



APPENDIX B

RADIOMETRIC AGE DETERMINATIONS

The radiometric age determinations listed are for localities established during the fieldwork of this investigation (Table B.1). The details of all other localities of radiometric age determinations appear in the references given in the appropriate tables of the map areas (Maps 1 to 7). The data are organized from oldest to youngest within each map area, starting with the southeasternmost area and ending with the northwesternmost.

B1. PRINCETON AND TULAMEEN BASINS (92H/7 to 10)

B1.1. Princeton Group

Map No.: R1 NTS Sheet:92H/9

UTM Coordinates:

FK0681850 E Latitude: 49°35'08"

FK5494950 N Longitude: 120°29'03"

Material Dated: Whole rock Dating Method: K-Ar

Location: A roadcut at 1120 metres (3675') elevation, 2.45 kilometres at 1600 from the confluence of Rampart and Summers creeks, north of Princeton.

Rock Unit: Princeton Group, Jura andesite

Lithology: Porphyritic (hypersthene, augite) basaltic andesite

Geological Setting: The sample comes from a flow remnant a few square kilometres in area that overlies sediments of the Allenby Formation. These are the only volcanics, the Miocene at Blakeburn excepted, which overlie the arkose-rich Middle Eocene sediments in southwestern British Columbia.

Analysts: D. Runkle, J. Harakal

Analytical Data:

K = 1.15±0.02; n = 2

40*Ar/Total 40Ar = 39.6%

40*Ar (x 10-6 cc/g) = 2.261

40*Ar (x 10-10 mol/g) = 1.009

Age: 49.4±2.0 Ma (Middle Eocene)

Map No.:R3 NTS Sheet:92H/10

UTM Coordinates:

FK0680649 E Latitude: 49°34'20"

FK5493850 N Longitude: 120°30'05"

Material Dated: Biotite Dating Method: K-Ar

Location: On the east side of Summers Creek about 30 metres above the creek and 50 metres south of the east end of the road bridge.

Rock Unit: Princeton Group, Summers Creek sandstone

Lithology: A crystal-rich (biotite, quartz, feldspar) vitric tuff and tuffaceous sandstone.

Geological Setting: The sample comes from close to the northern margin of the basin where the sediments are dominantly tuffaceous.

Analysts: D. Runkle, J. Harakal

Analytical Data:

K = 7.63±0.20; n = 2

40*Ar/Total 40Ar = 85.1%

40*Ar (x 10-6 cc/g) = 13.8

Age: 46.2±1.9 Ma (Middle Eocene)

**TABLE B.1
RADIOMETRIC DATES IN STRATIGRAPHIC ORDER**

Map No.	UTM Coordinates		NTS Sheet	Rock Unit	Age (Reason for anomalous date)
	Easting	Northing			
CHILCOTIN GROUP					
R**	EM0555200	EM5686900	920/8	MPvb	1.16±0.06 Ma
R3	FM0642150	FM5633550	3450	Mvb	10.4±0.4 Ma
R1	FM0602150	FM5628800	921/13	Mvb	29.7±2.7 Ma(reset or contaminated)
Princeton and Kamloops groups and unnamed Eocene volcanics					
R**	EM0582005	EM5622980	921/13	Evr	46.4±1.6 Ma
R**	EM0579500	EM5638090	921/13	EvdX	48.1±1.7 Ma
R2	FK0681850	FK5494950	92H/9	EPAA	49.4±2.0 Ma
R2	FM0625420	FM5678250	92P/3	EvdX	50.9±1.8 Ma
R1	FM0625430	FM5678550	92P/3	Evb	52.1±1.8 Ma
SPENCES BRIDGE GROUP					
R**	EM0570850	EM5650150	92P/4	IKSBV	89.7±3.1 Ma (reset by burial metamorphism)
R**	EM0577170	EM5634900	921/13	IKSBV	81.0±2.4 Ma (reset by burial metamorphism)

B2. CACHE CREEK AND TRANQUILLE RIVER (92I/14, 15)

B2.1. Chilcotin Group

Map No.:R3 NTS Sheet:92I/15

UTM Coordinates:

FM0642150 E Latitude: 50°50'21"

FM5633550 N Longitude: 120°58'52"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 1050 metres (3450') elevation on the west side of the Deadman River valley, 4.7 kilometres at 190° from the mouth of Criss Creek.

Rock Unit: Chilcotin Group, Chasm Formation, unit Mvb

Lithology: Medium grey, porphyritic (olivine 15%, titaniferous augite 30%) nepheline basanite composed of olivine and titaniferous augite phenocrysts lying in a matrix of 36% plagioclase (An63), 15% nepheline and 4% opaque minerals. The rock is free of alteration.

Geological Setting: The sample comes from near the base of a 400-metre-thick residual of basalt flows.

