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Province of British Columbia
Ministry of Energy, Mines
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Kakwa Recreation Area Geology

by J. Pell et al.

NTS 093H/15, 16 & 093I/1, 2 Scale 1:50 000

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GEOLOGICAL SURVEY BRANCH

OPEN FILE MAP 1992-10

KAKWA RECREATION AREA GEOLOGY

NTS 93H/15,16 & 93I/1,2

J. PELL, J. L. HAMMACK, B. FLETCHER, W. D. HARRIS AND V. M. KOYANAGI

SCALE 1:50 000

LEGEND

LOWER CRETACEOUS

lKG — **Gates Formation (110 metres):** *Moderately resistant, tan weathering unit. "Middle" Gates Member: thin to thick bedded, carbonaceous sandstone, siltstone, shale and coal. Torrens River Member: Thin to thick bedded, cross-laminated sandstone.*

lKM — **Moosebar Formation (35 to 55 metres):** *Recessive, thinly bedded, grey to tan weathering shale interbedded with rusty weathering siltstone.*

BULLHEAD GROUP

lKBG — **Gething Formation (45 to 50 metres):** *Moderately resistant, orange-brown weathering crosslaminated sandstone, carbonaceous siltstone and carbonaceous shale. Top of this unit is marked by a 2.5 to 3 metre coal seam.*

lKBC — **Cadomin Formation (25 metres):** *Resistant, cliff forming, buff-brown weathering polymictic pebble to cobble conglomerate.*

MINNES GROUP

lKMG — **Gorman Creek Formation (650 to 1000 metres):** *Moderately resistant, medium bedded, orange-brown and buff weathering sandstone, siltstone, mudstone, carbonaceous shale and thin coal beds.*

UPPER JURASSIC AND LOWER CRETACEOUS

uJM — **Monteith Formation (200 to 400 metres):** *Resistant, light grey-brown to yellow-brown weathering, fine grained laminated sandstone.*

JURASSIC

JF — **Fernie Formation (250 to 900 metres):** *Recessive, thinly bedded, dark grey to black shale and lesser grey-brown weathering siltstone and sandstone.*

TRIASSIC

SPRAY RIVER GROUP

TW — **Whitehorse Formation (130 to 400 metres):** *Recessive to resistant, buff to light-grey and yellow-grey weathering dolostone, grainstone, quartz wacke, and lesser siltstone, conglomerate and evaporite.*

TSM — **Sulphur Mountain Formation (370 to 470 metres):** *Moderately resistant, distinctive dark red-brown to brown-orange weathering unit.*
Llama Member: orange-brown weathering, thin to thick bedded dolomitic siltstone, silty limestone and dolostone.
Whistler Member: dark grey to black weathering siltstone, silty limestone, shale, dolostone, phosphorite and phosphatic pebble conglomerate.
Vega-phroso Member: platey to flaggy weathering calcareous siltstone, silty limestone and shale.

PERMIAN

PmM — **Mowich Formation (10 metres):** *Moderately resistant, thick bedded, light brown-buff weathering, light to medium grey, fine grained quartz arenite.*

PmB — **Belcourt Formation (>10 metres):** *Moderately resistant, thick bedded, medium grey chert pebble conglomerate with limestone matrix and lime mudstone.*

LOWER CARBONIFEROUS

CR — **RUNDLE GROUP (400 metres):** *Mount Head Formation: moderately resistant, thick bedded to massive, light grey weathering, light to dark-grey, fossiliferous, fine grained dolostone with common chert nodules. Locally petroliferous.*
Turner Valley, Shunda and Pekisko Formations: Variably thin to thick bedded, light to medium grey weathering, fossiliferous, medium grey crinoidal grainstone, packstone and wackestone with minor lime mudstone and dolostone.

UPPER DEVONIAN AND LOWER CARBONIFEROUS

CEB — **Exshaw & Banff Formations (180 to 260 metres):** *Recessive, black shale with thin interbeds of lime mudstone, wackestone, grainstone and minor sandstone.*

