

THE QUATERNARY HOODOO MOUNTAIN VOLCANIC COMPLEX AND PALEOZOIC AND MESOZOIC BASEMENT ROCKS, PARTS OF HOODOO MOUNTAIN (NTS 104B/14) AND CRAIG RIVER (NTS 104B/11) MAP AREAS

STRATIFIED ROCKS

QUATERNARY

- Qc4** soil, marsh and snow (above 1500 m)
- COLLUVIAL DEPOSITS**
- Qc3** unstratified colluvium including glacial fill, outwash, and talus
- Qc2** talus derived from local exposures
- Qc1** colluvium comprising black, glassy clasts and lava fragments; found on the northwest corner of Hoodoo Mountain
- FLUVIAL AND GLACIOFLUVIAL DEPOSITS**
- Qf1** stream gravel and associated fluvial deposits
- GLACIOLACUSTRINE DEPOSITS**
- Qs2** black, tan, light green to variegated, thinly-laminated glaciolacustrine sediments consisting of sand, silt, and clay; clay laminae are less than 1 mm thick; along south fork of upper Hoodoo River
- Qs1** black, tan to variegated, thin bedded fluvial to glaciolacustrine sediments comprising sand, clay and minor gravel beds; at the confluence of the north and south forks of upper Hoodoo River. Unit is unconsolidated, more drab in colouration and more sand-rich than Qs2. ¹⁴C age = 670±50 yr BP (radiocarbon age determination GSC-58-68)

Pleistocene and Holocene

Northern Cordillera Volcanic Province (Edwards, B.R., and Russell, J.K., 2000)

HOODOO MOUNTAIN VOLCANIC COMPLEX

- Qvpp** undivided porphyritic phonolite lavas covered by talus or forest; probably equivalent to Qvpp1. Elsewhere, the unit is subdivided into two subunits:
 - Qvpp2** unglaciated, alkali feldspar-phyric phonolite lava flows with preserved blocky flow surface and/or lava channel levees; on the northwestern, southwestern and southeastern sides of Hoodoo Mountain
 - Qvpp1** alkali feldspar-phyric phonolite lava flows whose flow surfaces have been partly modified by glaciation; lava channels still preserved (sample 93BRE3, preliminary ⁴⁰Ar/³⁹Ar age, ca. 71a and 93BRE4, preliminary ⁴⁰Ar/³⁹Ar age, ca. 28 ka (M. Villeneuve, pers. comm., 1998))
- Qvap** undivided aphanitic phonolite lava flows or those of poorly-consolidated stratigraphic position; includes three lava domes at the terminus of Twin Glacier with characteristics similar to several other Qvap units; unit is overlain by Qvpy1; also includes a lava flow / avalanche deposit of angular blocks of black, aphanitic lava on the west side of lower Hoodoo River, near the confluence with the Iskut River; K-Ar dates for this unit from Souther and Armstrong (unpubl. data, see Souther 1990a) range from 0.11±0.03 Ma to 0.02±0.01 Ma. Elsewhere the unit is subdivided into six subunits:
 - Qvap6** aphanitic phonolite subglacial lava flows and spines; green to grey-green; highly vesicular with irregularly shaped vesicles and local analcite-lined vesicles and amygdaloids; commonly abundantly jointed
 - Qvap5u** undivided aphanitic phonolite subglacial lava flow deposits; on the northwest corner of Hoodoo Mountain, including the southwestern side of large exposures of Qvpy2; it includes isolated occurrences of Qvh2 and Qvh3, as well as some lava flow breccia (sample 94BRE78, preliminary ⁴⁰Ar/³⁹Ar age ca. 30 - 40 ka (M. Villeneuve, pers. comm., 1998))
 - Qvap5** Qvap5, Qvap5a structurally highest aphanitic phonolite subaerial lava flows interbedded with flow breccia and hyaloclastite; on the northeast, southeast, south and west sides of Hoodoo Mountain; common irregular to radial columnar jointing
 - Qvap5a** domes and thick lava flows within or at the base of flow breccia; south and southwestern sides of Hoodoo Mountain
 - Qvap4** stratigraphically medial aphanitic to slightly porphyritic phonolite lava flows, generally black on fresh surfaces but weathering to rusty brown; often with coarse (>0.5 m in diameter) columnar joints and varying between 1 and 10 m in thickness (sample 93BRE16, preliminary ⁴⁰Ar/³⁹Ar age, ca. 54 ka (M. Villeneuve, pers. comm., 1998))
 - Qvap3** aphanitic phonolite lava flow(?) with abundant fresh and devitrified glass and heterolithic clasts; on the north side of Hoodoo Mountain capping the large deposit of Qvpy1 and as an isolated occurrence on the northeast corner of Hoodoo Mountain
 - Qvap2** stratigraphically medial aphanitic phonolite lava flows and domes; on northern and western sides of Hoodoo Mountain directly overlain by Qvap4 and Qvpy1. Subdivided into two subunits:
 - Qvap2a** a: commonly with narrow (<0.5 m in diameter) columnar joints, locally radially oriented, and with distinctive flow banding on the north and northeast sides of Hoodoo Mountain, (sample 94BRE45 submitted for ⁴⁰Ar/³⁹Ar dating)
 - Qvap2b** b: undivided medial aphanitic phonolite lava flows and flow breccia; mainly on west side of Hoodoo Mountain, (sample 94BRE113, preliminary ⁴⁰Ar/³⁹Ar age, ca. 80 ka (M. Villeneuve, pers. comm., 1998))
 - Qvap1** stratigraphically lowest aphanitic phonolite lava flows and domes, with closely-spaced columnar joints and platy jointing oriented parallel to the columns (sample 94BRE168, preliminary ⁴⁰Ar/³⁹Ar age, ca. 85 ka (M. Villeneuve, pers. comm., 1998))

