

#### EXPLANATION

GEOLOGY GENERALIZED FROM WESE AND OTHERS (1978)

#### CORRELATION OF MAP UNITS

##### UNCONSOLIDATED DEPOSITS

Quaternary  
Qaf Qd Qm

##### SEDIMENTARY ROCKS

Tnc Td

##### IGNEOUS ROCKS

Tg Tt Tmg Kg

##### METAMORPHIC ROCKS

Pgc

Pvu

Psc

Pzg

Pzg

Ppca

Ppfg

Paleozoic

Paleozoic and Cambrian

#### DESCRIPTION OF MAP UNITS

##### UNCONSOLIDATED DEPOSITS

Qac ALLUVIUM, COLLUVIUM, AND MINOR GLACIAL AND EOLIAN DEPOSITS  
Qaf ALLUVIAL FAN AND GLACIAL OUTWASH DEPOSITS  
Qd DUNE SAND  
Qm MORAINAL DEPOSITS

##### SEDIMENTARY ROCKS

Tnc NENANA GRAVEL AND COAL-BEARING FORMATION  
Td DETRITAL ROCKS

##### IGNEOUS ROCKS

Tg FELSIC TUFF AND LAVA  
Tt GRANITE AND QUARTZ MONZONITE  
Tmg UNDIVIDED GRANITIC AND DIORITIC ROCKS  
Kg UNDIVIDED GRANITIC AND MINOR DIORITIC ROCKS

##### METAMORPHIC ROCKS

Pgc GREENSTONE AND CHERT  
Pvu ULTRAMAFIC ROCKS  
Psc CATACLASTIC SCHIST AND GNEISS  
Pzg GREENSTONE, QUARTZITE, MARBLE, COARSE META-ARENITE, GREENSTONE, AND META-TUFF  
Pzg QUARTZITE, SLATE, CALC-PHYLLITE, AND MARBLE  
Ppca AUGEN GNEISS AND MINOR AMOUNTS OF OTHER GNEISSIC ROCKS  
Ppfg GNEISS, SCHIST, AUGEN GNEISS, AMPHIBOLITE, AND MARBLE

#### GEOLOGIC SYMBOLS

CONTACT, APPROXIMATELY LOCATED  
FAULT OR PROBABLE FAULT, DOTTED WHERE CONCEALED

#### GEOCHEMICAL SYMBOLS

SAMPLE SITE--represents background values at sites where there are no anomalous values

