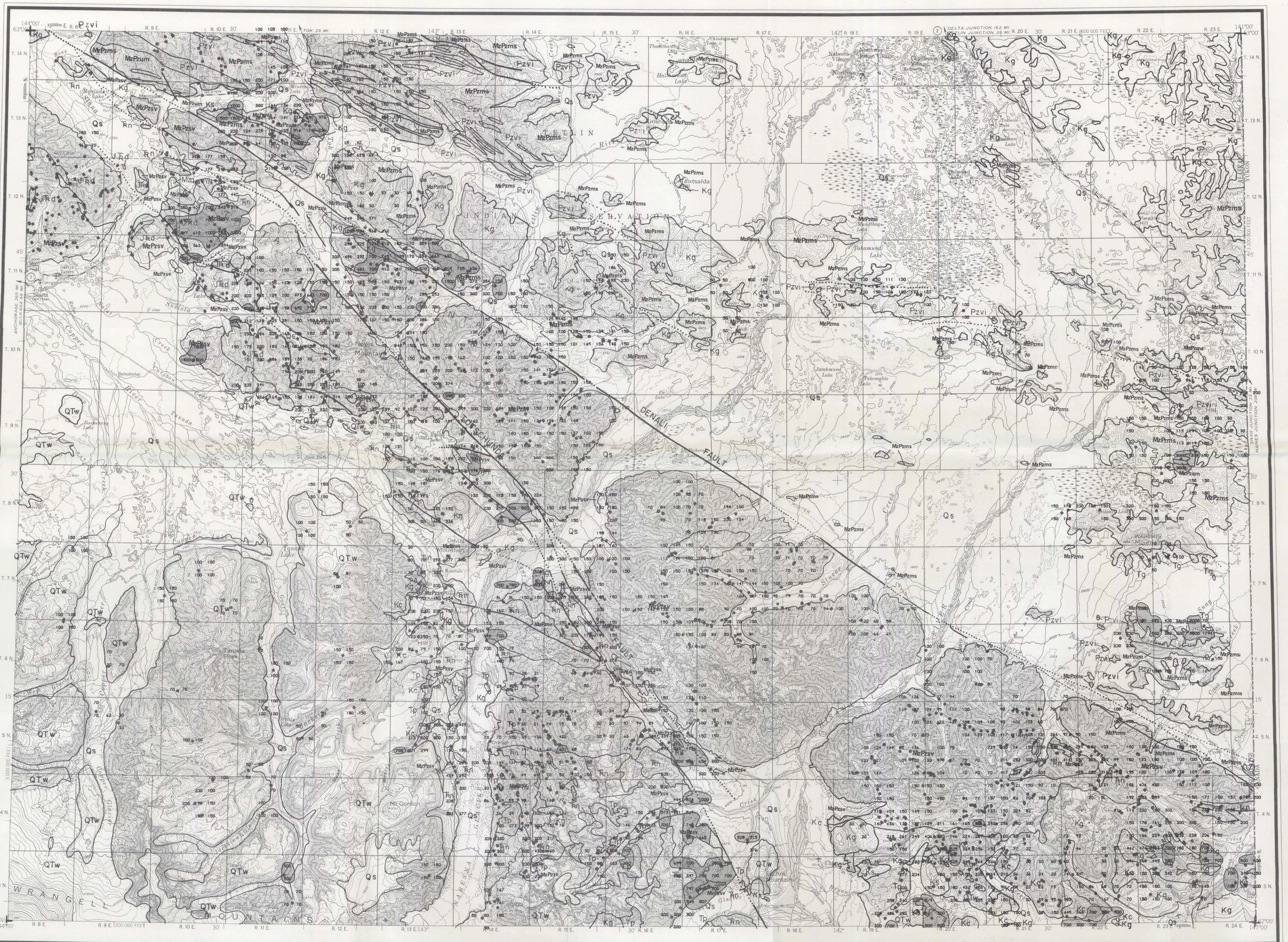
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Cr. Geochem. [redacted]

MISCELLANEOUS FIELD STUDIES MAP MF-655E
FOLIO OF THE NABESNA QUADRANGLE, ALASKA

[redacted] 150



BASE BY U. S. GEOLOGICAL SURVEY, 1965

SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1965

GEOCHEMICAL AND GENERALIZED GEOLOGIC MAP SHOWING DISTRIBUTION AND ABUNDANCE OF CHROMIUM IN THE NABESNA QUADRANGLE, ALASKA

BY SHERMAN P. MARSH

DISCUSSION

This map shows the distribution and abundance of chromium in stream sediments in the Nabesna quadrangle, Alaska. The geochemical data are plotted on a basemap showing the topography, generalized geology, and sample sites. Stream sediment samples were collected from active streams, then air dried and sieved. The -80 mesh (-177 microns) fractions were analyzed for chromium and other elements by semiquantitative emission spectrographic methods. Complete analytical data for geochemical samples collected by the U.S. Geological Survey in the Nabesna quadrangle are available on a computer tape (O'Leary, Van Trump, and others, 1975) that can be obtained from National Technical Information Service, Department of Commerce, Springfield, Va. 22151.

