RECEIVED

APR 13 1988

Ans'd ....

824955

When completed return to office copies of:
- this form
- plotted sample numbers

188 SOUTH OKANAGAN JOINT VENTURE

TARGET AREA AGUR / VENT   NTS: 82E/ 12W .

topo maps (scale): ref: 1981 field work (BCDM)

Planned Programme

H.M.: 2

Lithos:

Other: New NTS file AGUR/VENT CLAIMS NTS 82E/12W

Completed Programme date:

H.M. (total number, sample no's): 2

Lithos: 280-87bk-09, 10, 11, 12

Other:

Field Notes

Access:

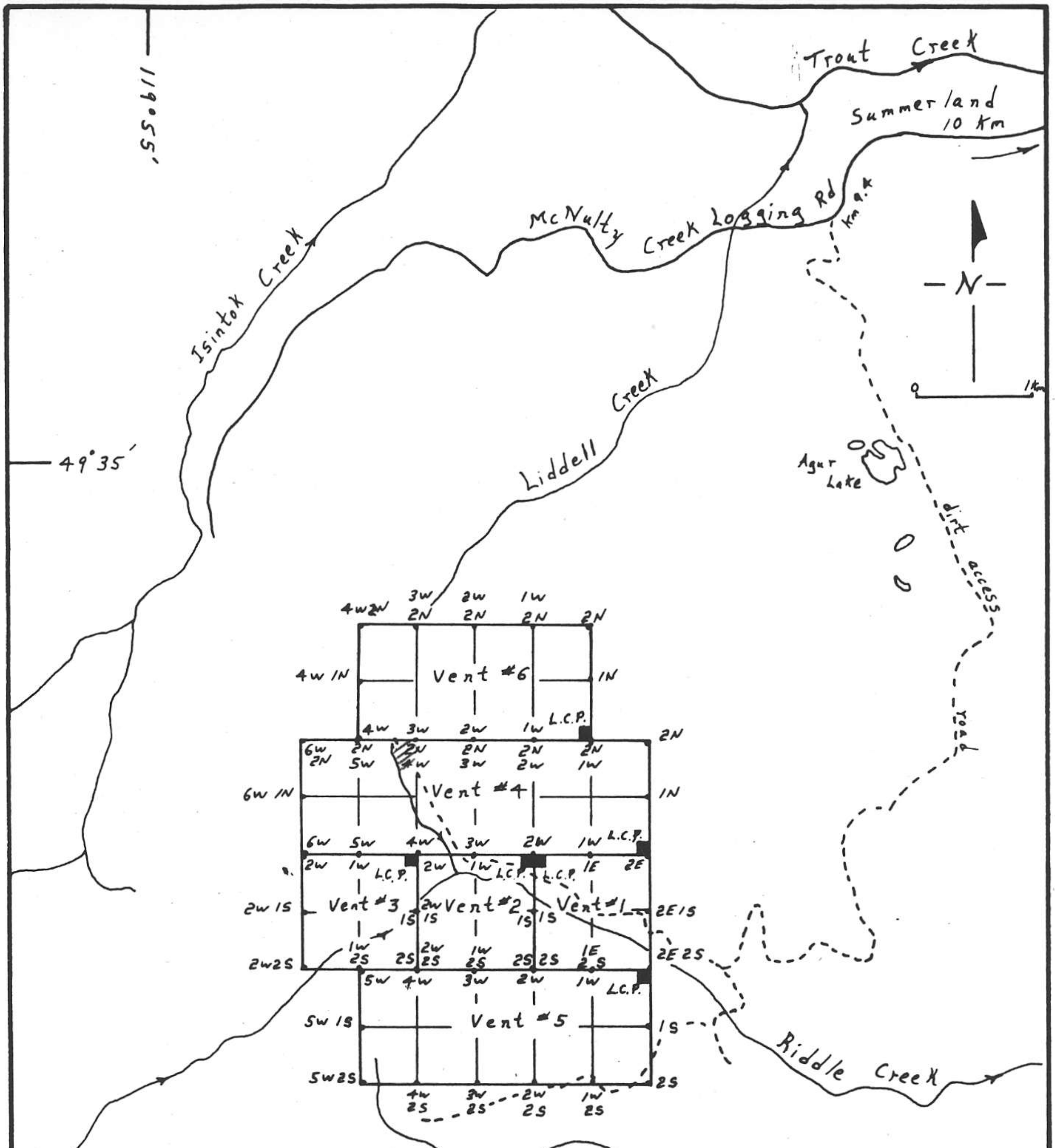
Claims, etc.: vent claims (56 units), property submittal from Murray Morrison.