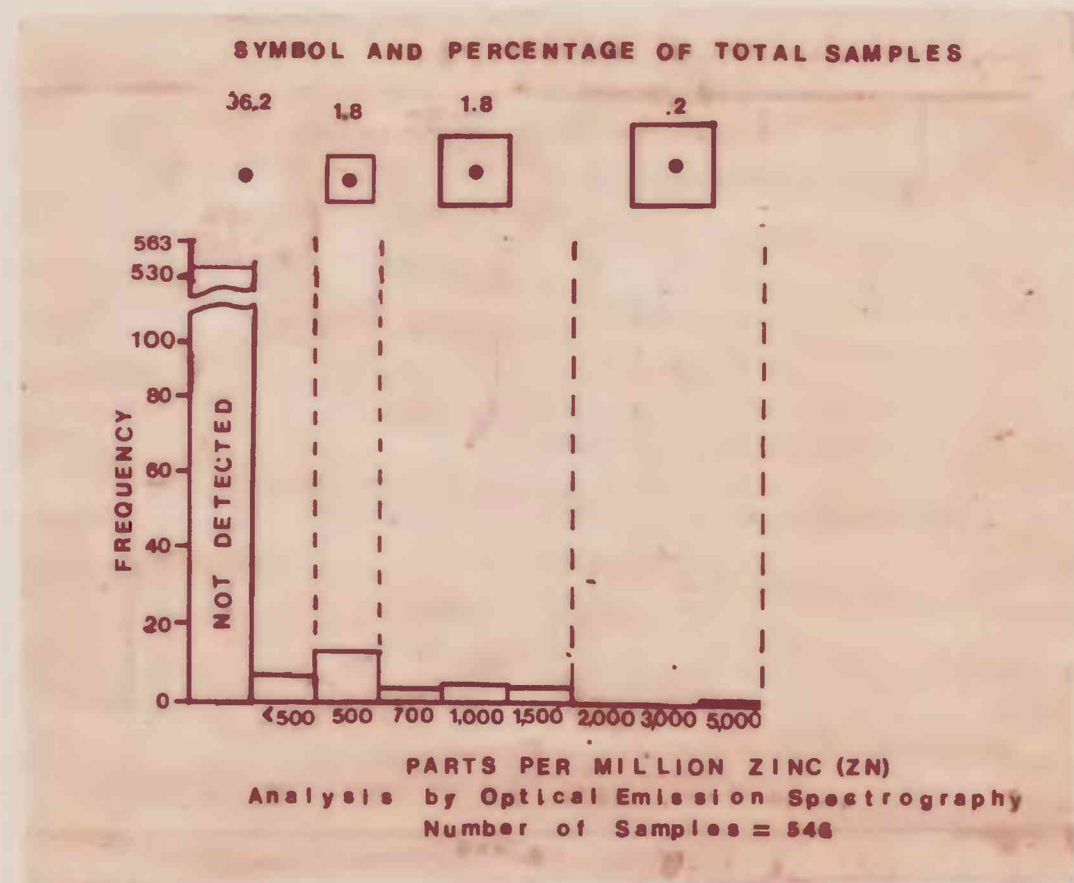
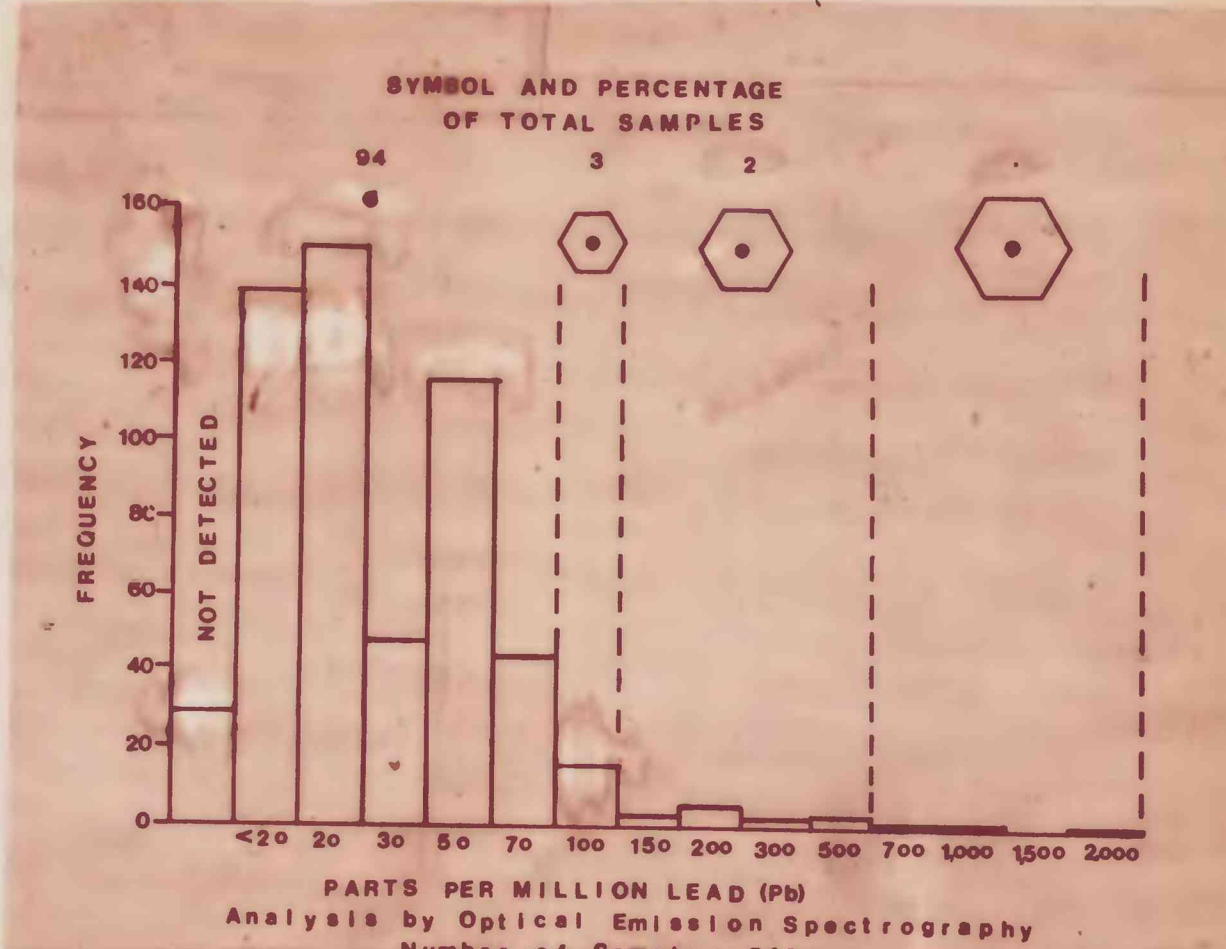