The map was prepared on a DEC 10 computer at the U.S. Geological Survey Computer Center in Denver, Colorado. Metal values, expressed on the map in parts per million (ppm), were obtained in the following manner: The raw (analytical) data were plotted on a rectangular coordinate system with intersections (mesh points) 1.6 km (1 mile) apart on the map and 6.4 km (4 miles) apart on the perspective diagram. The original data points were transposed to grid intersections by drawing 3.2 km-diameter (map) and 12.8 km-diameter (diagram) circles centered on the intersections, then shifting the coordinates of data points within each circle to the coordinates of the intersection. With the shift of coordinates, each point was weighted according to its distance from the mesh point; as a result, nearby data points influenced the final value at the mesh point more than outlying data points. After the data were weighted and projected to a mesh point, the values at that point were averaged. An L following a value on the map indicates that chromium was detected, but in amounts below that value, which is the smallest amount of chromium that can be measured by semiquantitative spectrographic methods. Where the average value at a mesh point is greater than the highest L value within the circle, the L is dropped and the average value printed.

The computer-generated perspective diagram shows the distribution and abundance of chromium in stream sediments in the quadrangle in easy-to-visualize, 3-dimensional perspective. The angle of perspective is 30° from the horizontal (H.A. = 30.0) and 30° from the vertical (V.A. = 30.0). The range of chromium values is 150 to 1500 ppm and each contour interval is equal to one-sixth of this range or approximately 225 parts per million. The range in chromium values on the perspective diagram is less than the range in values on the map because the original data are averaged over a larger area (12.8-km vs 3.2-km diameter circles).

The average value of chromium in stream sediments collected and analyzed in the Nabesna quadrangle is 200 ppm. Values of 500 ppm and greater are deemed to be anomalous based mainly on analysis of the statistical data shown on the accompanying histogram. Areas where chromium occurs in anomalous amounts are shaded on the map.

Chromium anomalies in the Nabesna quadrangle are associated with a variety of largely igneous rock types, including ultramafic, volcanic, and plutonic rocks. The strongest anomalies are north of the Denali fault and are associated with ultramafic bodies (Richter, 1975), some of which are known to contain massive chromite (Richter and others, 1975). A group of anomalies in the southeastern corner of the quadrangle occurs in Cretaceous volcanic rocks and Jurassic and Cretaceous marine sedimentary rocks peripheral to the Klein Creek pluton; only two small anomalies (T. 5 N., R. 13 E. and T. 5 N., R. 15 E.) are associated with the Nabesna pluton. In the northwestern part of the quadrangle, a number of anomalies appear to be related to the middle Cretaceous dioritic rocks of the Suslota Pass and Buck Creek plutons south of the Denali fault, and Tok-Tetlin pluton north of the fault. A wide zone of anomalies extending northwestward from Chisana Glacier to T. 9 N., R. 12 E. apparently is caused by the Nikolai Greenstone, whose amygdaloidal basalt flows are intrinsically high in chromium. Elsewhere, a few small anomalies occur in the Wrangell Lava (T. 3 N., R. 11 E.), in the Tetelna Volcanics (T. 10 N., R. 10 E.), and in the diorite complex (T. 10 and 11 N., R. 10 and 11 E.).

REFERENCES CITED

O'Leary, R. M., Van Trump, George, and others, 1975, Spectrographic and chemical analyses of rock and stream-sediment samples from the Nabesna quadrangle, Alaska: Natl. Tech. Inf. Service (U.S. Dept. Commerce) Magnetic Tape No. PB240-488

Richter, D. H., 1975, Geologic map of the Nabesna quadrangle, Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-655A, 1 sheet, scale 1:250,000.

Richter, D. H., Singer, D. A., and Cox, D. P., 1975, Mineral resources map of the Nabesna quadrangle, Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-655K, 1 sheet, scale 1:250,000.