UPPER DEVONIAN

uDPA — **Palliser Formation (530 metres):** *Characteristically unfossiliferous. Upper Part: Resistant, massive to thick bedded, monotonous succession of medium grey weathering lime mudstone with rare nodular chert. Base of the upper part is marked by 10 metres of laminated black and grey lime mudstone. Lower Part: Less resistant, thin bedded lime mudstone with rare skeletal grainstone and oolitic beds. Base is marked by a thin, brown weathering fossil hash layer.*

uDS — **Simla Formation (60 to 70 metres):** *Resistant, massive to thick bedded, light grey weathering skeletal grainstone. Very fossiliferous with common corals, bryozoans and crinoids.*

uDMH — **Mount Hawk Formation (90 to 140 metres):** *Resistant, cliff forming, grey to brown-grey weathering lime mudstone to wackestone. Invariably fossiliferous with common gastropods, corals and brachiopods.*

uDPE — **Perdrix Formation (185 to 470 metres):** *Recessive, grey-green to black shale with thin calcareous *interbeds.*

uDF — **Flume Formation (75 to 145 metres):** *Moderately resistant, thick bedded to massive, grey, buff to chocolate brown weathering stromatoporoid biostrome overlain by and interbedded with recessive, dark grey weathering shaley lime mudstone. Base consists of a thin quartzose sandstone unit overlain by a thin unit of red and green calcareous shale.*

uDFU — *Upper Flume Formation: Recessive to moderately resistant, dark grey, shaley limestone, lime mudstone, wackestone and packstone. Locally rich in brachiopods, corals and crinoids.*

uDFL — *Lower Flume Formation: Moderately resistant, thick bedded to massive, grey, buff to chocolate brown weathering stromatoporoid biostrome interbedded with dark grey weathering shaley lime mudstone. Base consists of thin quartzose sandstone overlain by red and green calcareous shales. Locally abundant brachiopods.*

MIDDLE DEVONIAN

mDD — **Dunedin Formation (60 metres):** *Mt. Buchanan area only. Upper part: resistant, thick bedded, medium grey lime mudstone and skeletal wackestone with minor interbeds of quartz arenite and siltstone. Lower part: less resistant, orange-brown weathering, light grey quartz arenite and siltstone.*

MIDDLE ORDOVICIAN

mOU — **Unnamed Unit (>75 metres):** *Medium bedded to massive dolomitic quartz arenite and fine grained dolostone. Distinctive yellow to buff-orange resistant weathering unit.*

mOS — **Skoki Formation (110 to 380 metres):** *Resistant, tan weathering, medium to thick bedded, finely crystalline dolostone. Locally contains oncolites, stromatolites, intraclasts, mud cracks and rare chert nodules. Monotonous cliff forming unit.*

LOWER ORDOVICIAN

lOM — **Monkman Quartzite (30 to 100 metres):** *Resistant, thin bedded to massive, light-grey to buff weathering quartzite and dolomitic quartzite.*

OSP — **Survey Peak Formation (450 to 600 metres):** *Resistant, wavy bedded, buff to orange weathering silty dolostone, dolomitic siltstone and blue-grey weathering limestone. Base consists of 30 to 70 metres of recessive, light green-grey weathering calcareous shale and argillaceous limestone interbedded with flat pebble conglomerate.*

OSPU — *Upper Survey Peak Formation: Resistant, wavy bedded, buff to orange weathering silty dolostone, dolomitic siltstone and blue-grey weathering limestone.*

OSPL — *Lower Survey Peak Formation: Recessive, light green -grey weathering calcareous shale and argillaceous limestone interbedded with flat pebble conglomerate.*

UPPER CAMBRIAN

uƐL — **Lynx Formation (600 to 800 metres):** *Resistant, cliff forming, medium to thick bedded, grey, buff and orange weathering limestone, dolostone and lesser shale. Distinctive banded unit.*

MIDDLE CAMBRIAN

mƐA — **Arctomys Formation (50 to 100 metres):** *Recessive, thinly bedded red shale; interbedded with orange weathering dolostone and dolomitic siltstone.*

mƐP — **Pika Formation (80 to 100 metres):** *Thin to medium bedded, medium grey lime mudstone with interbedded brown weathering shale. Commonly recessive but upper part may be resistant. Base locally marked by orange weathering dolostone unit.*

mƐE — **Eldon Formation (350 to 375 metres):** *Massive, cliff forming, thin to thick bedded, medium to dark grey lime mudstone and lesser orange weathering dolostone. Dolomitized worm burrows common.*

mƐS — **Snake Indian Formation (400 metres):** *Thin to medium bedded red and green shale, tan weathering dolostone and medium grey limestone, silty limestone and siltstone. Locally divisible into upper and lower parts:*

mƐSU — *Upper Snake Indian Formation: Resistant, medium bedded grey limestone, tan dolostone and brightly colored red and green shale. Cliff former.*

mƐSL — *Lower Snake Indian Formation: Recessive, thinly bedded, red, green and grey shale with interbedded tan weathering dolostone.*

LOWER CAMBRIAN

lƐH — **Hota Formation (20 to 60 metres):** *Resistant, dark grey weathering limestone sandy limestone and calcareous shale.*

