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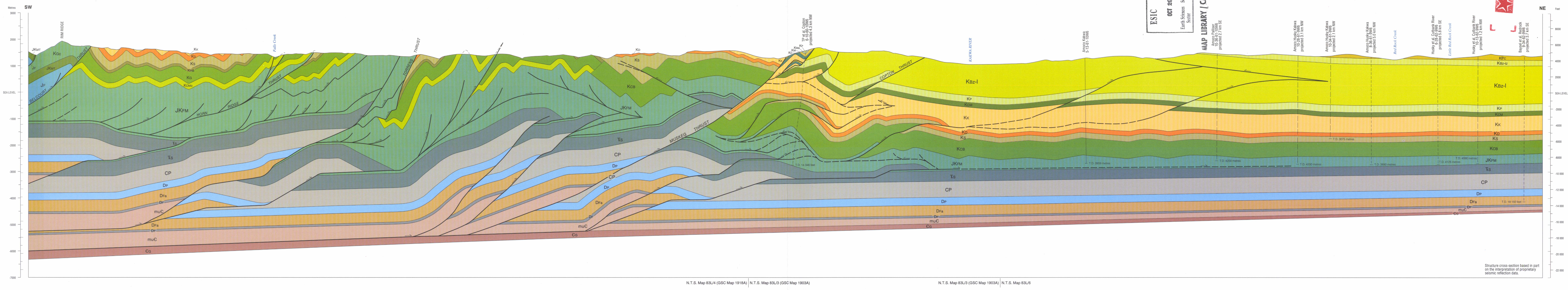
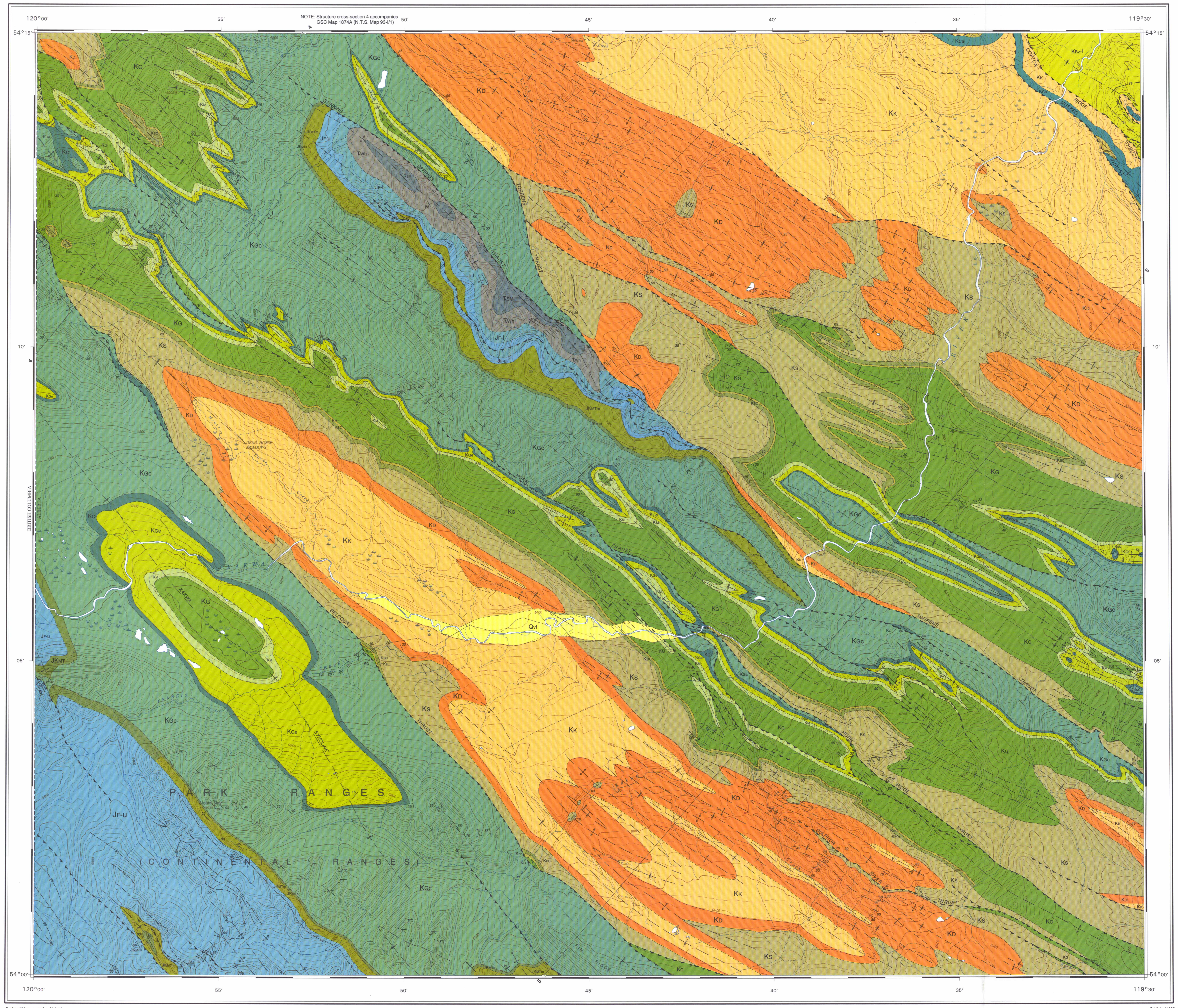
GEOLOGICAL SURVEY OF CANADA · COMMISSION GÉOLOGIQUE DU CANADA