EXPLANATION FOR GENERALIZED GEOLOGIC MAP

[Geology generalized from Richter (1975)]

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS

Qs — QUATERNARY

SEDIMENTARY AND VOLCANIC ROCKS

QTw — QUATERNARY AND TERTIARY
Ks — Upper(?) Cretaceous — CRETACEOUS
Kc — Lower Cretaceous — CRETACEOUS
Ŧn — Upper and(or) Middle Triassic — TRIASSIC
MzPzsv — MESOZOIC AND PALEOZOIC

INTRUSIVE, METAMORPHIC, AND ULTRAMAFIC ROCKS

Tp, Tg — TERTIARY
Kg — CRETACEOUS
JŦd — JURASSIC AND TRIASSIC
Mza — MESOZOIC
MzPzms, MzPzum — MESOZOIC AND PALEOZOIC
Pzvi — PALEOZOIC

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qs — UNCONSOLIDATED SEDIMENTARY DEPOSITS (Quaternary)

SEDIMENTARY AND VOLCANIC ROCKS

QTw — WRANGELL LAVA (Quaternary and Tertiary)
Ks — CONTINENTAL SEDIMENTARY ROCKS (Upper? Cretaceous)
Kc — CHISANA FORMATION (Lower Cretaceous) Marine and subaerial volcanic rocks
Ŧn — NIKOLAI GREENSTONE (Upper and(or) Middle Triassic)
MzPzsv — UNDIVIDED SEDIMENTARY AND VOLCANIC ROCKS (Mesozoic and Paleozoic)

INTRUSIVE, METAMORPHIC, AND ULTRAMAFIC ROCKS

Tp — PORPHYRY (Tertiary) Porphyritic andesite to rhyodacite
Tg — UNDIVIDED GRANITIC ROCKS (Tertiary) Chiefly quartz monzonite
Kg — UNDIVIDED GRANITIC ROCKS (Cretaceous) Chiefly granodiorite and quartz monzonite
JŦd — DIORITE COMPLEX (Jurassic and Triassic)
Mza — ANORTHOSITE (Mesozoic)
MzPzms — UNDIVIDED METAMORPHOSED SEDIMENTARY ROCKS (Mesozoic and Paleozoic)
MzPzum — UNDIVIDED ULTRAMAFIC ROCKS (Mesozoic and Paleozoic)
Pzvi — UNDIVIDED METAMORPHOSED MAFIC VOLCANIC AND INTRUSIVE ROCKS (Paleozoic)

Contact. Dotted where concealed

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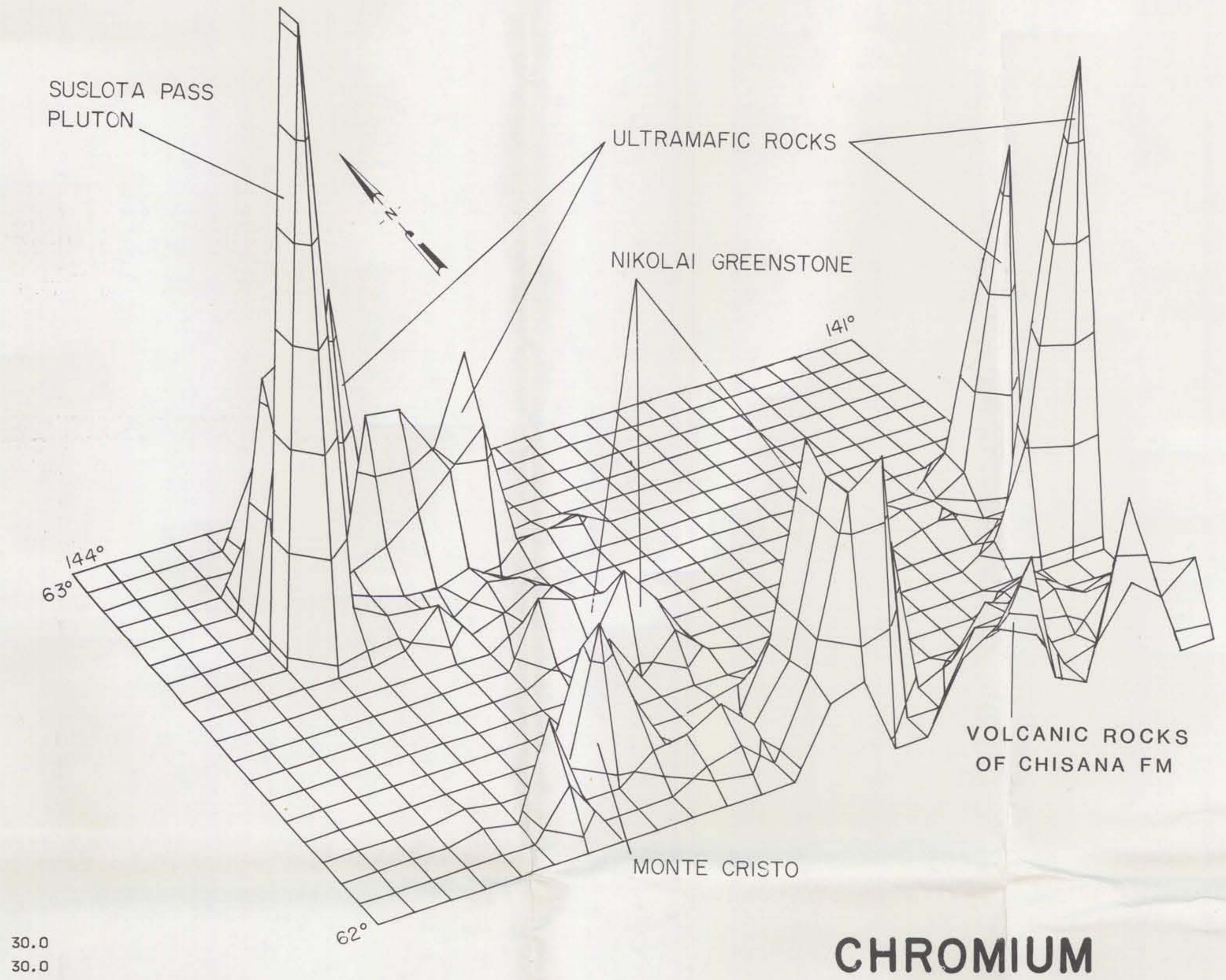
Geochemical sample locality

