THE FARLEIGH LAKE RADIOACTIVE OCCURRENCE
(82E/5W)

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INTRODUCTION

The Farleigh Lake area, 11 kilometres west of Penticton, was a focus of interest and investigation up until the time of the Provincial moratorium on uranium exploration. Work completed to 1980 by Petro Canada Exploration Inc. included 40 kilometres of linecutting on the Astro claim, that was followed by geochemical and geophysical surveys, then a program of diamond drilling. The targets of this activity were radioactive areas in basal Tertiary beds.

GEOLOGICAL SETTING

The Farleigh Lake area is underlain by an eroded Jurassic-Cretaceous granitic complex that is partly covered by basal Tertiary volcanic and sedimentary rocks. The Kettle River Formation is the oldest Tertiary unit and consists of granite boulder conglomerate, arkose, and rhyolite tuff that unconformably overlies the granite. Disconformably above this are purple and grey volcanic rocks, wackes, and siltstones of the Yellow Lake Member of the Marron Formation. These units are succeeded upward by slightly younger trachytes of the Nimpit Lake Member of the Marron Formation and dacitic lavas and feeder dykes of the Marama Formation (*see* Fig. 2 and accompanying table).

Structurally, the area is relatively simple. The Tertiary beds are inclined gently to the south and southwest, dipping outward from the granite complex, which is exposed in the north and north-central part of the map-area. Important gravity movement occurred east of the Marron Valley fault which slices north-northwest across the eastern part of the map-area. A number of subsidiary faults, marked by minor movement and lineaments, intersect the granite complex and the Tertiary rocks.

RADIOACTIVE ROCKS

During the course of the geological survey of the map-area, 39 stations were established to measure the radioactivity of the various rock types. This was achieved using a portable gamma ray scintillometer (Geo Metrics/Exploranium Model GRS-101) which yielded the following results:

ROCK TYPE	MEAN $\bar{X}$ *cps*	STANDARD DEVIATION *cps*	NUMBER OF SAMPLES
Yellow Lake Member			
Volcanic Rocks	159	30	15
Sedimentary Rocks			
Wacke, shales	213	31	4
Pink grit	*300-600*	---	---
Kettle River Formation			
Rhyolite tuff	100	34	5
Conglomerate and arkose	162	---	3
Granitoids	83	21	12

Clearly the most radioactive rocks are the pink grits. These occur as a subunit within wacke-shale lenses intercalated in the Yellow Lake alkaline volcanic assemblage. In the Kettle River Formation, the conglomerates and arkosic beds are more radioactive than the rhyolite tuffs.