N.T.S. Map 83L/4 (GSC Map 1918A) | N.T.S. Map 83L/3 (GSC Map 1903A) · N.T.S. Map 83L/3 (GSC Map 1903A) | N.T.S. Map 83L/6

Structure cross-section 5

NOTE: Structure cross-section 4 accompanies GSC Map 1874A (N.T.S. Map 93-I/1)



Published 1997

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT

Qvf — *Alluvium, colluvium, till; gravel, sand, silt (shown only where bedrock is covered extensively)*

MESOZOIC

CRETACEOUS AND TERTIARY
UPPER CRETACEOUS AND PALEOCENE

KPc — *COALSPUR FORMATION: sandstone, siltstone, claystone, and coal. Structure cross-section northeast of Kakwa Falls map area only*

CRETACEOUS
UPPER CRETACEOUS
BRAZEAU FORMATION (KBz-l - KBz-u)

KBz-u — *Upper part: sandstone; siltstone, mudstone, and coal. Structure cross-section northeast of Kakwa Falls map area only*

KBz-l — *Lower part: sandstone; green, grey, fine to very coarse grained, argillaceous, carbonaceous, locally conglomeratic. Mudstone, siltstone; green, brown, grey, carbonaceous. Ribbed weathering unit. Base of local resistant units denoted by rs on map*

SMOKY GROUP (KK - KP)

KP — *PUSKWASKAU FORMATION: shale and calcareous shale; dark grey to black, commonly silty, grey to rusty weathering, sideritic concretions; recessive weathering (Dowling, Thistle and Hanson members). Sandstone, resistant weathering near top (Chungo Member). Siltstone and shale at top (Nomad Member). Subsurface only*

KMa — *MARSHYBANK FORMATION: sandstone; grey, fine grained, quartz and chert rich, well cemented, brown weathering (lower part). Interbedded mudstone, siltstone, sandstone and minor coal (upper part). The lower part forms a resistant weathering unit. Subsurface only*

KMu — *MUSKIKI FORMATION: shale; dark grey, silty, rusty weathering with thin interbeds of grey argillaceous siltstone near the top. Recessive unit*

KCa — *CARDIUM FORMATION: sandstone; grey, fine grained, quartz and chert rich, well sorted and cemented, rusty brown weathering. Shale; grey, carbonaceous with argillaceous siltstone to coarse grained sandstone interbeds. Local chert-pebble conglomerate. Resistant marker unit*

KCM — *CARDIUM, MUSKIKI AND MARSHYBANK FORMATIONS, undivided. Subsurface only*

KK — *KASKAPAU FORMATION: shale; dark grey to black, commonly silty, rusty weathering, with sideritic concretions and variable amounts of very thinly interbedded grey, brown weathering siltstone. Calcareous shale: dark grey, silver-grey weathering. Recessive, poorly exposed unit. Mesoscopic faults and folds are common*