GOG GROUP

lƐMA — **Mahto Formation (300 to 350 metres):** *Resistant, grey and maroon weathering; maroon, pink and light grey quartz arenite. Locally dolomitic and interbedded with dolostone.*

lƐMU — **Mural Formation (225 to 300 metres):** *Recessive, reddish-brown weathering, interbedded quartz arenite, sandy dolostone, limestone and shale.*

lƐMC — **McNaughton Formation (1500 metres):** *Dark grey to rusty weathering, light grey quartz arenite and quartz granule conglomerate. Forms resistant cliffs.*

UPPER PROTEROZOIC

uPM — **MIETTE GROUP - Upper Part:** *Brown weathering argillite, quartz pebble conglomerate, quartz wacke and quartz arenite. Local dolostone blocks of olistromal origin.*

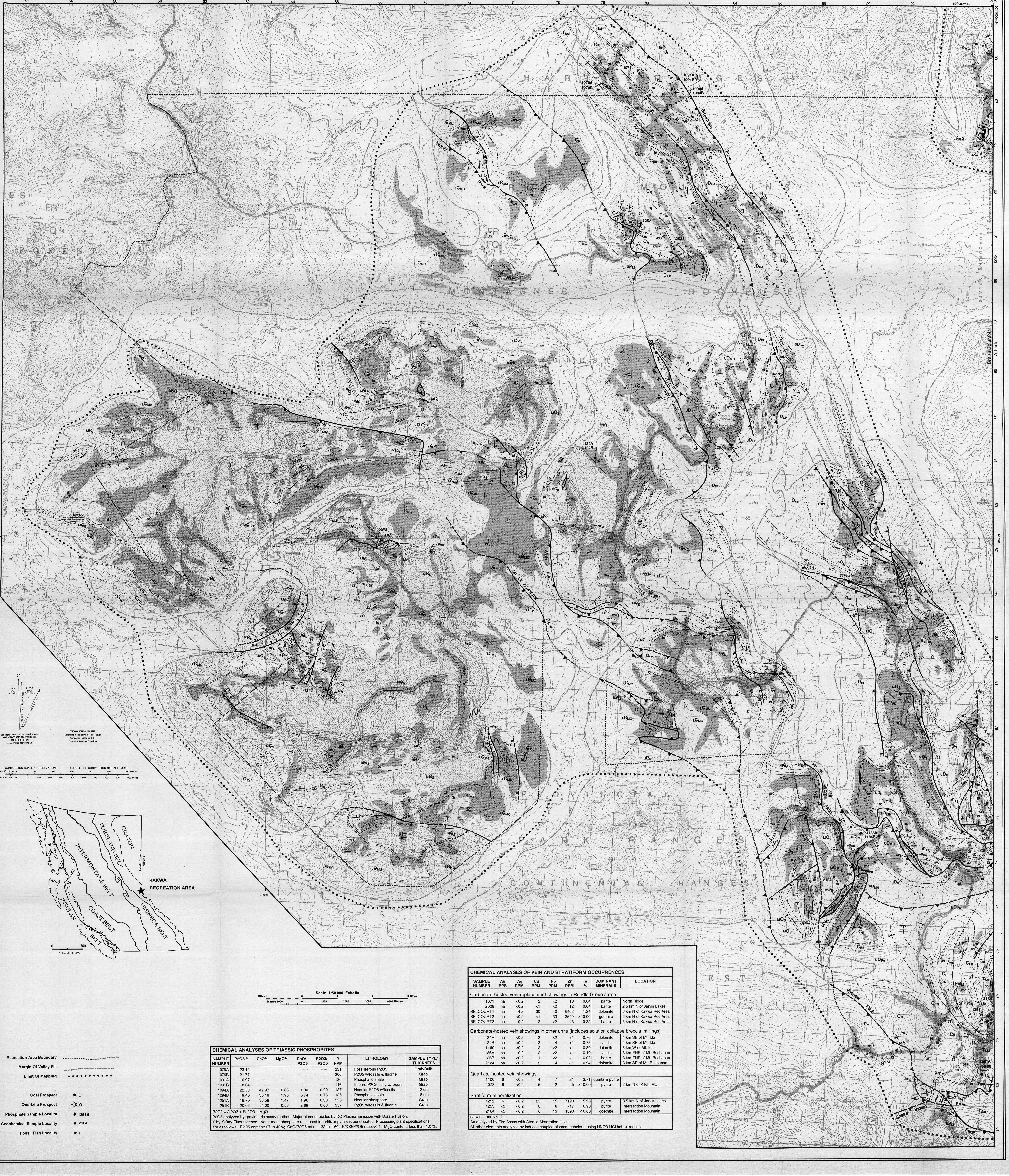
Compiled by J. Pell and J. L. Hammack from mapping by J. Pell, J. L. Hammack, B. Fletcher, W. D. Harris and V. M. Koyanagi (1991); and M. E. McMechan (1986), Geological Survey of Canada, Open File Map 1229; and M. E. McMechan and R. I. Thompson (1985), Geological Survey of Canada, Open File Map 1150.