Comments: all geochem rocks were negative, ground is covered w/ glacial outwash sands. HM's in area, from drainage right through property - negative, NFW

KLDA
GEOCHEMICAL SOIL SURVEY DATA

COLLECTOR: bwk PROJECT: 280 NTS MAP: 82E/12W
DATE: May 20 1987 AREA: Agur/Vent target PHYSIOGRAPHY: claim map ref

SAMPLE NO.	LOCATION	DESCRIPTIONS	Au	Ag	As	Sb	Cu
280-87bk-09	Vent claims (Mcusson submittal)	grab from o/c (borrow pit) rusty limonitic FP/gd bx - fault zone	–	–	–	–	15
-10	" "	select grab of 6" wide Fe stn'd argillized fault zone in maroon FP - vesicular int fault zone.	–	–	–	–	77
-11	" "	random grab of bleached Fe stn'd clay altered FP - hotspring alt'n. from borrow pit.	–	–	–	5	87
-12	" "	grab from heavy Fe stn'd pyritic hbl gd - fault e 070/40N	–	–	10	–	28



Location Map
Vent 1-6 Mineral Claims
Osoyoos Mining Division
N.T.S. 82-E-12W Scale 1:50,000

THE RIDDLE CREEK URANIUM-THORIUM PROSPECT

(82E/12W)

By B.N. Church

The Riddle Creek uranium-thorium prospect, 15 kilometres west of Summerland, was discovered in 1977 and acquired the same year by British Newfoundland Exploration Ltd. Work on the property to date includes line-cutting, mapping, soil geochemistry, and several short drill holes.

The present report is based on recent geological and scintillometer surveys and a lithogeochemical study sponsored by the Ministry.

GEOLOGICAL SETTING

A large radioactive anomaly coincides with an Eocene volcanic centre near the headwaters of Riddle Creek (Figure 1). The principal radioactive rocks include trachytes and mafic phonolites of the Marron Formation and consanguineous igneous intrusions of the Coryell-type.