KD — *DUNVEGAN FORMATION: sandstone; grey, very fine to medium grained, argillaceous, brown weathering, micaceous bedding planes. Mudstone; grey, brown, silty, brown weathering, commonly carbonaceous, laminated, micaceous bedding planes. Sandstone - mudstone in fining upward cycles. Rare lenticular coal seams (<20 cm thick), and medium- to coarse-grained sandstone (quartzose, crossbedded, grey weathering). Relatively resistant marker unit with good topographic expression but usually poorly exposed*

LOWER AND UPPER CRETACEOUS

KS — *SHAFTESBURY FORMATION: shale; dark grey, grey or rusty weathering. Red-brown weathering, laminated siltstone interbeds are common near top. Recessive, dark weathering unit.*

LOWER CRETACEOUS
LUSCAR GROUP (KC - KG)

KG — *GATES FORMATION: sandstone; fine to coarse grained, carbonaceous, cross-bedded, tan or red-brown weathering. Interbedded with carbonaceous shale; grey, brown; carbonaceous siltstone; grey, cross-laminated; coal; beds commonly over 1 m thick; and sandy pebble conglomerate; clast supported, in beds up to 5 m thick. Sandstone; fine grained, well sorted, resistant, brown weathering unit, up to 20 m thick, forms base of succession in many areas. Ribbed weathering unit*

KM — *MOOSEBAR FORMATION: shale; dark grey with ironstone concretions. Sandstone; grey, very fine grained, laminated, very thin to thin bedded, brown weathering, absent in lower part of unit, more common near the top. Recessive marker unit*

KGl — *GLADSTONE FORMATION: sandstone; fine to coarse grained, carbonaceous, crossbedded, orange-brown weathering, and local sandy pebble conglomerate. Interbedded with carbonaceous siltstone, carbonaceous shale and coal. Plant remains abundant throughout. Ribbed weathering unit*

KC — *CADOMIN FORMATION: conglomerate; pebble to cobble, clast supported in red-brown weathering sandy matrix. Local interbeds of sandstone and siltstone. Resistant, light grey weathering, or black lichen covered marker unit*

MINNES GROUP (JKMTm - KGc)

KGc — *GORMAN CREEK FORMATION: interlayered sandstone, siltstone, mudstone, carbonaceous shale or coal in repetitive fining upward cycles generally 1 to 5 m thick. Sandstone; fine to coarse grained, carbonaceous, ripple cross-laminated or crossbedded, commonly rich in dark chert, locally conglomeratic, orange or brown weathering. Siltstone; grey, carbonaceous, orange or grey weathering. Shale; silty, carbonaceous, grey weathering, commonly grading to coal. An orange-brown weathering succession with few marker units; commonly complexly folded with minor faults*

LOWER AND UPPER CRETACEOUS
FORT ST. JOHN GROUP (KM - KS)

KS — *SHAFTESBURY FORMATION: shale; dark grey, grey or rusty weathering. Red-brown weathering, laminated siltstone interbeds are common near top. Recessive, dark weathering unit. Base of local resistant sandstone and pebbly sandstone units denoted by s on map*

LOWER CRETACEOUS

KBC — *BOULDER CREEK FORMATION: sandstone; medium to coarse grained, crossbedded, well sorted, grey weathering. Conglomerate; granule to pebble, clast supported or condensed, grey weathering. Carbonaceous siltstone and shale. Resistant, light grey weathering or black lichen-covered unit*

KH — *HULCROSS FORMATION: shale; dark grey, with ironstone concretions. Siltstone; grey, laminated, brown weathering, micaceous and carbonaceous bedding surfaces. Recessive unit*

KHB — *HULCROSS AND BOULDER CREEK FORMATIONS, undivided. Subsurface only*

KG — *GATES FORMATION: sandstone; fine to coarse grained, carbonaceous, cross-bedded, tan or red-brown weathering. Interbedded with carbonaceous shale; grey, brown; carbonaceous siltstone; grey, cross-laminated; coal; beds commonly over 1 m thick; and sandy pebble conglomerate; clast supported, in beds up to 5 m thick. Sandstone; fine grained, well sorted, resistant, brown weathering unit, up to 20 m thick, forms base of succession in many areas. Ribbed weathering unit*

