URANIUM RECONNAISSANCE PROGRAM
(82E, 82L, and 82M)

By P. A. Christopher

A federal-provincial geochemical reconnaissance program for uranium was initiated in 1976. This program involved stream and water sampling at a sample interval of approximately one sample per 5 square miles (12.5 square kilometres) in south-central British Columbia. Map areas 82E, 82L, and most of 82M were covered between mid June and mid September by a crew of 13 people under the direction of S. B. Ballantyne, Geological Survey of Canada, Ottawa, and T. Kalnins, British Columbia Department of Mines and Petroleum Resources. Silt and water samples were collected at approximately 3 600 sites. Water samples are being analysed for uranium, fluorine, and pH, and silt samples are being analysed for uranium by neutron activation at the Atomic Energy laboratory in Ottawa, and for copper, lead, zinc, silver, molybdenum, manganese, and cobalt. Analytical results should be available prior to the 1977 field season.

In conjunction with this program, brief examinations of uranium occurrences were carried out in order to evaluate their geological environments. Company exploration in the study area was directed mainly to basal type uranium deposits in unconsolidated sediments below Pliocene (K-Ar whole rock 4.7±0.2 m.y.) and Miocene (?) plateau basalts. The Lassie Lake – Cup Lake, Kallis Creek, Pearson Creek, Hydraulic Lake, Carrott Mountain, and Vidler Creek prospects were examined to evaluate this type of occurrence.

URANIUM MINERALIZATION IN THE HYDRAULIC LAKE AREA
(82E/11E, 14E)

By P. A. Christopher

Examinations of basal-type uranium prospects in the Hydraulic Lake area were conducted to establish favourable settings for uranium deposition. Figure 2 shows the general geological settings of known deposits in the Hydraulic Lake area. Uranium mineralization occurs in unconsolidated fluvial sediments that are capped by an impermeable horizon, usually Pliocene or Miocene (?) plateau basalts. The mineralized area northwest of Hydraulic Lake is partly capped by basalt and partly by clay-rich horizons of low permeability within the sedimentary sequence. The uranium-bearing fluvial sediments in the area unconformably overlie metamorphic rocks (Monashee Group), Early Tertiary sedimentary and volcanic rocks (Kettle River Formation), and Nelson, Valhalla, and