LOW-RADIOACTIVE COUNTRY ROCKS

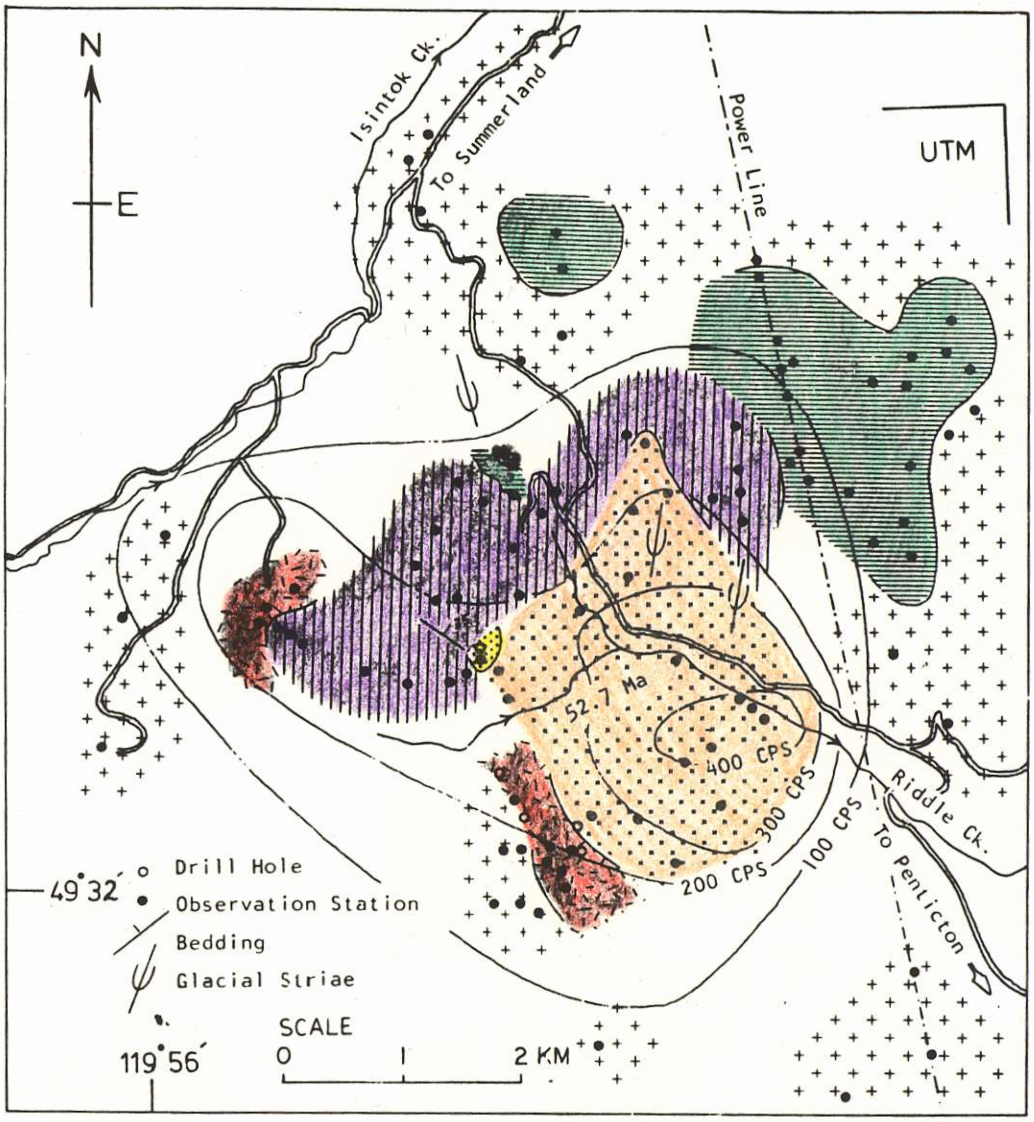
At the base of the Tertiary section and north of the zone of anomalous radioactivity, poorly exposed polymictic boulder conglomerate beds are tentatively assigned to the Springbrook Formation. These rocks appear to be unconformably underlain by granitic phases of the Okanagan Batholith (Jurassic-Cretaceous) and overlain by unnamed andesites. The andesites form a significant formation in the northeast part of the area where lava and breccia are 250 metres thick. Alkaline andesite dominates (No. 1, Table 1) and is characterized by scattered microphenocrysts of plagioclase and hornblende usually less than 1 millimetre in diameter.

Scintillometer readings on these rocks and other basal and basement units range from 40 to 80 counts per second.

RADIOACTIVE ROCKS

Rocks that show anomalous radioactivity are principally mafic phonolites and trachyte lavas and breccias (Nos. 2 and 4, Table 1). These overlie the andesites and onlap parts of the Okanagan Batholith. They are dated 52.7±1.8 Ma (K/Ar on biotite) and correlate with the Yellow Lake Member of the Marron Formation near Penticton.

Mafic phonolites, which form the base of the Yellow Lake Member, are exposed on the ridges north and northeast of Riddle Creek where interlayered lava flows and lahar deposits attain a thickness of about 75 metres. Petrographic examination shows conspicuous rhomb-shaped anorthoclase phenocrysts to 2 centimetres in length and smaller subhedral



LEGEND

BEDDED ROCKS

MARRON FORMATION (Eocene)

- Trachyte lava and breccia
- Ash flow and conglomerate beds
- Mafic phonolite lava, breccia

- Andesite lava and breccia

SPRINGBROOK FORMATION ?

- Polymictic conglomerate

IGNEOUS INTRUSIONS

CORYELL INTRUSIONS (Eocene)

- Syenite and monzonite

BASEMENT ROCKS

- + + Mostly granitiod bodies

Figure 1. Geology of the Riddle Creek radioactive volcanic centre.