KM — *MOOSEBAR FORMATION: shale; dark grey with ironstone concretions. Sandstone; grey, very fine grained, laminated, very thin to thin bedded, brown weathering, absent in lower part of unit, more common near the top. Recessive marker unit*

BULLHEAD GROUP (KC - KGe)

KGe — *GETHING FORMATION: sandstone; fine to coarse grained, carbonaceous, crossbedded, orange-brown weathering, and local sandy pebble conglomerate. Interbedded with carbonaceous siltstone, carbonaceous shale and coal. Plant remains abundant throughout. Ribbed weathering unit*

KC — *CADOMIN FORMATION: conglomerate; pebble to cobble, clast supported in red-brown weathering sandy matrix. Local interbeds of sandstone and siltstone. Resistant, light grey weathering, or black lichen covered marker unit*

KCMo — *CADOMIN, GETHING AND MOOSEBAR FORMATIONS, undivided. Subsurface only*

KCB — *CADOMIN, GETHING, MOOSEBAR, GATES, HULCROSS, AND BOULDER CREEK FORMATIONS, undivided. Subsurface only*

JURASSIC AND CRETACEOUS
UPPER JURASSIC AND LOWER CRETACEOUS
MONTEITH FORMATION (JKMTm - JKMTs)

JKMTs — *Mixed facies: sandstone; very fine to medium grained, rich in dark chert, ripple cross-laminated, locally carbonaceous, brown weathering. Shale and siltstone; grey, interlaminated, micaceous and carbonaceous parting planes, brown weathering, local carbonate concretions. Conglomerate; pebble, clast supported in lenses up to 3 m thick. Brown weathering unit*

JKMTm — *Marine sandstone facies: sandstone; very fine grained, light brown-grey, laminated, pinkish or light grey weathering with minor grey shale interbeds. Resistant marker unit*

JKMT — *MONTEITH FORMATION, undivided*

JKFM — *FERNIE FORMATION AND MINNES GROUP, undivided. Subsurface only*

JURASSIC
FERNIE FORMATION (JF-l - JF-u)

JF-u — *Upper part: Siltstone and silty sandstone; brown-grey, very thin to thin bedded, red-brown weathering, micaceous parting planes, local large orange-brown weathering concretions. Interbedded with shale: grey, silty, brown weathering. Brown, relatively recessive weathering unit with locally mappable resistant intervals 20 to 80 m thick dominated by silty sandstone. Base of uppermost unit denoted by us; other units with uncertain stratigraphic positions denoted by ss on map*

JF-l — *Lower part: shale; dark grey, locally rusty weathering, ironstone concretions; minor quartz sandstone and glauconitic sandstone near base. A few metres of interbedded black shale and dark limestone occurs at base (Nordegg Member). Recessive unit*

JF — *FERNIE FORMATION, undivided. Subsurface only*

TRIASSIC
SPRAY RIVER GROUP (ŦSM - ŦWh)

ŦWh — *WHITEHORSE FORMATION: interbedded silty dolostone, sandstone, siltstone, sandy limestone, intraformational conglomerate, solution breccia, anhydrite, limestone and cherty dolostone. Limestone; light grey weathering with minor dolostone and intraformational conglomerate. A distinctive, brightly weathering, ribbed unit*

ŦSM — *SULPHUR MOUNTAIN FORMATION: siltstone, silty limestone; grey, red-brown, platy to flaggy weathering, contains phosphatic fossils. Minor interbedded shale, dolostone and sandstone. A distinctive, red-brown, moderately resistant weathering unit*

ŦS — *SPRAY RIVER GROUP, undivided. Subsurface only*

SUBSURFACE ONLY

PALEOZOIC

CARBONIFEROUS AND PERMIAN

CP — *BANFF FORMATION, RUNDLE GROUP AND BELCOURT AND MOWICH FORMATIONS, undivided: limestone, shale, dolostone and minor sandstone*

DEVONIAN
UPPER DEVONIAN

DP — *PALLISER FORMATION: limestone; brown-grey, wavy bedded to nodular, dolomitic and burrow mottled*

