## DESCRIPTIVE NOTES

### INTRODUCTION

In the vicinity of Gang Ranch, approximately 80 to110 kilometres of right-lateral, strike-slip movement on the Fraser fault has juxtaposed a western assemblage of Lower Cretaceous and Eocene volcanic, volcaniclastic and sedimentary rocks against Pennsylvanian toTriassic marine sediments and mafic volcanic rocks of the Cache Creek Complex. This package of Lower Cretaceous and Eocene strata is bounded to the southwest by the Hungry Valley Thrust which places Jurassic to Cretaceous marine clastics of the Jackass Mountian Group on top of Eocene volcanic rocks (Tipper, 1978). The distribution of Cretaceous and Tertiary strata in the Gang Ranch area was initially established by Mathews and Rouse (1984) on the basis of palynology and radiometric dating. Determining the nature of the Cretaceous - Eocene contact and identifying the occurrences of industrial minerals within the Eocene strata has been the subject of this investigation.

### STRATIGRAPHY

East of the Fraser fault, siliceous volcanic tuffs, black and green ribbon chert and sheared, siliceous black argillite comprise the major part of the Cache Creek Complex (PTrtp). In the southeast corner of the map area, a 150-metre-thick lens of light grey, recrystallized limestone (lst) is interbedded with black argillite and chert. Along the northern side of Gaspard Creek, mafic volcanic flows and gabbro underly green chert and argillite (PTrv).

West of the Fraser fault, approximately 700 metres of maroon, green-brown, and grey, crystal-phyric to aphanitic andesite flows and local hornblende porphyry flows of the Lower Cretacous Spences Bridge Group (lKsbv) are the oldest rocks exposed. A subgreenschist grade metamorphic assemblage of pumpellyite, zeolite, calcite and chlorite fills fractures and amygdules throughout the Spences Bridge Group volcanic package. This alteration assemblage provides a field criterion for distinguishing between Cretaceous and overlying Eocene volcanic flows.

Approximately 2000 metres of Eocene volcanic and volcaniclastic rocks overly the Spences Bridge Group volcanic rocks on a gently west-dipping surface. The base of the Eocene package consists of red, yellow-beige and brown, andesitic to dacitic volcaniclastics and interlayered volcanic flows (Ev). In the western portion of the map area, these volcanic rocks are overlain by a thick accumulation of pink, grey and white rhyolite flows, quartz-rich welded crystal tuffs and lithic tuffs (Evr). Towards the east, the coarse-grained, rhyolite tuff grades laterally into layers of white and green rhyolite crystal and ash tuffs that are interlayered with andesite, dacite and basalt volcaniclastics and flows (Evt). In the southwestern corner of the map sheet a grey-green, feldspar porphyry flow (Evf) overlies rhyolite lithic and crystal tuff. A sequence of well-bedded sediments, containing layers of bentonitic ash and thin coal seams (Ecg), overlies the volcanic strata at a number of localities immediately west of the Fraser fault.

Flat-lying, erosional remnants of Miocene to Pleistocene plateau basalts (Plvb, MPlvb) and minor Miocene fluviatile sediments, in places overlain by a cream-coloured, rhyolitic ash layer, (Ms) occur throughout the map area and in places directly overly the trace of the Fraser fault.

### STRUCTURE

Volcanic rocks of the Spences Bridge Group are exposed in the footwall of a major northwest-trending normal fault, informally referred to as the Empire Valley fault. The Empire Valley fault appears to merge with the Fraser fault, but most likely post-dates dextral, transcurrent motion. East-dipping reverse faults and northwest-trending upright folds have developed in Eocene sediments and volcaniclastics west of the Fraser fault. Slickensides measured along the Fraser fault indicate the most recent movement was dip-slip. Constraints on timing of latest movement on the Fraser fault is provided by a rhyolitic ash layer which extends across the trace of the fault north of Gaspard Creek. The ash has been included in the Miocene Fraser Bend Formation by Mathews and Rouse (1984).

### INDUSTRIAL MINERALS

Extensive alteration of rhyolite crystal and ash tuffs to zeolite and bentonitic clay has taken place within the Eocene strata. Preliminary X-ray diffraction analysis of the tuffs have identified montmorillonite, illite and heulandite group zeolites. Perlite (hydrated rhyolitic obsidian) occurs at two locations in the southern portion of the map area. The westernmost of these occurrences (P1) is the Frenier perlite deposit, presently owned by Aurun Mines Limited. Fragments of diatomite have been identified within Miocene rhyolitic ash at a location west of the Gang ranch (D1).