Analysts: D. Runkle, J. Harakal

Analytical Data:

$K = 0.828 \pm 0.002\%$ $n = 2$

$40^*Ar/Total\ 40Ar = 40.3\%$

$40^*Ar\ (x\ 10^{-6}\ cc/g) = 0.334$

$40^*Ar\ (x\ 10^{-10}\ mol/g) = 0.149$

Age: 10.4 ± 0.4 Ma (Late Miocene)

B3. BONAPARTE TO DEADMAN RIVERS (92P/2, 3)

B3.1. Kamloops Group, Skull Hill Formation

Map No.: R1 NTS Sheet:92P/3

UTM Coordinates:

FM0625430 E Latitude: 51°14'49"

FM5678550 N Longitude: 121°12'11"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 975 metres (3200') elevation on the east valley-wall of Fly Creek, 1.1 kilometres at 001° from the confluence of Fly Creek and Bonaparte River.

Rock Unit: Kamloops Group, Skull Hill Formation, unit Evb

Lithology: Olivine-bearing (completely pseudomorphed by iddingsite) augite basalt with a flat-stage plagioclase determination of An50.

Geological Setting: An olivine basalt flow, which has the outcrop characteristics of the Miocene Chasm Formation of the Chilcotin Group but is of Eocene age and therefore part of the Kamloops Group.

Analysts: J. Harakal, D. Runkle

Analytical Data:

$K = 1.75 \pm 0.01$

$40^*Ar/Total\ 40Ar = 67.0\%$

$40^*Ar\ (x\ 10^{-6}\ cc/g) = 3.593$

$40^*Ar\ (x\ 10^{-10}\ mol/g) = 1.603$

Age: 52.1 ± 1.8 Ma (Early Eocene)

Map No.: R2 NTS Sheet:92P/03

UTM Coordinates:

FM0625420 E Latitude: 51°14'39"

FM5678250 N Longitude: 121°12'12"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 930 metres (3050') elevation in the dry bed of Fly Creek, 0.8 kilometres upstream from its confluence with Bonaparte River.

Rock Unit: Kamloops Group, Skull Hill Formation, unit Evdx

Lithology: Porphyritic (hypersthene, augite) basaltic andesite

Geological Setting: In a volcanic breccia near the top of the Kamloops Group which in this locality has been mapped as Miocene plateau basalt by Campbell and Tipper (1971).

Analysts: J. Harakal, D. Runkle

Analytical Data:

$K = 1.93 \pm 0.00$

$40^*Ar/Total\ 40Ar = 74.3\%$

$40^*Ar\ (x\ 10^{-6}\ cc/g) = 3.871$

$40^*Ar\ (x\ 10^{-10}\ mol/g) = 1.727$

Age: 50.9 ± 1.8 Ma (Middle Eocene)

B4. HAT CREEK (92I/12 to 14)

B4.1. Chilcotin Group

Map No.:R1 NTS Sheet:92I/13

UTM Coordinates:

EM0602150 E Latitude: 50°48'14"

EM5628800 N Longitude: 121°33'01"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 1335 metre (4375') elevation on the east side of the Upper Hat Creek valley, 4.60 kilometres at 193° from the confluence of Robertson and Hat creeks.

Rock Unit: Chilcotin Group, unit Mvb

Lithology: Porphyritic (titaniferous augite, olivine) basalt

Geological Setting: Sample collected from the base of a basalt flow remnant 50 metres thick. Church (1977) has a single whole-rock date from basalt in the Hat Creek valley. Unfortunately his sample was from basalt boulders from an unknown source.

Analysts: J. Harakal, D. Runkle

Analytical Data:

$K = 0.627 \pm 0.006$

$40^*Ar/Total\ 40Ar = 11.2\%$

$40^*Ar\ (x\ 10^{-6}\ cc/g) = 0.712$

$40^*Ar\ (x\ 10^{-10}\ mol/g) = 0.318$

Age: 29.0 ± 2.7 Ma (Late Oligocene)

Remarks: The sample may not be suitable for K-Ar dating. Possible leaching, low K(?) and high atmospheric argon content raise doubts regarding the K-Ar age. Similar K-Ar dates have been obtained for basalts south of Kamloops, as for example Ewing (1981b); [Mv9-1] 25.5 ± 0.4 Ma (Monger, 1989b), and Mathews (1989, p. 973) at Summit Lake in 93J.

B5. FRASER RIVER (92I/5, 12, 13, 16; 92O/1, 8; 92P/4)

B5.1. Spences Bridge Group

Map No.: R NTS Sheet:92P/4**

UTM Coordinates:

EM0570850 E Latitude: 51°00'02"

EM5650150 N Longitude: 121°59'25"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 1160 metres (3800') elevation in a roadcut on the Slok Creek Forestry Access Road on the north side of Leon Creek, 5.5 kilometres at 263° from the mouth of Leon Creek.

Rock Unit: Spences Bridge Group, unit lKsBv

Lithology: Medium grey-green to slightly maroon porphyritic (plagioclase) latite flow composed of 20% slightly sericitized, carbonated and laumontitized albite (An2) phenocrysts set in a matrix (72%) composed of plagioclase and finely disseminated opaque minerals (hematite?). Amygdules (4%) composed of carbonate. The altered rock contains 2% carbonate, 2% laumontite and 5% chlorite-montmorillonite.

