Province of British Columbia
Department of Mines and Petroleum Resources
Mineral Resources Branch

Canada
Department of Energy, Mines and Resources
Geological Survey of Canada

82L

## LEGEND

Note: This legend is common to National Geochemical Reconnaissance Map 5-1976, Open File 409; Map 6-1976, Open File 410 and Map 7-1976, Open File 411

QUATERNARY

| | |
|---|---|
| 8 | Glacial, lacustrine, and fluviatile gravel, sand, silt and clay |

TERTIARY

| | |
|---|---|
| 7 | Plateau basalts, olivine basalts |
| 6 | Volcanic flow rocks with interbedded sedimentary rocks; 6a, conglomerate, sandstone, shale and tuff |
| 5 | CORYELL: alkalic plutonic rocks; porphyritic granite and rhyolite |

JURASSIC - CRETACEOUS

| | |
|---|---|
| 4 | NELSON and VALHALLA: granitic plutonic rocks |

JURASSIC

| | |
|---|---|
| 3 | Maffic and ultramafic intrusive rocks, pyroxinite, hornblendite serpentinite |

PALEOZOIC (including UPPER PROTEROZOIC and TRIASSIC)

| | |
|---|---|
| 2 | Basaltic and andesitic lavas, greenstone, tuff, quartzite, limestone and argillite; 2a, quartzite, argillite, limestone, slate, schist, phyllite, sandstone and conglomerate |

PROTEROZOIC (SHUSWAP TERRANE)

| | |
|---|---|
| 1 | Gneiss, minor schist, limestone, marble, dolomite, slate, phyllite; 1a, schist, quartzite, limestone, slate, argillite |

Geological contact.....
Fault.....
Dyke.....
Mineral occurence.....Zn ×

Legend modified and geology compiled for the geochemical map by T.E. Kalnins from maps 1059A, by H.M.A. Rice 1945, 1946, and A.G. Jones 1947, 1951

Geological cartography by the Geological Survey of Canada

Base-map at the same scale published by the Mapping and Charting Establishment, M.C.E., 1966. Additional drainage obtained from Department of Lands, Forests and Water Resources, British Columbia Land Use maps, 1:125,000 scale

Mean magnetic declination 1977, 23°07.2' East decreasing 4.9' annually. Readings vary from 21°49.2' in the SE corner to 23°04.2' in the NW corner of the map area

Elevation in feet above mean sea-level

### Geochemical Symbol and Data Presentation

The concentration of an element at a sample site is graphically represented as one of 15 symbols, if a sample was collected but there is no data available a dot is plotted. The symbols are symmetrically arranged so that they first increase in size to the eighth symbol and then increase in blackness to the fifteenth. The two small crosses at the low end of the scale are used to respectively denote concentrations below the analytical detection limit, or, in the data group containing the detection limit. The data are grouped on a semi-logarithmic scale, i.e. 1,2,5,10,20,50,100 etc. Five decades can be spanned and this arbitrary division has been chosen for the continuing Canada wide series of maps constituting the National Geochemical Reconnaissance.

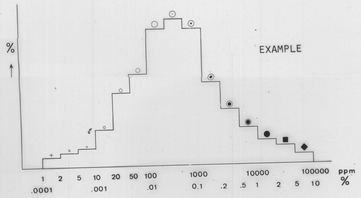
The choice of symbols and the data groups they represent for any specific element is based on the histogram and cumulative frequency plot for the total survey data from one, or more contiguous, open file sheets covered in one field season. The eighth symbol is used for the model group as defined by the histogram, this group usually includes the median of the data as defined by the 0.5 (50%) point on the cumulative frequency plot. Some, or all, of the remaining 14 symbols are chosen so as to achieve an appropriate graphical impact. An example of all 15 symbols is given below.

The symbol maps, being based on the total survey data distributions, are unaffected by the availability of ever increasing levels of knowledge in bedrock and surficial geology, and other environmental factors. Therefore, the raw data symbol maps are only intended to assist the rapid inspection of the data for gross regional features. To fulfil the needs of a more specific and thorough interpretation, the raw symbol maps should be modified using the field and analytical data provided in the data listings and any other knowledge available. To assist in the appraisal and modification of the data in terms of the symbol map bedrock geology, a table of summary statistics and proposed threshold values for each mapped bedrock unit, or broad lithologic unit, again based on the total survey data, is presented below the histogram. This table can be used along, or in conjuction, with the sample location map and data listings to indicate above threshold samples where they occur on the map. In many instances, the table will also illustrate, more clearly than the map, the dependence of mean geochemical levels on bedrock type. It may often be also observed that whilst the total data appears to approximate a log-normal distribution the data for individual map or lithologic units appears to approximate a normal distribution. The proposed thresholds presented are believed to be useful in interpreting the data from a mineral exploration viewpoint. Locations of samples with concentrations in excess of the threshold for the rock unit they appear to be derived from, should be studied carefully. The above threshold concentration can be due to a wide range of geological and environmental factors, but one of these could be the presence of abnormal concentrations of the element in a form of interest to the mineral explorationist.

