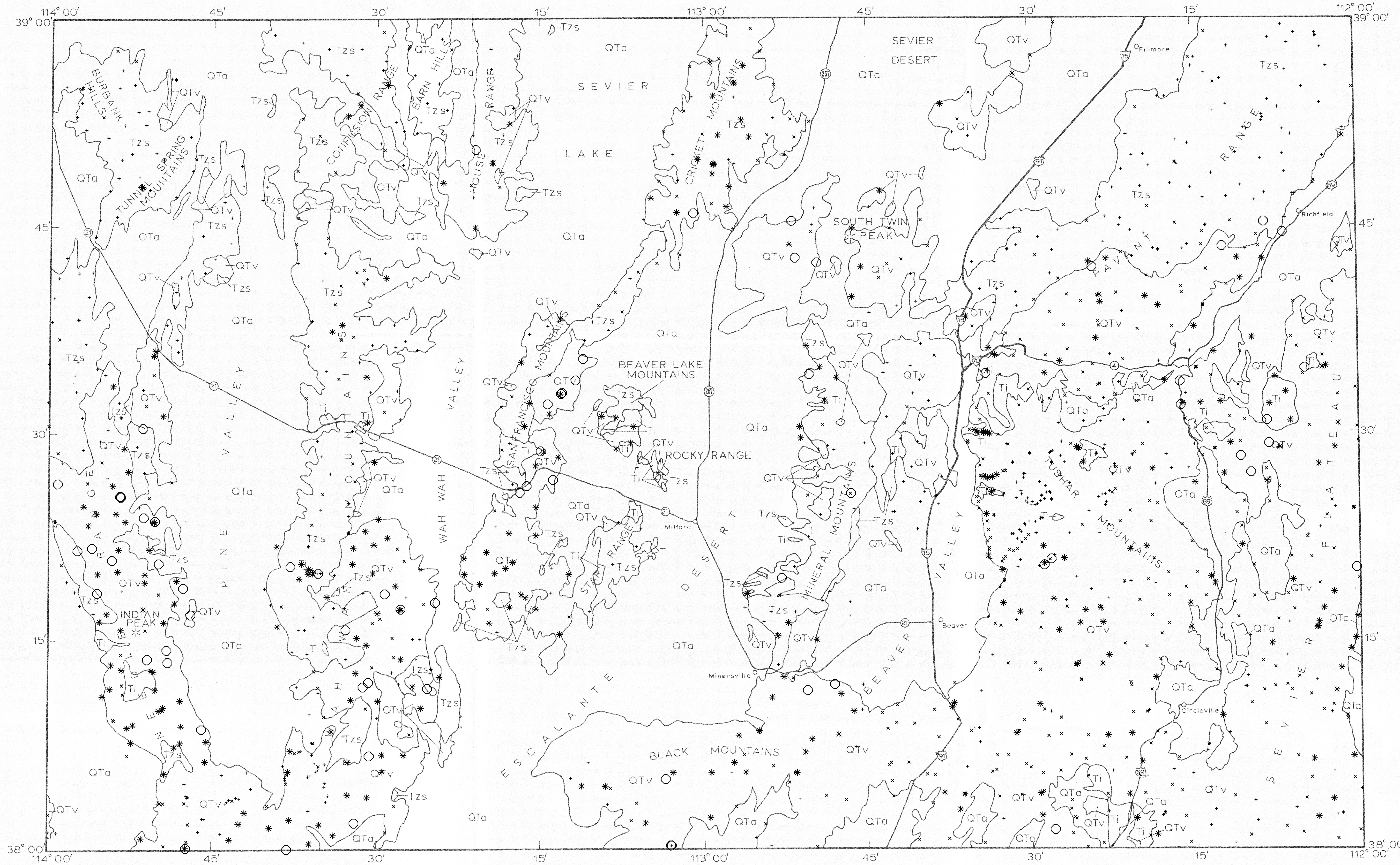
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

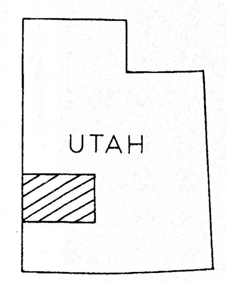
MISCELLANEOUS FIELD STUDIES
MAP MF-2138-A
FOLIO OF THE RICHFIELD 1° X 2° QUADRANGLE, UTAH



SCALE 1:250 000

5 0 5 10 15 MILES

5 0 5 10 15 KILOMETERS



INDEX MAP

Geology generalized from Steven and others (1978)

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MAP SHOWING DISTRIBUTION OF BARIUM IN STREAM-SEDIMENT SAMPLES, RICHFIELD 1° X 2° QUADRANGLE, UTAH

By

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1990

INTRODUCTION

This map of the Richfield 1° x 2° quadrangle shows the regional distribution of barium in the less-than-0.180-mm (minus-80-mesh) fraction of stream sediments. It is part of a folio of maps of the Richfield 1° x 2° quadrangle, Utah, prepared under the Conterminous United States Mineral Assessment Program. Other published geochemical maps in this folio are listed in the references (this publication).

The Richfield quadrangle is located in west-central Utah and includes the eastern part of the Pioche-Marysvale igneous and mineral belt, which extends from the vicinity of Pioche in southeastern Nevada, east-northeastward for 155 miles into central Utah. The western two-thirds of the Richfield quadrangle is part of the Basin and Range province, whereas the eastern third is part of the High Plateaus of Utah, a subprovince of the Colorado Plateau.