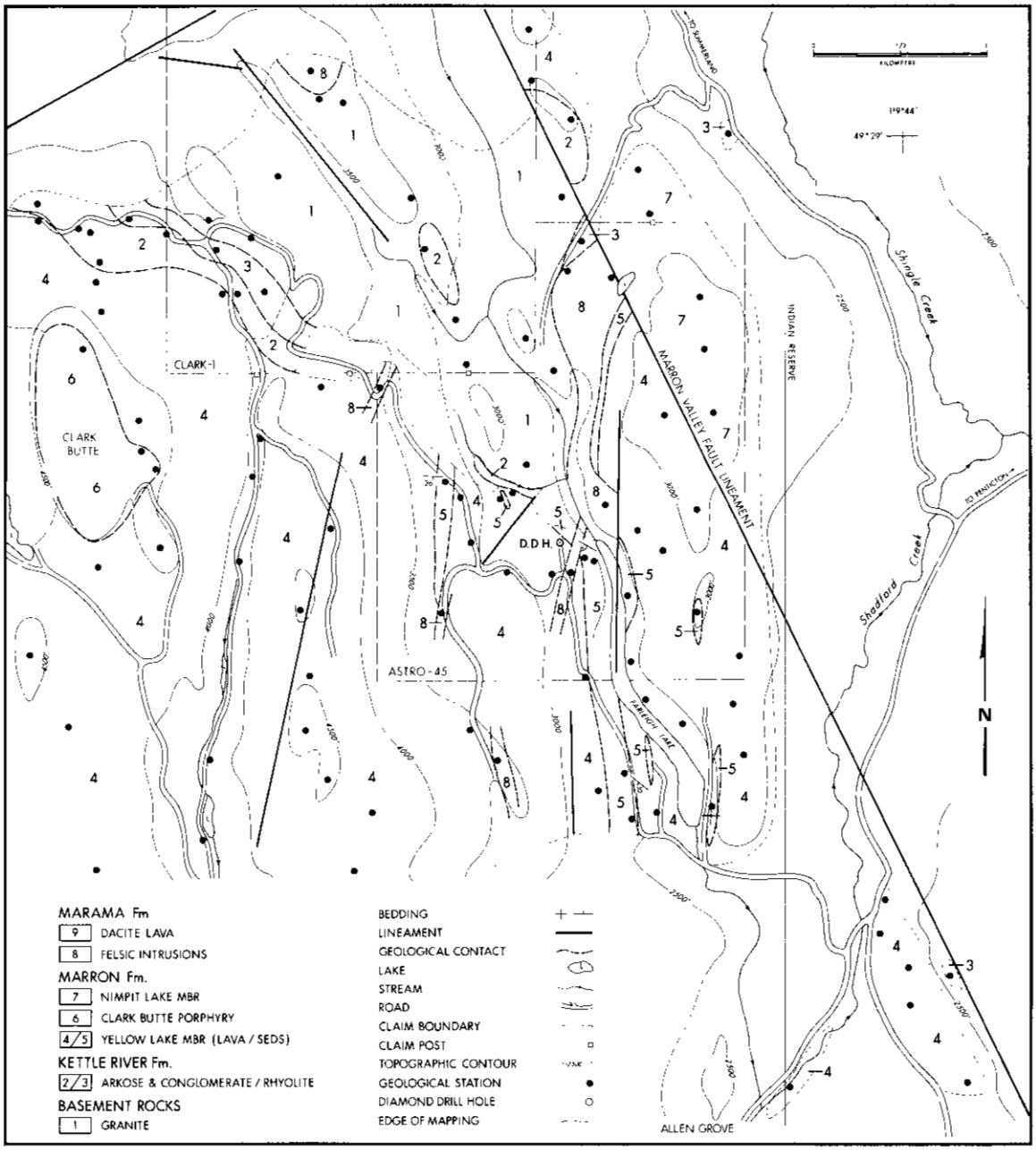

Figure 2. The Farleigh Lake radioactive occurrence (82E/5W).

CHEMICAL ANALYSES OF ROCKS FROM THE FARLEIGH LAKE AREA (82E/5W)

	1	2	3	4
Oxides Recalculated to 100–				
SiO_2	76.16	62.57	56.09	58.48
TiO_2	0.38	0.68	1.04	0.76
Al_2O_3	16.19	18.60	16.43	20.25
Fe_2O_3	1.77	3.30	4.51	2.97
FeO	0.32	1.58	1.97	1.29
MnO	0.03	0.10	0.10	0.11
MgO	0.47	1.21	4.52	1.70
CaO	0.35	1.49	6.17	4.58
Na_2O	0.58	4.52	3.84	4.42
K_2O	3.75	5.95	5.33	5.44
	100.00	100.00	100.00	100.00
Oxides as Determined –				
H_2O+	3.12	1.74	1.02	0.69
H_2O-	0.26	0.38	0.48	1.06
CO_2	0.25	0.25	0.25	0.31
S	0.01	0.01	0.01	0.01
P_2O_5	0.30	0.09	0.36	0.34

Key to Analyses:
1 – Rhyolite tuff breccia from Kettle River Formation, 3 kilometres northwest of Farleigh Lake.
2 – Radioactive tuff, Skaha Creek area.
3 – Mafic phonolite lava from Yellow Lake Member, 400 metres west of south end of Farleigh Lake.
4 – Clarke Butte sill, Yellow Lake Member, 3 kilometres northwest of Farleigh Lake.

Pink grit is best exposed in the section near the Petro-Canada drill hole immediately west of the north end of Farleigh Lake. Here the beds are 30 metres thick. They occur below the lowest mafic phonolite lavas of the Yellow Lake Member and overlie tuffaceous sandstones and siltstones. The grit is well layered, however, it displays few examples of grading, crossbedding, or scour structures. The pink colour of this rock is caused by numerous broken alkali-feldspar crystals and pebbles of feldspathic rhomb porphyry lava. Where the grit is most deeply eroded several tuffaceous layers and a few very thin coal seams, 1 to 3 centimetres thick, are exposed.

In the Petro-Canada drill hole, 200 metres west of the exposed section, the grit diminished in thickness to only 3.8 metres, perhaps indicating that it is a channel deposit. According to company reports, assay results on core yielded an average of 29 ppm uranium and 110 ppm thorium. A single sample from a coal seam gave 65 ppm uranium and 185 ppm thorium. The drill hole intercepted the Kettle River Formation below the Yellow Lake Member. The hole cut 46 metres of rhyolite breccia resting on 29 metres of conglomerate. Although no assay results are available from this core, grab samples elsewhere are encouraging. For example, trenching in the Kettle River conglomerate and arkose by Brinco Mining Limited, immediately south of Brent Lake to the north of the map-area, produced surprising assay results in the range of 1 to 1.5 per cent U_3O_8 on samples from a thin carbonaceous seam.

DISCUSSION

Basal units of the Early Tertiary assemblage are the source of radioactive anomalies and have provided interesting targets for uranium exploration. The pink grit, near the base of the Yellow Lake Member of the Marron Formation, is unusual in that the unit appears to represent a channel deposit of reworked alkaline ash and ash flow material. The source of this material could be the Riddle Creek radioactive volcanic

centre several kilometres to the northwest. The boulder conglomerates and arkose of the Kettle River Formation are more in keeping with the 'basal uranium' model where the metal source is the underlying granitoid complex. In the future the Penticton area may provide a unique opportunity for investigation of these two diverse, yet spatially related, uranium-thorium occurrences.

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