Table 1. Cation exchange analyses of zeolite bearing tuffs.

| Sample | UTM Coordinates Northing | Easting | Exchangeable Cation Analysis (Milli-equivalent/100g) Mg | Ca | K | Na | Total | CEC (Milli-equivalent/ 100g) |
|---|---|---|---|---|---|---|---|---|
| C1 | 5795050 | 548750 | 1.40 | 7.02 | 1.04 | 4.68 | 14.14 | 15.5 |
| C2 | 5703850 | 549100 | 3.14 | 31.8 | 9.23 | 41.4 | 85.57 | 87.0 |
| C3 | 5702500 | 550450 | 0.96 | 22.6 | 4.35 | 23.2 | 50.25 | 52.8 |
| C4 | 5698125 | 549200 | 3.25 | 31.6 | 1.24 | 0.47 | 36.56 | 34.7 |
| C5 | 5693875 | 552675 | 1.80 | 54.5 | 15.1 | 34.0 | 105.2 | 106.0 |
| C6 | 5692586 | 552812 | 0.53 | 17.3 | 2.02 | 18.9 | 38.75 | 42.8 |
| C7 | 5693700 | 550688 | 3.07 | 27.3 | 7.84 | 4.09 | 42.30 | 43.9 |
| C8 | 5689300 | 545875 | 5.81 | 14.1 | 7.19 | 0.44 | 27.54 | 27.7 |

Table 2. Industrial Minerals in the Gang Ranch area.

| Loc. # | Commodity | Status | Location Northing | Easting | Minfile Number |
|---|---|---|---|---|---|
| B1 | Bentonite | showing | 5708600 | 542000 | 111 |
| B2 | Bentonite | showing | 5708000 | 545500 | 112 |
| B3 | Bentonite | showing | 5705800 | 548600 | 113 |
| B4 | Bentonite | showing | 5702150 | 548950 | 114 |
| B5 | Bentonite | showing | 5693000 | 553250 | 115 |
| B6 | Bentonite | showing | 5686500 | 548750 | 116 |
| Z1 | Zeolite | showing | 5707800 | 546450 | 117 |
| Z2 | Zeolite | showing | 5705500 | 548100 | 118 |
| Z3 | Zeolite | showing | 5603700 | 549150 | 119 |
| Z4 | Zeolite | showing | 5693875 | 552875 | 120 |
| P1 | Perlite | producer | 5687750 | 545425 | 072 |
| P2 | Perlite | prospect | 5688750 | 546700 | 072 |

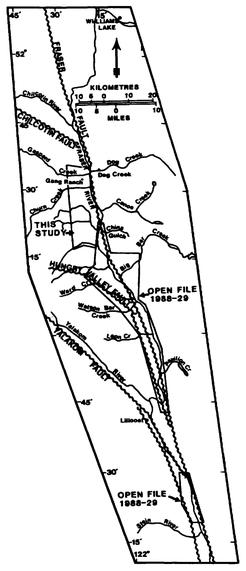
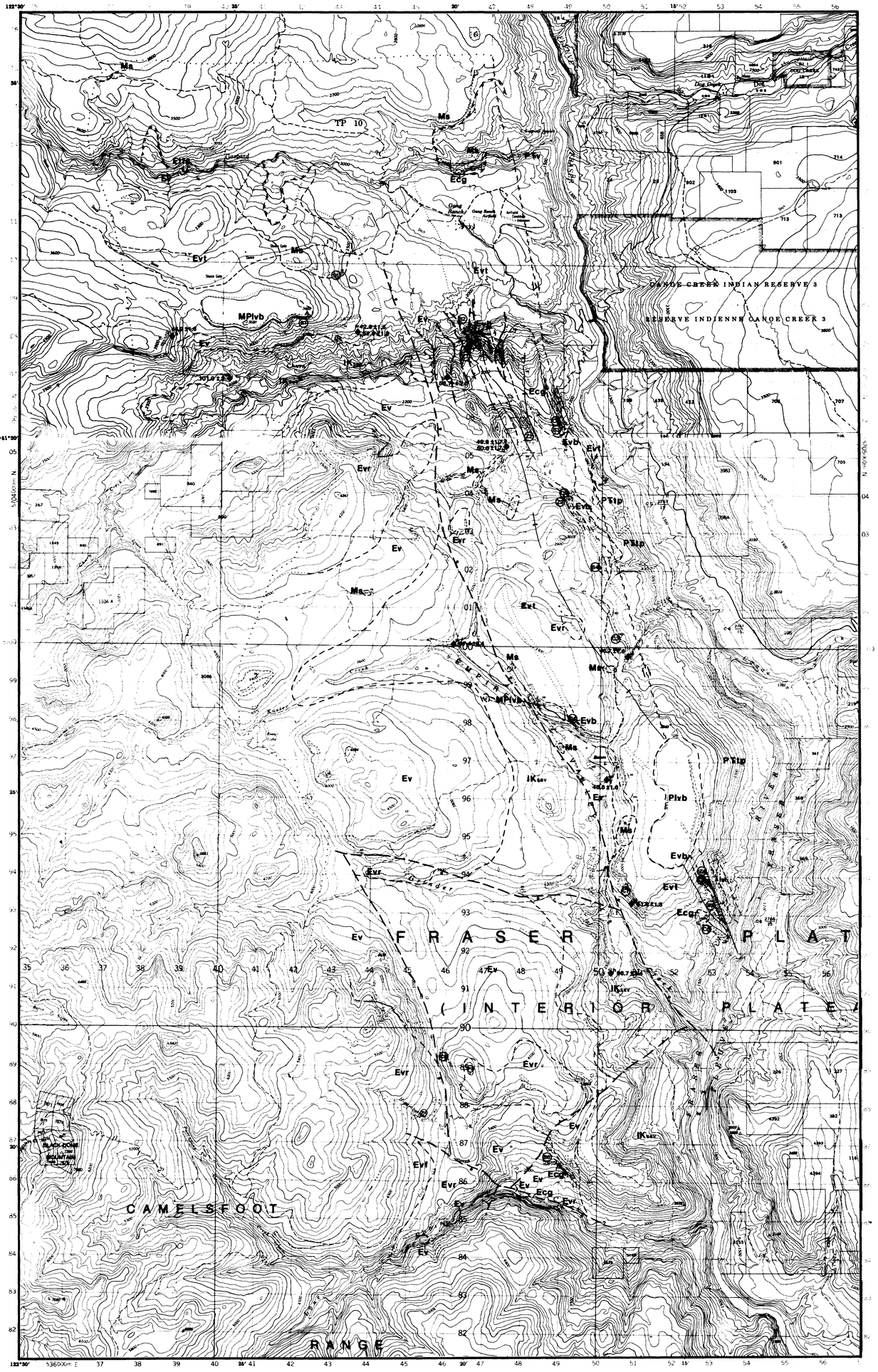