- Qvu(a-b)** undivided volcanic rocks including lava flows and volcanic breccias; commonly weather to form hoodoos and/or occur below tree-line; elsewhere the undivided volcanic are subdivided:
 - Qvua** yellow to brown volcanic rocks that form hoodoos in the steep canyons on the southwest flank of Hoodoo Mountain
 - Qvub** pinkish brown Holocene(?) volcanic rocks exposed at the eastern edge of Hoodoo Glacier; feldspar-phyric with columnar joints and resembling Qc3; overlain by Q1 and Q2

INTRUSIVE ROCKS

DYKES

QUATERNARY

- Q1** Pleistocene and Holocene undivided Holocene(?) dykes that crosscut Mesozoic basement rocks and occur within or crosscut some of the lower units in Hoodoo Mountain and Little Bear mountain volcanic complexes. Elsewhere the unit is subdivided into four types:
 - Q11** basalt dykes that contain white granitic xenoliths characterized by disseminated patches of black glass; intrude Qvub on northern Little Bear mountain near the summit
 - Q12** purple-brown, tephritic dykes; intrude Mesozoic rocks west of Little Bear mountain and east of Hoodoo Glacier
 - Q13** pink-brown, trachyandesite dykes; intrude Mesozoic rocks and crosscut Qvd2 immediately east of Hoodoo Glacier (sample 94BRE74 preliminary ⁴⁰Ar/³⁹Ar age, ca. 1800 ka (M. Villeneuve, pers. comm., 1998))
 - Q14** grey-green, phonolitic (?) dykes; intrude Mesozoic rocks on the north side of upper Hoodoo River near the confluence and both Qvap2b and Qvap5 on the west side of Hoodoo Mountain

PALEOZOIC AND MESOZOIC BASEMENT ROCKS

STRATIFIED ROCKS

- U-TSG** *Stuhler Group* clinozygne porphyry volcanoclastic rocks and metasedimentary and metavolcanic rocks including argillite and sericite schist; found along the south fork of the upper Hoodoo River, on the south slope of Little Bear mountain. Near Twin Glacier, unit is subdivided (Fillipone and Ross, 1989):
 - U-TSG7** black slate, grey tuffaceous slate
 - U-TSG6** andesitic tuff, tuff breccia, crystal tuff, SA amygdaloidal flows, tuff
 - U-TSG5** tuff, argillite, minor basalt, calcareous tuff, limestone
 - U-TSG4** massive basalt or mafic flows, tuff
 - U-TSG3** basalt, well-bedded tuff, lapilli tuff
 - U-TSG2** interlayered basalt, rhyodacite, rhyolite, minor limestone
 - U-TSG1** basalt, andesite, mafic tuff, limestone, siltstone