SYMBOLS

Geological Boundary (defined, approximate, inferred)
Thrust Fault (defined, approximate, inferred)
Normal Fault (defined, approximate, inferred)
Bedding (inclined, vertical, overturned)
Anticline axial trace (upright, overturned)
Syncline axial trace (upright, overturned)
Glacial Ice
Outcrop

Recreation Area Boundary
Margin Of Valley Fill
Limit Of Mapping

Coal Prospect — C
Quartzite Prospect — Q
Phosphate Sample Locality — 1251B
Geochemical Sample Locality — 2164
Fossil Fish Locality — F



CHEMICAL ANALYSES OF TRIASSIC PHOSPHORITES

SAMPLE NUMBER	P2O5 %	CaO%	MgO%	CaO/ P2O5	R2O3/ P2O5	Y PPM	LITHOLOGY	SAMPLE TYPE/ THICKNESS
1079A	23.12	-----	-----	-----	-----	231	Fossiliferous P2O5	Grab/Bulk
1079B	21.77	-----	-----	-----	-----	206	P2O5 w/fossils & fluorite	Grab
1091A	10.97	-----	-----	-----	-----	136	Phosphatic shale	Grab
1091B	8.04	-----	-----	-----	-----	116	Impure P2O5, silty w/fossils	Grab
1094A	22.58	42.97	0.63	1.90	0.20	137	Nodular P2O5 w/fossils	12 cm
1094B	9.40	35.18	1.90	3.74	0.75	136	Phosphatic shale	18 cm
1251A	18.70	36.58	1.47	1.96	0.38	358	Nodular phosphate	Grab
1251B	20.06	54.00	0.53	2.69	0.08	357	P2O5 w/fossils & fluorite	Grab

R2O3 = Al2O3 + Fe2O3 + MgO
P2O5 analyzed by gravimetric assay method; Major element oxides by DC Plasma Emission with Borate Fusion; Y by X-Ray Fluorescence. Note: most phosphate rock used in fertilizer plants is beneficiated, Processing plant specifications are as follows: P2O5 content: 27 to 42%; CaO/P2O5 ratio: 1.32 to 1.60; R2O3/P2O5 ratio:<0.1; MgO content: less than 1.0 %.

CHEMICAL ANALYSES OF VEIN AND STRATIFORM OCCURRENCES

SAMPLE NUMBER	Au PPB	Ag PPM	Cu PPM	Pb PPM	Zn PPM	Fe %	DOMINANT MINERALS	LOCATION
Carbonate-hosted vein-replacement showings in Rundle Group strata								
1071	na	<0.2	2	<2	13	0.04	barite	North Ridge
2028	na	<0.2	<1	<2	12	0.04	barite	2.5 km N of Jarvis Lakes
BELCOURT1	na	4.2	30	40	6462	1.24	dolomite	6 km N of Kakwa Rec Area
BELCOURT2	na	<0.2	<1	33	3549	>10.00	goethite	6 km N of Kakwa Rec Area
BELCOURT3	na	0.2	2	<2	43	0.32	barite	6 km N of Kakwa Rec Area
Carbonate-hosted vein showings in other units (includes solution collapse breccia infillings)								
1124A	na	<0.2	2	<2	<1	0.70	dolomite	4 km SE of Mt. Ida
1124B	na	<0.2	3	4	<1	0.75	calcite	4 km SE of Mt. Ida
1160	na	<0.2	2	<2	<1	0.30	dolomite	6 km W of Mt. Ida
1186A	na	0.2	2	<2	<1	0.10	calcite	3 km ENE of Mt. Buchanan
1186B	na	<0.2	1	<2	<1	0.02	barite	3 km ENE of Mt. Buchanan
2124	na	<0.2	2	4	<1	0.94	dolomite	3 km SE of Mt. Buchanan
Quartzite-hosted vein showings								
1100	6	<0.2	4	7	21	3.71	quartz & pyrite	
2078	6	<0.2	5	12	5	>10.00	pyrite	2 km N of Kitchi Mt.
Stratiform mineralization								
1252	6	<0.2	25	15	7190	5.98	pyrite	3.5 km N of Jarvis Lakes
1253	<5	<0.2	8	8	717	6.90	pyrite	Intersection Mountain
2164	<5	<0.2	6	13	1890	>10.00	goethite	Intersection Mountain

na = not analyzed.
Au analyzed by Fire Assay with Atomic Absorption finish.
All other elements analyzed by induced coupled plasma technique using HNO3-HCl hot extraction.