To comprehensively study an area, all available geological, environmental and recorded data should be utilized. The data separation by bedrock type can often be improved by constructing new data subsets and deriving local threshold levels based on the most detailed and up-to-date knowledge available.

The reliability of hydrogeochemical maps has to be assessed using different criteria than for stream sediment maps. The majority of the samples from an individual drainage system were collected over a short time period in order to minimize ephemeral climatic effects. In comparing water data, the dates of sample collection in the data listing must be considered. Seasonal variations in the magnitude of anomalies have been detected. However, in terms of contrast, the anomalies are persistent because both background and anomalous values vary sympathetically over longer periods of time.

Samples displaying the highest U and F levels are not necessarily indicative of mineral occurrences. Differential leaching of bedrock and re-cyling of U and F in highly carbonated waters can lead to such high U and F levels. The data should be interpreted in terms of: the drainage basin geology, i.e. potential primary source and secondary host rocks; and the uranium and other elemental data in stream sediments collectively used to support a particular model of uranium provenance.




INDEX MAP

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 6-1976

FLUORINE IN STREAM WATERS

CANADA-BRITISH COLUMBIA AGREEMENT ON A URANIUM RECONNAISSANCE PROGRAM

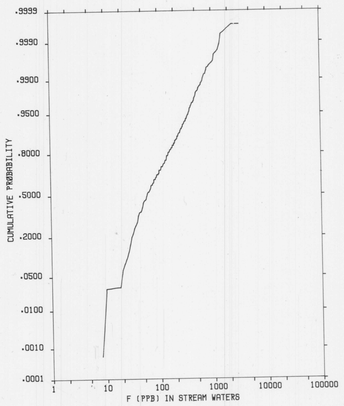
Scale 1:250,000

Kilometres 6 0 6 12 18 Kilometres

Miles 4 0 4 8 Miles

Universal Transverse Mercator Projection



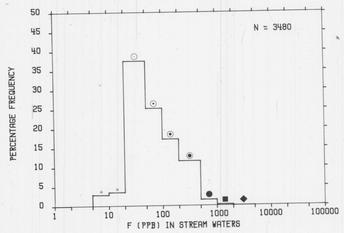




Table of Thresholds for Major Geological Units

| Lithology | No. of Samples | Mean | S.D. | C.V.% | Threshold |
|---|---|---|---|---|---|
| 8 TILL | 397 | 93 | 152 | 163 | 350 |
| 7 OLVB | 192 | 130 | 133 | 102 | 400 |
| 6a CGLM | 22 | 263 | 227 | 86 | 450 |
| 6 ANDS | 114 | 312 | 250 | 80 | 120 |
| 5 SYNT | 143 | 134 | 153 | 114 | 400 |
| 4 GRNT | 938 | 125 | 140 | 112 | 450 |
| 3 UMFC | 3 | 59 | 79 | 132 | 450 |
| 2a QRTZ | 50 | 40 | 25 | 62 | 1200 |
| 2 GRNS | 306 | 130 | 133 | 102 | 800 |
| 1a SCST | 238 | 94 | 167 | 177 | 500 |
| 1 GNSS | 1077 | 72 | 122 | 169 | 400 |

Data units are ppb

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 6-1976
OPEN FILE 410

Resource Geophysics and Geochemistry Division

Geological Survey of Canada, Ottawa

Geochemistry and field operations supervised by S.B. Ballantyne
Federal-Provincial coordination by E.H.W. Hornbrook
Analatycal chemistry by J.J. Lynch
Data monitoring by R.G. Garrett, N.G. Lund and D.J. Ellwood

British Columbia, Mineral Resources Branch

Federal-Provincial coordination by A. Sutherland Brown, N.C. Carter and P.A. Christopher
Field operation assistance by T.E. Kalnins

Contractors
Sample collection staff and vehicles supplied by Stokes Exploration Management Co. Ltd.
Chemical analysis by Bondar-Clegg and Co. Ltd.

This map forms one of a series of 39 sheets released under Geological Survey of Canada, Open Files 409, 410, 411. The Open Files consists of data for 10 elements each for stream sediments, two elements for stream waters and sample site location. The data listing of each Open File includes pH data.

The data are also available in digital form. For further information please contact:

The Director,
Computer Science Centre,
Department of Energy, Mines and Resources
Ottawa, Ontario K1A 0E8

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 6-1976
OPEN FILE 410
SOUTH EASTERN BRITISH COLUMBIA, 1976
FLUORINE IN STREAM WATERS