Bedrock in the northern part of the Richfield quadrangle consists predominantly of Late Proterozoic and Paleozoic sedimentary strata that were thrust eastward during the Sevier orogeny in Cretaceous time onto an autochthon of Mesozoic sedimentary rocks located in the eastern part of the quadrangle. The southern part of the quadrangle is largely underlain by Oligocene and younger volcanic rocks and related intrusions. Extensional tectonism in late Cenozoic time broke the bedrock terrain into a series of north-trending fault blocks; the uplifted mountain areas were eroded to various degrees and the resulting debris was deposited in adjacent basins. Most of the mineral deposits in the Pioche-Marysvale mineral belt were formed as a result of igneous activity in middle and late Cenozoic time. A more complete description of the geology and a mineral-resource appraisal of the Richfield quadrangle appears in Steven and Morris (1984 and 1987).

The regional sampling program was designed to define broad geochemical patterns and trends that can be utilized along with geological and geophysical data to assess the mineral-resource potential for this quadrangle. Reconnaissance geochemical surveys are valuable tools in mineral exploration, especially when used in conjunction with data obtained from other earth science disciplines. Idenifying specific exploration targets generally involves additional, more detailed investigations.

SAMPLE COLLECTION AND PREPARATION

Stream-sediment samples were collected at 1,445 sites throughout the Richfield quadrangle. The sample sites are located along small, normally unbranched or first-order stream drainages, which range from 1 to 2 miles in length and whose stream courses are 2 to 12 feet wide. Sample density within the bedrock areas is one sample per 3 square miles. Intermountain basins containing sediments were not sampled. Each sample is a composite of material collected at four or five sites (usually within 30 feet of each other) across and along the active channel. About 1 to 2 pounds of bulk sediments were collected at each site. Geochemical sampling was conducted by G.K. Lee, W.R. Miller, J.B. McHugh, R.E. Tucker, J.D. Tucker, and J.F. Guadagnoli.

The less-than-0.180-mm fraction of stream sediments was prepared by drying the bulk sediment and sieving it to less than 0.180 mm. This fraction was then pulverized using a vertical ceramic-plate mill to a powder (less than 0.105 mm) and analyzed.

ANALYTICAL PROCEDURES

For this study, barium concentration was determined by using a 6-step dc-arc optical-emission spectrographic method. The results of the analyses appear in Motooka and Miller (1983). All values are reported within a framework made up of six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2) and represent approximate geometric midpoints of the concentration ranges. The precision is within one adjoining reporting interval on either side of the reported value 83 percent of the time, and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976).

GENERATION OF MAPS

A computer-generated point-plot map for barium in the less-than-0.180-mm fraction of stream sediments was prepared using the computerized map-generation programs within the U.S. Geological Survey's STATPAC system (VanTrump and Miesch, 1977). Barium concentrations ranged from 50 to 5,000 ppm. Approximately 50 percent of the samples were considered to be within the range of background values; the remaining 50 percent are divided into three classifications that range from highly anomalous to weakly anomalous; each class is represented by a symbol or size of symbol on the histogram (fig. 1). The least anomalous class indicates only elevated values above background and does not indicate mineralization. The most anomalous classification represents one percent of the total population followed by less anomalous classifications representing larger percentages of the total population.

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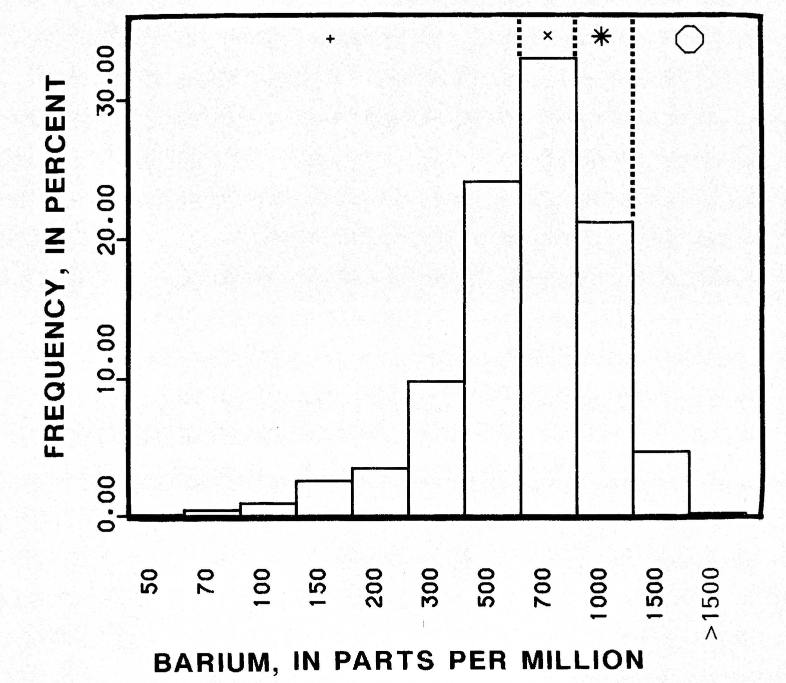

EXPLANATION

SAMPLE LOCALITIES FOR BARIUM

- ○ Highly anomalous value
- ✳ Moderately anomalous value
- × Weakly anomalous value
- + Nonanomalous value

Figure 1.--Histogram showing barium concentrations in stream-sediment samples collected in the Richfield 1° x 2° quadrangle, Utah. Number of samples, 1,445.

LIST OF MAP UNITS

QTa	Surficial deposits, undivided (Quaternary and Tertiary)
QTv	Volcanic rocks, undivided (Quaternary and Tertiary)
Ti	Intrusive igneous rocks, undivided (Tertiary)
Tzs	Sedimentary rocks, undivided (Tertiary to Late Proterozoic)
_______	Contact

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