Table of Chemical Analyses

	1	2	3	4	5	6
Oxides recalculated to 100						
SiO_2	57.89	57.37	63.87	61.39	57.58	66.51
TiO_2	0.96	0.93	0.64	0.84	0.87	0.49
Al_2O_3	16.38	19.16	17.92	17.05	16.21	17.01
Fe_2O_3	4.43	3.01	3.14	3.43	3.83	2.58
FeO	1.03	1.77	0.73	1.07	2.48	0.24
MnO	0.08	0.09	0.11	0.09	0.12	0.14
MgO	4.33	2.40	1.10	1.99	3.73	0.28
CaO	6.90	4.05	0.64	3.34	5.22	0.84
Na_2O	4.12	5.83	4.71	5.47	4.71	6.05
K_2O	3.88	5.39	7.14	5.33	5.25	5.86
	100.00	100.00	100.00	100.00	100.00	100.00
Oxides and elements as determined						
$+H_2O$	0.56	2.02	0.90	0.20	1.14	0.70
$-H_2O$	0.58	0.35	0.75	0.18	0.41	0.70
CO_2	0.25	0.25	<0.11	0.25	0.25	0.25
S	0.02	<0.01	<0.005	0.01	0.02	0.01
P_2O_5	0.82	0.46	0.25	0.32	0.68	<0.15
BaO	0.21	0.30	0.10	0.20	0.23	0.013
SrO	0.30	0.42	0.07	0.21	0.31	0.02
Molecular Norm						
Quartz	2.0	-	5.7	1.3	-	6.6
Orthoclase	22.7	31.1	41.8	31.0	30.6	34.0
Albite	36.7	38.8	41.8	48.3	41.8	53.0
Nepheline	-	7.3	-	-	-	-
Anorthite	14.6	10.0	3.1	6.1	7.5	1.9
Wollastonite	7.7	3.9	-	4.1	7.2	0.9
Enstatite	11.8	-	3.0	5.4	0.6	0.8
Ferrosilite	-	-	-	-	-	-
Forsterite	-	4.9	-	-	7.2	-
Fayalite	-	-	-	-	-	-
Ilmenite	1.3	1.3	0.9	1.2	1.2	0.7
Magnetite	0.4	2.1	0.4	0.7	3.9	-
Hematite	2.8	0.6	1.9	1.9	-	2.1
Corundum	-	-	1.4	-	-	-

Key to Analyses

1. Alkaline andesite, basal volcanic assemblage
2. Mafic phonolite lava (rhomb porphyry), Yellow Lake Member, Marron Formation
3. Trachyte ash flow, Yellow Lake Member, Marron Formation (Skaha Creek area)
4. Trachyte lava (rectangular porphyry), Yellow Lake Member, Marron Formation
5. Coryell-type monzodiorite intrusion
6. Trachyte dyke, on north fork of Riddle Creek

and euhedral phenocrysts of green diopsidic augite, biotite, apatite, and magnetite set in a devitrified glassy or fine-grained feldspathic matrix. Scintillometer readings are in the range 140 to 180 counts per second.

The most radioactive rocks are thick trachyte lava flows that comprise the upper part of the Yellow Lake Member in this area. This unit is estimated to be between 150 to 200 metres in thickness. It underlies the ridges and slopes immediately northeast and south of the confluence of the forks of Riddle Creek. The trachyte contains large rectangular or platy mixed feldspar phenocrysts of anorthoclase, sanidine, and plagioclase; otherwise it is petrographically similar to the mafic phonolite (rhomb porphyry) suite. Scintillometer measurements are in the range 300 to 420 counts per second.

Coryell plutonic rocks crop out on the hillsides north and south of the westerly source of Riddle Creek. These are high level miarolitic syenomonzonite and monzodiorite phasos (No. 5, Table 1) that are mineralogically akin, and feeders to, the overlying Yellow Lake volcanic pile into which the Coryell pluton has evidently stoped. The rock is composed of about 80 per cent alkali feldspar, mostly orthoclase with rhomb-shaped anorthoclase cores, and 20 per cent smaller phenocrysts and interstitial grains of amphibole and pyroxene with poikilitic inclusions of biotite, magnetite, apatite, and sphene. The average scintillometer reading is 250 counts per second.