Figure 1. Location map showing the Fraser River Fault System, Yalakom and subparallel faults. This project is a northward continuation of Open File 1988-29 (modified from Read, 1988).




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

# OPEN FILE 1989-27

# GEOLOGY AND INDUSTRIAL MINERALS IN THE GANG RANCH AREA

**NTS 92O/8W, 9W**

**GEOLOGY BY K. C. GREEN**

**SCALE 1:50 000**

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Metres
Yards 1000 0 1000 2000 3000 4000 Yards

## LEGEND

MIOCENE TO PLEISTOCENE

**Plvb** **CHILCOTIN GROUP** Vesicular basalt flows; well-developed columnar jointing.

**Ms** Bedded gravel, conglomerate and minor sandstone; cream, micaceous rhyolite ash and minor pyroclastic breccia.

MIOCENE AND/OR PLIOCENE AND/OR PLEISTOCENE

**MPlvb** **CHILCOTIN GROUP** Vesicular basalt flows; well-developed columnar jointing.

MIDDLE EOCENE

**Ecg** Well-bedded, yellow-brown, pebble to cobble conglomerate and sandstone; minor bentonitic ash and coal seams.

**Evf** Grey and green, feldspar porphyritic andesite flow.

**Evr** White, grey and pink, aphanitic to porphyritic (quartz and feldspar) rhyolite flows; layered and welded lithic and crystal tuff; minor perlite.

**Evb** Dark brown-weathering, aphanitic, flow-layered basalt flows.

**Evt** Beige, red and pink, aphanitic and plagiophyric andesite and dacite volcanic breccia and flows; interlayered, white rhyolitic tuff and ash; minor hornblende porphyry volcanic breccia and flows.

**Ev** Beige, red and pink, aphanitic and plagiophyric andesite and dacite volcanic breccia and flows; minor hornblende porphyry volcanic breccia and flows.

**Etfs** Well-bedded, tuffaceous wacke and lithic tuff.

LOWER CRETACEOUS

**SPENCES BRIDGE GROUP**

**lKsbv** Grey and maroon, aphanitic and plagiophyric, amygdaloidal andesite and basalt flows; local hornblende porphyry dacite.

**lKsbs** Well-bedded cobble to boulder conglomerate, sandstone and siltstone; volcanic arenite and lithic tuff.

PENNSYLVANIAN TO TRIASSIC

**CACHE CREEK COMPLEX**

**PTrv** Mafic volcanic flows; gabbro; green and red phyllite and chert.

**PTrtp** Black and green chert and sheared argillite; rare limestone (lst).

## SYMBOLS

Geological boundary: defined; approximate; assumed

Fault: strike-slip; normal (peg side down); reverse (barbs indicate dip of fault)

Slickensides: 50

Bedding: inclined 21; vertical

Flow layering: inclined 34; vertical

Foliation: inclined 75; vertical

Dyke: inclined 50; vertical

Trace of axial surface: syncline; anticline

Surface trace of base of slide block:

Rhyolite crystal or ash tuff

Perlite: Frenier Mine (P1); perlite occurrence (P2)

Diatomite: (D1)

K-Ar radiometric date (Mathews, W. H. and Rouse, G. E., 1984): whole rock 46.85 1.6Ma; hornblende 50.75 ± 1.0; biotite 56.75 ± 2.0

Cation Exchange Capacity (Table 1) sample location: (C1)

Limit of mapping:

## REFERENCES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Read, P.B. (1988): Tertiary Stratigraphy and Industrial Minerals: Fraser River, Lytton to Gang Ranch, British Columbia, B. C. Ministry of Energy Mines and Petroleum Resources, Open File 1988-29.

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