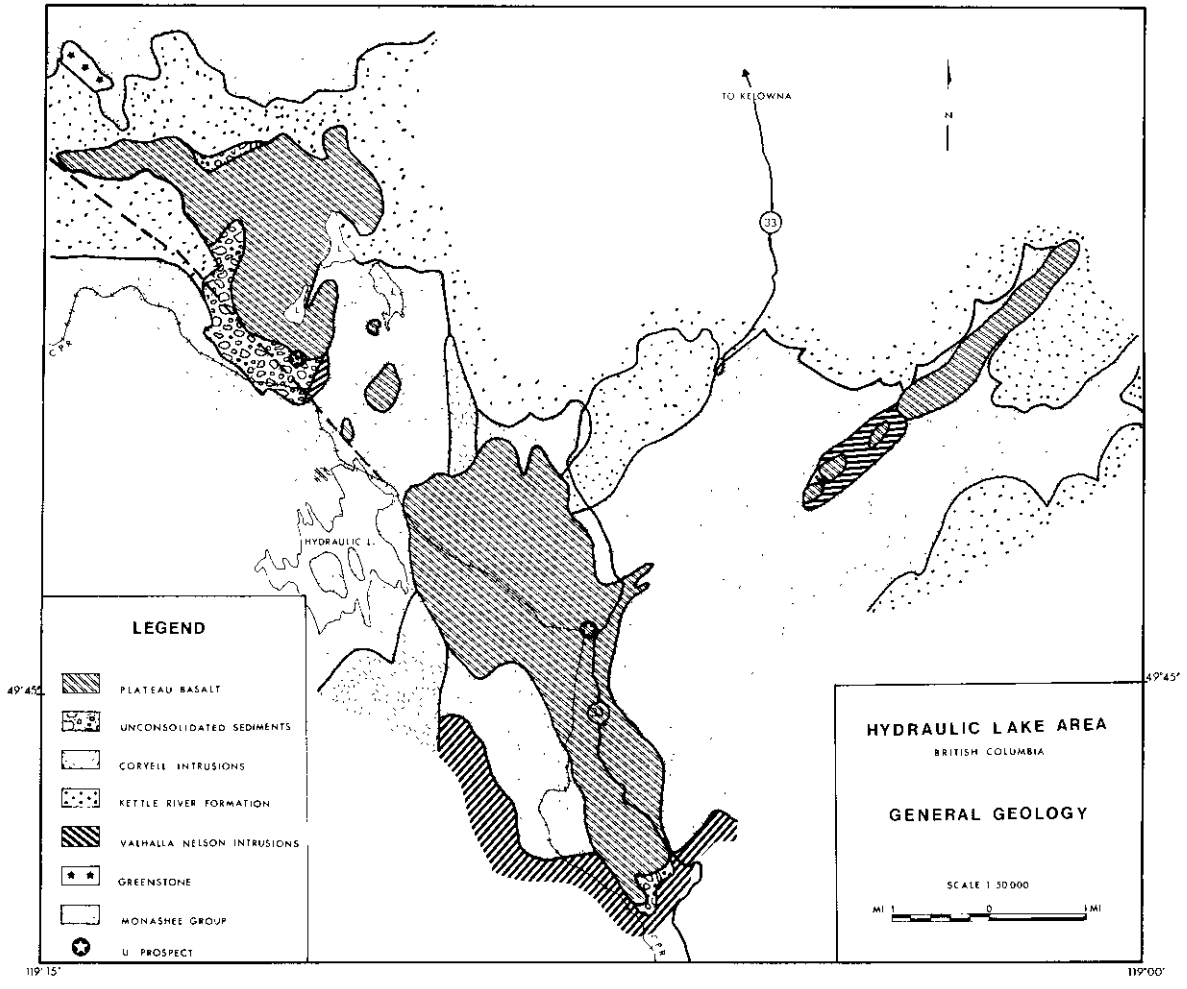

Figure 2. General geological setting of uranium deposits in the Hydraulic Lake area (modified from company reports).

Coryell intrusive rocks. Strong faults occur in the area of the mineral deposits but their relationship to the mineralization has not been determined.

Secondary uranium minerals occur as films on pebbles and in the matrix of unconsolidated or loosely consolidated conglomerate and carbonaceous sediments that were deposited in paleo-stream channels. Meta-autunite is the only uranium mineral that has been identified. Authigenic iron sulphide is common in the unconsolidated sediments and northwest of Hydraulic Lake massive iron sulphide cements uraniferous gravels just above the unconformity with basement rocks.

Figure 3 is an idealized section of basal-type uranium deposits in south-central British Columbia. Uranium mineralization occurs in groundwater traps at several horizons within the basal sediments below an impermeable capping commonly at or near an unconformity. The base of the Early Tertiary Marron and Kettle River Formations has been checked in several locations but no deposit similar to the Northwest Uranium deposit in Washington State has been found.

The following features should be considered when prospecting for basal-type uranium deposits in British Columbia:

(1) Plateau basalts provide an easily recognizable cap which may have sealed a favourable porous horizon, but impermeable sediments can also act as caps for a groundwater trap (for example, Hydraulic Lake).

(2) High background granitic rocks (for example, Coryell intrusions) are the preferred basement rocks.

(3) Organic material can stimulate reducing conditions necessary for deposition of uranium.

(4) Deposits are often associated with faults or fracture zones.

(5) Channel deposits are more likely to occur than large blanket deposits.

(6) Surface expressions of uranium are weak because of the impermeable caps. Groundwater seepage testing appears to be the best prospecting tool.

(7) In Washington State the Northwest Uranium and Big Smoke deposits are basal-type deposits in carbonaceous sediments of the mid Tertiary (Oligocene) Gerome Formation. A similar setting may occur within Eocene volcanic and sedimentary rocks in British Columbia.