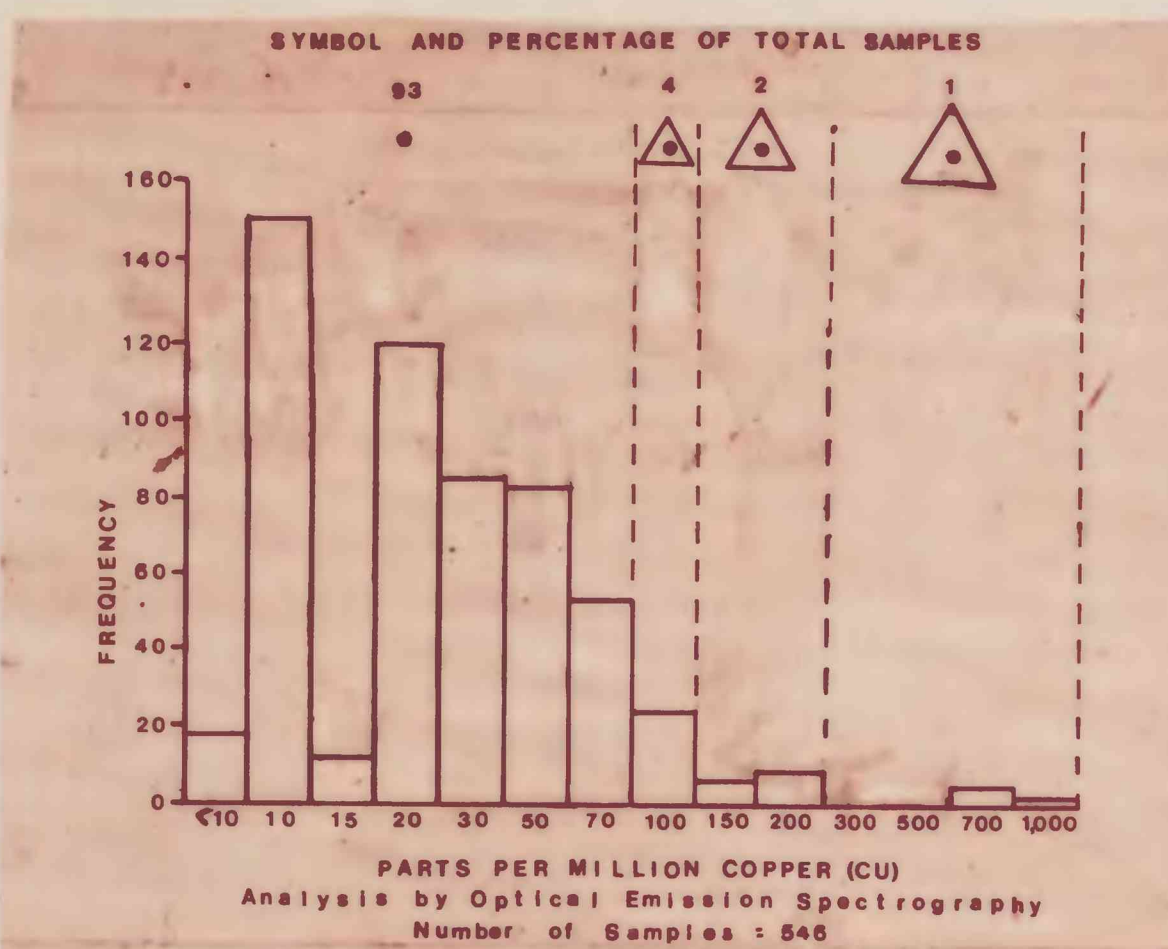
ANOMALOUS VALUES--Explained on histograms