Area that contains anomalous amounts of metal

130 Mean value of samples in parts per million within grid area

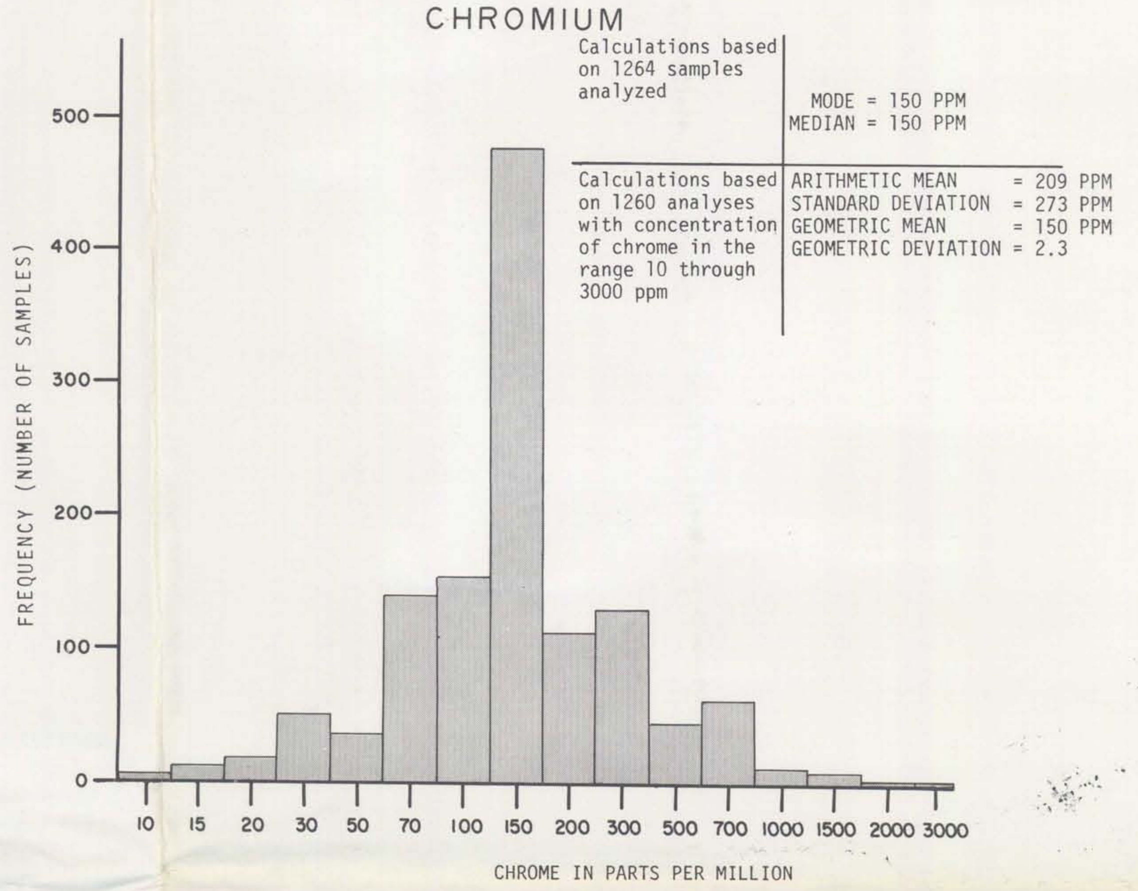
All samples northwest of this boundary were analyzed by atomic absorption methods



V.A.= 30.0
H.A.= 30.0

RANGE: 150.0000 — 1500.0000

CHROMIUM



HISTOGRAM SHOWING STATISTICAL DATA FOR CHROME

Background information for this folio is published as U.S. Geological Survey Circular 718, available free of charge from the U.S. Geological Survey, Reston, Va. 22092.

For sale by U. S. Geological Survey, price $.50