SCINTILLOMETER SURVEY

In the course of routine geological investigation of the Riddle Creek area, rock outcrops were tested in a manner outlined by McDermott (1977) using a portable gamma ray scintillometer (GeoMetrics/Exploranium Model GRS-101). Quantitative control was obtained for uranium from neutron activation of 24 samples, courtesy of D.R. Boyle of the Geological Survey of Canada, and for thorium from spectrometer analysis performed by the Analytical Division of the Ministry. The relationship between counts per second and uranium/thorium composition can be reduced to two equations:

$$U = c.p.s.\ (0.072) - 0.538$$
$$Th = c.p.s.\ (0.231) + 6.913$$

Accordingly, the following averages are calculated for uranium and thorium levels for the main rock types, based on c.p.s. values at 93 stations:

Rock Unit	U ppm	Th ppm
Trachyte (Yellow Lake Member)	27	94
Mafic phonolite (Yellow Lake Member)	11	45
Coryell Intrusions	18	66
Andesite Unit (unnamed)	5	23
Springbrock Formation	4	22
Okanagan Batholith	4	22

Scintillometer results (Figure 1) were contoured using the method outlined in Geological Fieldwork, 1980, Paper 1981-1, page 27. A bull's-eye arrangement of contours lies immediately south of the main course of

Riddle Creek in an area underlain by trachyte lavas and a volcanic centre. Thoroughly altered rocks are exposed below the trachyte on Riddle Creek and more distally on the slopes to the west. Pervasive hydrothermal alteration of the trachyte and vent (?) breccia has produced cream and white kaolinized rocks of variable radioactive response.

THE PROSPECT

A diamond-drill program consisting of approximately 270 metres in seven holes was completed in 1978. Six holes were sited south of Riddle Creek near the west boundary of the trachyte and one hole sited north of the creek. The purpose of the drilling was to test bedrock near geochemical soil anomalies and projected structural traps for uranium-bearing solutions.

North of Riddle Creek, drill hole No. 7 was directed at a northeast-dipping section of strata +30 metres thick of coarse clastic sedimentary rocks that is overlain by partly welded ash flow breccia at the base of the trachyte unit. (This stratigraphic-structural target is strikingly similar to the occurrence of radioactive trachyte ash and breccia in clastic sedimentary beds in the vicinity of Farleigh Lake and Skaha Creek, 15 to 20 kilometres to the southeast (No. 3, Table 1 - unit 1b on Preliminary Map 35). Although no significant uranium was found, the drilling proved good porosity of the beds below the ash flow and thus potential for further exploration.

Most of the drilling in the area of soil anomalies south of Riddle Creek intersected Coryell intrusive rocks. However, hole No. 1 near the west boundary of the trachyte cut altered rocks showing vestiges of conglomerate and breccia similar to the rocks at site No. 7.

A few prominent radioactive high spots were not tested by the drilling. The most important of these is an easterly trending felsic dyke about 4 metres wide exposed 450 metres north of the confluence of the forks of Riddle Creek. This is thought to be a feeder to the trachyte lavas of the Marron Formation (No. 6, Table 1). Scintillometer readings here averaging 1500 c.p.s. correspond to rock analyses showing 121 ppm U and 342 ppm Th. Radiographs of slabbed samples show that radioactive elements are concentrated on manganese pitch and dendritic growths on numerous small cracks. A similar dyke with scintillometer readings in the range of 600 to 900 c.p.s. was found at the contact between Coryell plutonic rocks and mafic phonolite lavas in the northwest part of the map-area between Isintok Creek and the western headwaters of Riddle Creek.

DISCUSSION

The Riddle Creek Tertiary outlier lies near the western extremity of a belt of Eocene alkaline volcanic rocks that are characterized by anomalous uranium and thorium contents (Church and Johnson, 1978). It is suggested that these rocks are the source of the relatively high uranium levels in streams of the Okanagan-Boundary area found by the 1976 URP survey. The possibilities of secondary uranium deposition and enrichment in this setting are numerous, including dykes, permeable sedimentary rocks and alteration zones associated with volcanic vents (Culbert and Leighton, 1978).

High radioactive response near the headwaters of Riddle Creek coincides with what appears to be a trachyte volcanic centre (Figure 1). In 1978, a program of short diamond-drill holes was conducted peripheral to this centre and yielded low uranium values. For future study the volcanic centre and associated ash flow deposits offer the best target.

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