Geological Setting: In the fault sliver between Slok Creek and Fraser faults.

Analysts: J. Harakal, D. Runkle

Analytical Data:

K = 1.18

40*Ar/Total 40Ar = 92.1%

40*Ar (x 10-6 cc/g) = 4.218

40*Ar (x 10-10 mol/g) = 1.882

Age: 89.7±3.1 Ma (Late Cretaceous)

Map No.: R** NTS Sheet:92I/13

UTM Coordinates:

EM0577170 E Latitude: 50°51'45"

EM5634900 N Longitude: 121°54'13"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 695 metres (2275') elevation on the left bank of Slok Creek, about 100 metres upstream from the Slok Creek Forestry Access Road, 2.4 kilometres at 2580 from the mouth of Pavilion Creek.

Rock Unit: Spences Bridge Group, unit IKsBv

Lithology: Medium grey, platy jointed rhyodacite flow containing 1% plagioclase phenocrysts which are slightly sericitized and replaced by carbonate and 4% biotite phenocrysts completely pseudomorphed by chlorite and minor carbonate which lie in a matrix of 86% flow-oriented plagioclase microlaths and 5% opaque minerals. The rock contains 2% chlorite and 2% carbonate as alteration minerals.

Geological Setting: In the fault sliver between Slok Creek and Fraser faults in a sequence of volcanics which presumably unconformably overlies the Pavilion Group.

Analysts: J. Harakal, D. Runkle

K = 1.62±0.01 n = 2

40*Ar/Total 40Ar = 92.3%

40*Ar (x 10-6 cc/g) = 5.218

40*Ar (x 10-10 mol/g) = 2.329

Age: 81.0±2.8 Ma (Late Cretaceous)

B5.2. Unnamed Eocene Volcanics

Map No.:R** NTS Sheet: 92I/13

UTM Coordinates:

EM0579500 E Latitude: 50°53'28"

EM5638090 N Longitude: 121°52'11"

Material Dated: Whole rock Dating Method: K-Ar

Location: At 425 metres (1400') elevation on the west side of Fraser River 2.65 kilometres at 3600 from the mouth of Pavilion Creek.

Rock Unit: Eocene, unit Evdx

Lithology: Medium grey porphyritic (augite, plagioclase) andesite volcanic breccia composed of 35% plagioclase phenocrysts (An47) and 20% augite phenocrysts lying in a matrix composed of 41% plagioclase microlaths and optically irresolvable material which contains celadonite (3%) and carbonate (1%) as alteration products.

Geological Setting: In the fault wedge between Slok Creek and Fraser faults, from a sequence which unconformably overlies the Pavilion Group.

Analysts: J. Harakal, D. Runkle

Analytical Data:

K = 3.11±0.01 n = 2

40*Ar/Total 40Ar = 69.9%

40*Ar (x 10-6 cc/g) = 5.888

40*Ar (x 10-10 mol/g) = 2.627

Age: 48.1±1.7 Ma (Middle Eocene)

Map No.: R** NTS Sheet:92I/13

UTM Coordinates:

EM0582005 E Latitude: 50°45'17"

EM5622980 N Longitude: 121°50'15"

Material Dated: Whole rock Dating Method: K-Ar

Location: A roadcut on Highway 12 north of Lillooet and 0.4 kilometres southwest of the highway bridge across Gibbs Creek, Fraser Canyon.

Rock Unit: Eocene, unit Evr

Lithology: Light pinkish grey, aphanitic felsite composed of 50% fine (0.2 mm) quartz, 48% fine, untwinned, slightly dusty potash feldspar, 2% unidentified opaque minerals and 0.5% dawsonite.

Geological Setting: In a fault sliver between Slok Creek and Fraser faults.

Analysts: J. Harakal, D. Runkle

Analytical Data:

K = 3.51±0.01 n = 2

40*Ar/Total 40Ar = 93.0%

40*Ar (x 10-6 cc/g) = 6.409

40*Ar (x 10-10 mol/g) = 2.860

Age: 46.4±1.6 Ma (Middle Eocene)

B5.3. Chilcotin Group

Map No.:R** NTS Sheet:92O/8

UTM Coordinates:

EM0555200 E Latitude: 51°19'58"

EM5686900 N Longitude: 122°12'28"

Material Dated: Whole rock Dating Method: K-Ar

Location: Located on the north end of Crows Bar Ridge about 150 metres north of survey station 3492' on the east side of the Fraser River south of China Gulch.

Rock Unit: Chilcotin Group, unit Pvb

Lithology: Dictyaxitic olivine basalt flow

Geological Setting: Taken from near the base of an erosional remnant of olivine basalt flows close to the trace of the Fraser fault.

Analysts: J. Harakal, D. Runkle

Analytical Data:

K = 0.455±0.006, n = 2

40*Ar/Total 40Ar = 16.3%

40*Ar (x 10-6 cc/g) = 0.0202

40*Ar (x 10-10 mol/g) = 0.0090

Age: 1.16±0.06 Ma (Pleistocene)

