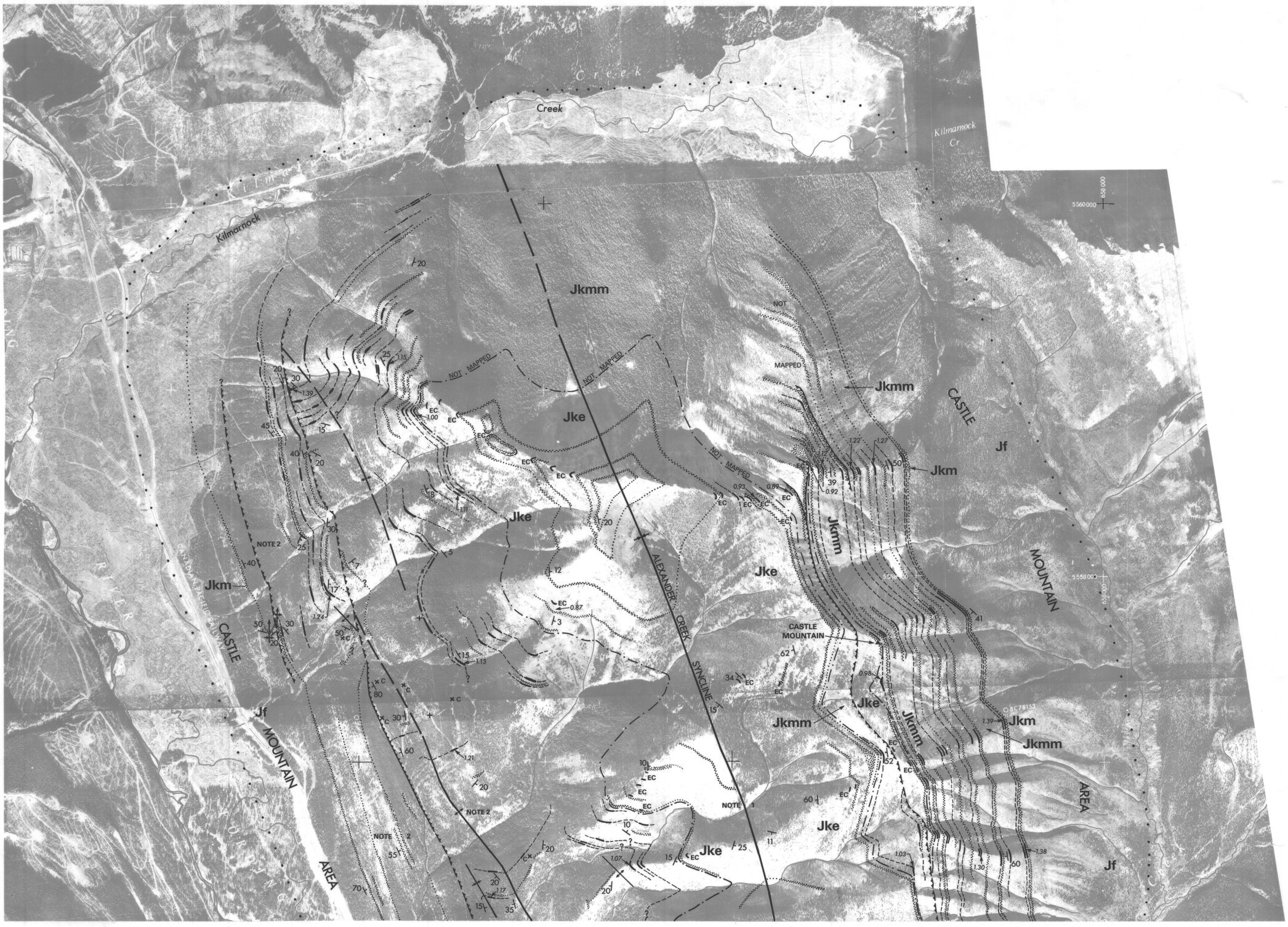

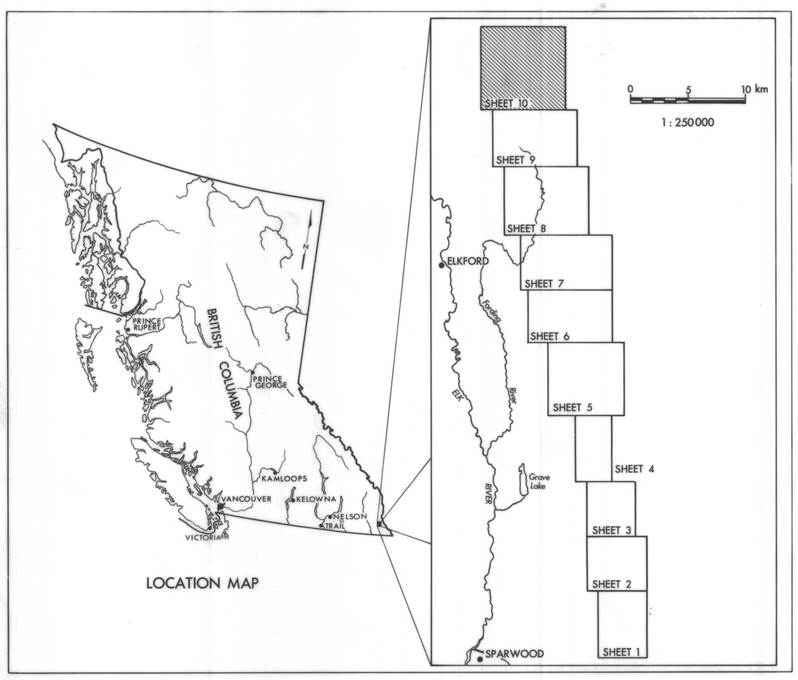

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

SHEET 10

PRELIMINARY MAP 60

AUGUST 1985

GEOLOGY OF THE ELK VALLEY COALFIELD

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