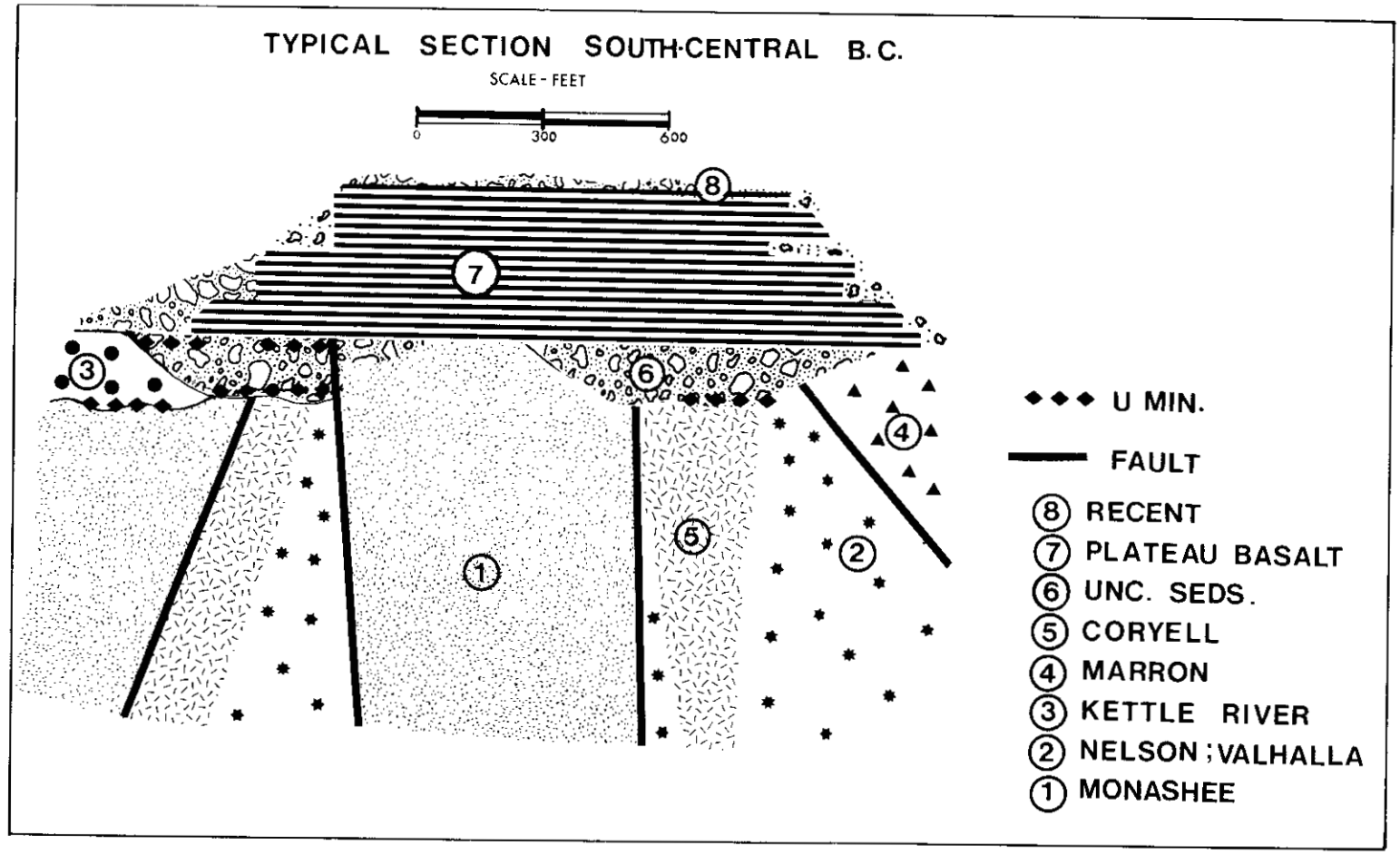

Figure 3. Typical section showing the setting of basal type uranium deposits in south-central British Columbia.