Carboniferous or Permian

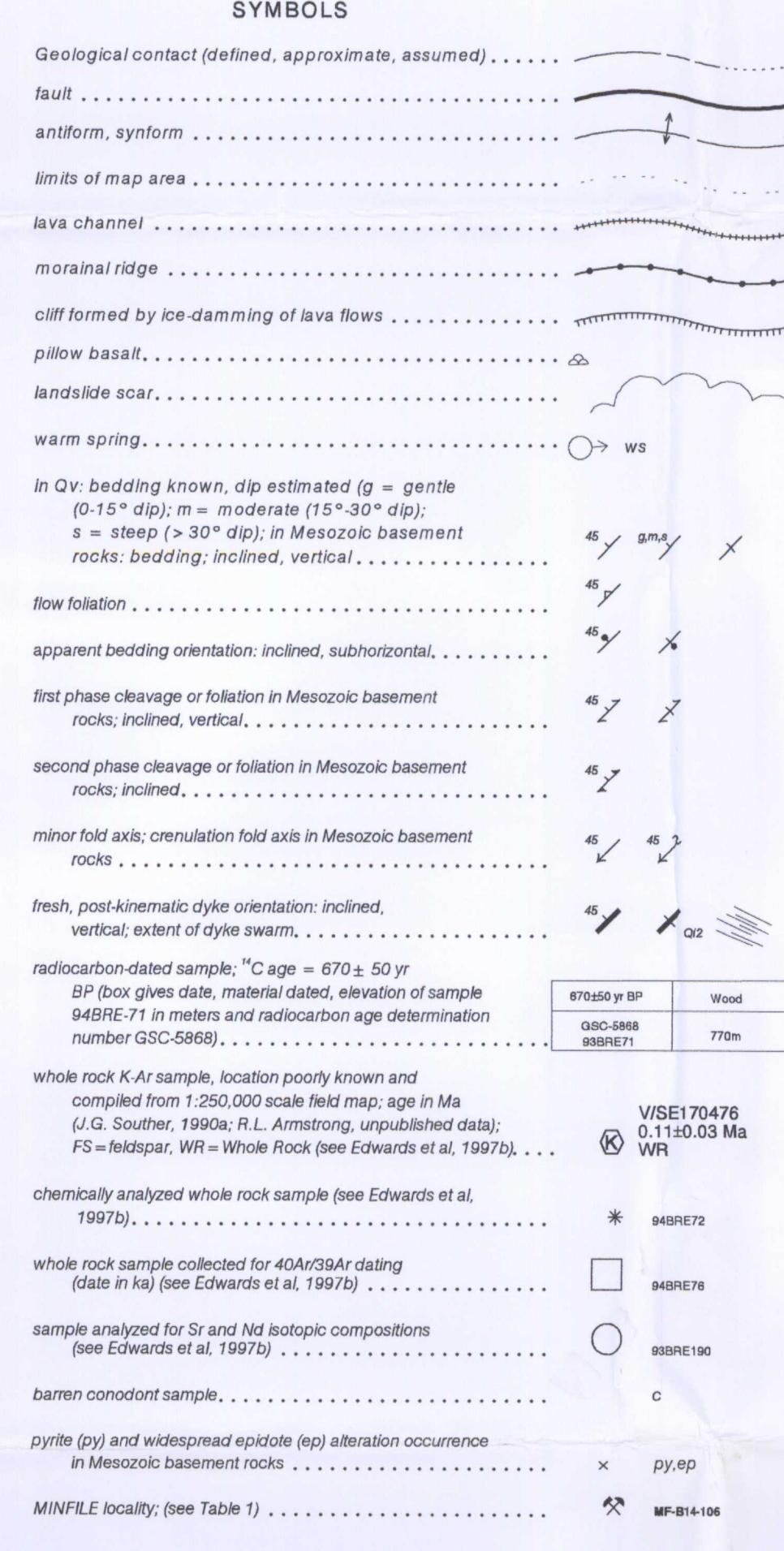
- CPI** grey and buff limestone (Kerr, 1948)

INTRUSIVE ROCKS

- emjgd** Early to Middle Jurassic hornblende gneiss/diorite and diorite (emjgd) and undivided intermediate and felsic plutonic rocks (emjdi) of Early Jurassic: Texas Creek and Middle Jurassic Three Sisters plutonic suites, undivided, on the southwestern flank of Hoodoo Mountain and immediately west of Hoodoo Mountain (Kerr, 1948)
- T-Jsy** Late Triassic to Early Jurassic alkali-feldspar porphyry and minor syenite of Triassic-Jurassic Copper Mountain plutonic suite on the south flank of Hoodoo Mountain (Kerr, 1948)
- T-Jdi** Late Triassic irregular diorite intrusions, dykes and sills (Fillipone and Ross, 1989)

- Qvh** hyaloclastite, consisting of black to brown, vitric lapilli-size fragments in a yellow or green matrix of talagonite; commonly found in small outcrops associated with Qvap6. Subdivided into three subunits:
 - Qvh3** hyaloclastite with fresh, non-altered vitric lapilli-size clasts in yellow matrix Qvh3a yellow hyaloclastite interbedded with green mudstone
 - Qvh2** hyaloclastite with fresh non-altered vitric lapilli-size clasts in greenish grey matrix
 - Qvh1** hyaloclastite with devitrified vitric lapilli-size clasts in yellow to red matrix
- Qvpy** yellow to green pyroclastic rocks consisting of lapilli to ash-size fragments of pumice, crystals and accidental lithic fragments; unwelded to strongly welded lavas; yellow portions form distinctive recessive units. Subdivided into two subunits:
 - Qvpy1** on north-central flank of Hoodoo Mountain
 - Qvpy2** on the west-central and southwest sides of Hoodoo, exposed in inaccessible cliffs; correlated with Qvpy1 based on stratigraphic position, recessive character and yellow colour