DFa — *FAIRHOLME GROUP: limestone, dolostone, argillaceous limestone and shale*

DF — *FLUME FORMATION: limestone, shale*

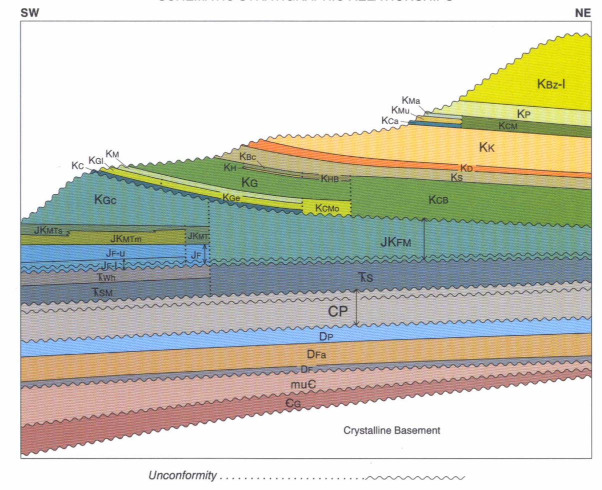
CAMBRIAN
MIDDLE AND UPPER CAMBRIAN

mu€ — *Limestone, dolostone and shale*

LOWER CAMBRIAN

€G — *GOG GROUP: quartz sandstone*

SCHEMATIC STRATIGRAPHIC RELATIONSHIPS



Unconformity ....

Outcrop examined, bedding attitude not determined .... ×
Geological boundary (defined, approximate, assumed) ....
Geological boundary (assumed projection under cover of younger deposits) ....
Bedding, tops known (inclined, overturned) 70 72
Bedding, tops unknown (inclined) 50
Fault, thrust or reverse, west vergent (teeth indicate upthrust side; assumed) ....
Fault, thrust or reverse, east vergent (teeth indicate upthrust side; defined, approximate, assumed) ....
Fault, thrust or reverse, east vergent (assumed projection under cover of younger deposits) ....
Anticline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge) ....
Syncline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge) ....
Anticline and syncline (assumed projection under cover of younger deposits) ....
Monocline (arrow indicates dip direction of steeper limb; approximate) ....
Diagrammatic profiles of sets of minor folds (30 to 10 m wavelength) viewed to the northwest. Axial trace indicates the observed extent of the structures ....
Minor folds; axis, trend and plunge; (z fold, s fold) 15 16
Lateral change in lithofacies (denoted by zig-zag perpendicular to map unit contacts) ....
Change in mapping precision; stratigraphic subdivisions are amalgamated at dotted line .... JKMT | JKMTs / JKMTm
Line of section .... 5 — 5
Well (abandoned) ....

Geological interpretation by M.E. McMechan, 1988, 1994, based on ground and air observations and airphoto and seismic interpretation (1981-83, 1985, 1994)

SCHEDULE OF WELLS

1. *Mich. Wis. LRI Torrens 6-21-60-13W6*

Digital cartography by D.A. Lemay and P.R.J. Wozniak, Geological Survey of Canada (Calgary)

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map at the scale of 1:50 000 from Geomatics Canada, Natural Resources Canada, modified for publication by the Geological Survey of Canada

Copies of the topographical edition covering this map area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario, K1A 0E9

Approximate magnetic declination 1997, 21°57′ East, decreasing 8.8′ annually

Elevations in feet above mean sea level

Recommended citation:
McMechan, M.E.
1997: Geology and structure cross-section, Kakwa Falls, Alberta; Geological Survey of Canada, Map 1918A, scale 1:50 000

Copies of this map may be obtained from the Geological Survey of Canada
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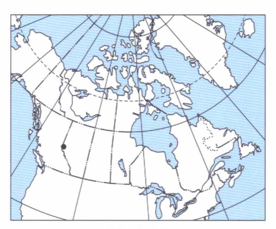

LOCATION MAP

MAP 1918A

GEOLOGY

KAKWA FALLS

WEST OF SIXTH MERIDIAN

ALBERTA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilomètres

Universal Transverse Mercator Projection · Projection transverse universelle de Mercator

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93-I/8 1842A	83L/5 1869A	83L/6
93-I/1 1874A	83L/4 1918A	83L/3 1903A
93H/16 1892A	83E/13 OF-1710	83E/14 1904A

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

Canada

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1918A