COPPER

LEAD

ZINC

BACKGROUND INFORMATION RELATING TO THIS MAP IS PUBLISHED AS U.S. GEOLOGICAL SURVEY CIRCULAR 783 AVAILABLE FREE OF CHARGE FROM THE U.S. GEOLOGICAL SURVEY, RESTON, VA. 22092



#### DISCUSSION

This map shows the distribution and abundance of copper, lead, and zinc in 546 heavy-mineral concentrate samples collected in the Big Delta quadrangle in 1975 and 1977. This sampling was a part of geochemical studies made for the Alaska Mineral Resource Assessment Program. The heavy-mineral concentrates were separated from stream sediments collected in the active channels of streams draining areas ranging from approximately 10 to 25 km<sup>2</sup>. The areas within the quadrangle that show a low density of sample sites, particularly along the major northeast-trending fault and in the northwestern part of the quadrangle, were areas where dense brush and trees prevented helicopter landings. Areas in the southwestern and south-central parts of the quadrangle were not sampled because they are covered by thick unconsolidated deposits of Quaternary material, which limits effective geochemical sampling within the present program.

The heavy-mineral concentrates were panned in the field to remove most of the low-density minerals. The panned samples were sieved through a 20-mesh (0.8 mm) screen in the laboratory and the -20 mesh fraction was further separated with bromoform (specific gravity, 2.86) to remove the remaining low-density mineral grains. Magnetite and other strongly magnetic heavy minerals were removed from the heavy-mineral fraction by the use of a hand magnet. The remaining heavy minerals were passed through a Frantz Isodynamic Separator and a nonmagnetic fraction was obtained at a setting of 0.6 amperes. A split of this fraction was pulverized and analyzed by semiquantitative emission spectrography (Grimes and Marranzino, 1968). Map plots and histograms were produced from the analytical results. The range of anomalous values for each element was determined from the histograms and was subdivided into two or more plotting intervals represented by the symbols shown on the map and histograms.

Complete analytical data for all of the sample sites shown on this map are available in a U.S. Geological Survey Open-File Report by R. M. O'Leary and others (1978).

The use of trade names is for descriptive purposes only and does not constitute endorsement of these products by the U.S. Geological Survey.

#### REFERENCES CITED

- Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.
- O'Leary, R. M., Cooley, E. F., Day, G. W., Hessin, T. D., McDougal, C. M., and McDonal, Steven, 1978, Spectrographic and chemical analyses of geochemical samples from the Big Delta Quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-571, 127 p.
- Weber, F. R., Foster, H. D., Keith, T. E. C., and Dusel-Bacon, Cynthia, 1978, Preliminary geologic map of the Big Delta Quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-529A, scale 1:250,000.

GEOCHEMICAL MAP SHOWING THE DISTRIBUTION AND ABUNDANCE OF COPPER, LEAD, AND ZINC IN THE NONMAGNETIC HEAVY-MINERAL CONCENTRATE SAMPLES IN THE BIG DELTA QUADRANGLE, ALASKA

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1978