SYMBOLS



LITTLE BEAR MOUNTAIN VOLCANIC COMPLEX

- Qvbs** orange to reddish orange, basaltic volcanic sandstone and lithic crystal lapilli tuff; mainly on south end of Little Bear mountain
- Qvbb** orange to mottled black and orange, basaltic breccia with bomb-sized fragments of basalt in a glass matrix but no recognizable pillow basalt fragments
- Qvbs** grey basaltic hyaloclastite; lapilli to ash-size glass fragments with scattered fragments of plagioclase, olivine, clinopyroxene and basalt
- Qvbm** **Qvbp** black to grey, massive basalt flows; mainly on north and of Little Bear mountain (sample 94BRE2, ⁴⁰Ar/³⁹Ar age, ca. 235 ka (M. Villeneuve, pers. comm., 1998)); Qvbs: black to grey, basaltic pillow breccia and/or hyaloclastite; mainly on central northwestern sides of Little Bear mountain

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MAP and MINFILE No.	MINFILE LIBRARY No.	NAME (and alternate names)	STATUS	COMMODITIES	NTS MAP INDEX	LATITUDE (deg-min-sec)	LONGITUDE (deg-min-sec)	UTM Northing	UTM Easting (zone 8; NAD 27)	LOCATION ACCURACY	SIGNIFICANT MINERALS	ALTERATION TYPE	MINERAL DEPOSIT PROFILE CODE (type)
MF-B14-106	10214	TWIN GLACIER	showing	Cu, Pb	104B14E	56-45-58	131-12-02	6293300	365500	5 km	cpy, ga, py	-	I05 (vein)
MF-B14-127	10235	HOODOO DISCOVERY	showing	Ag	104B14W	56-49-06	131-19-29	6299350	358100	500 m	py, arg, pyrgt, cin, brnt, sericite, silicification, carbonate, pyrite	I05 (vein)	
MF-B14-130	10238	HEATHER VEIN (HOODOO WEST 2)	showing	Ag, Au, Pb, Zn, Cu	104B14W	56-47-10	131-23-00	6295900	354400	500 m	ga, sph, thrdt, aspy, cpy, py	silicification, carbonate, pyrite	I05 (vein)
MF-B14-284	10392	HOODOO NORTH	showing	Ag	104B14W	56-49-51	131-19-02	6300750	358600	500 m	py, arg, pyrgt, cin, brnt	carbonate, silicification	I05 (vein)

Notes:
 References: MINFILE 104B Iskut River; British Columbia Ministry of Energy, Mines and Petroleum Resources, MINFILE, released January, 1995; Lefebvre and Hoy (1996) USGS Bulletin 1693 citation is: D.P. Cox and D.A. Singer, editors, Mineral Deposit Models, United States Geological Survey Bulletin 1693, 379 p., 1986.
 Abbreviations: Ag=silver; arg=argillite; aspy=arsenopyrite; Au=gold; brnt=bornite; cin=chalcocite; cpy=chalcocopyrite; Cu=copper; ga=galenite; Mo=molybdenum; moly=molybdenite; Pb=lead; pyrite; pyrgt=pyrrhotite; sph=sphalerite; thrdt=tetrahedrite; Zn=zinc
 Mineral Deposit Profile Codes: I05=polymetallic veins Ag-Pb-Zn (Lefebvre and Hoy, 1996)

BC PROFILE #	DEPOSIT TYPE	APPROXIMATE SYNONYMS	USGS MODEL #	REFERENCE	GLOBAL EXAMPLES (Province, State or Country)	B.C. EXAMPLES
I05	Polymetallic veins Ag-Pb-Zn*Au	Felsic intrusion associated Ag-Pb-Zn veins	22c, 25b	USGS Bull 1693	Elsa (Yukon), Coeur d'Alene (Idaho), Creede (Colorado)	Silver Queen, Beaverdell, Silvana, Lucky Jim

From: D.V. Lefebvre and T. Hoy, (editors), 1996, Selected British Columbia Mineral Deposit Profiles, Volume 2 - Metallic Deposits, B.C. Geological Survey Branch, Open File 1996-13, Appendix 1.

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