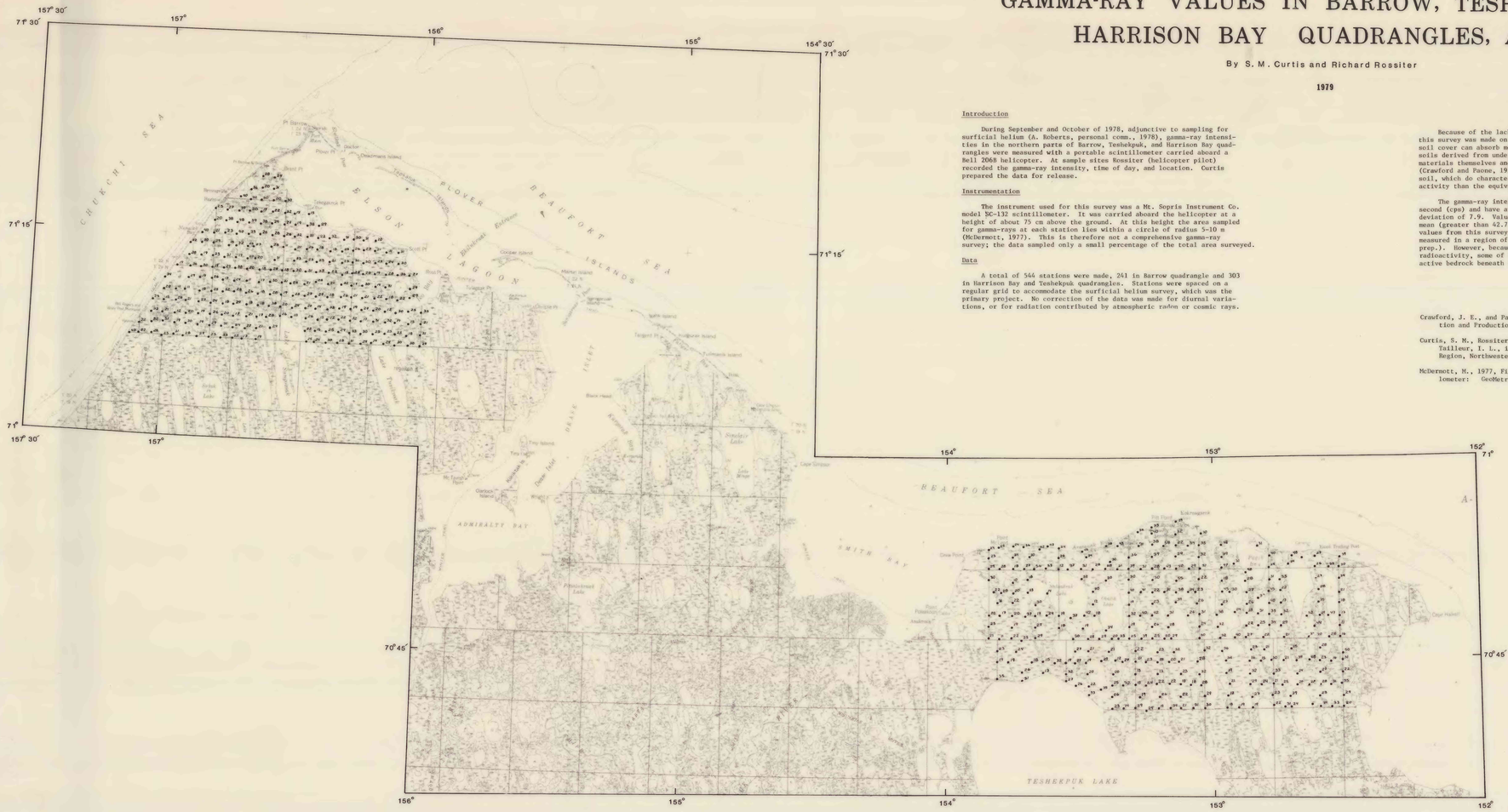
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

U.S. GEOLOGICAL SURVEY
OPEN FILE REPORT
79-1146
SHEET 1 OF 1

GAMMA-RAY VALUES IN BARROW, TESHEKPUK, AND HARRISON BAY QUADRANGLES, ALASKA

By S. M. Curtis and Richard Rossiter

1979



Introduction

During September and October of 1978, adjunctive to sampling for surficial helium (A. Roberts, personal comm., 1978), gamma-ray intensities in the northern parts of Barrow, Teshekpuk, and Harrison Bay quadrangles were measured with a portable scintillometer carried aboard a Bell 206B helicopter. At sample sites Rossiter (helicopter pilot) recorded the gamma-ray intensity, time of day, and location. Curtis prepared the data for release.

Instrumentation

The instrument used for this survey was a Mt. Sopris Instrument Co. model SC-132 scintillometer. It was carried aboard the helicopter at a height of about 75 cm above the ground. At this height the area sampled for gamma-rays at each station lies within a circle of radius 5-10 m (McDermott, 1977). This is therefore not a comprehensive gamma-ray survey; the data sampled only a small percentage of the total area surveyed.

Data

A total of 544 stations were made, 241 in Barrow quadrangle and 303 in Harrison Bay and Teshekpuk quadrangles. Stations were spaced on a regular grid to accommodate the surficial helium survey, which was the primary project. No correction of the data was made for diurnal variations, or for radiation contributed by atmospheric radon or cosmic rays.

Because of the lack of bedrock outcrop, essentially every station in this survey was made on a cover of soil and tundra. While even a thin soil cover can absorb most of the radiation from underlying bedrock, many soils derived from underlying radioactive rock contain radioactive materials themselves and may indicate the radioactivity of the bedrock (Crawford and Paone, 1956). On the other hand, water-saturated rock or soil, which do characterize much of the field area, may show lower radioactivity than the equivalent dry material (McDermott, 1977).

The gamma-ray intensity data all fall between 11 and 58 counts per second (cps) and have an arithmetic mean value of 26.8 cps with a standard deviation of 7.9. Values greater than two standard deviations above the mean (greater than 42.7 cps) may be treated as anomalous, although all values from this survey fall within the background range of intensities measured in a region of the northwestern Brooks Range (Curtis, et al., in prep.). However, because what was sampled was essentially soil-cover radioactivity, some of the higher values obtained may reflect more radioactive bedrock beneath those soils.

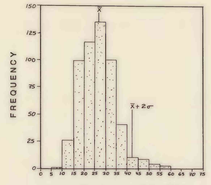
References

Crawford, J. E., and Paone, J., 1956, Facts Concerning Uranium Exploration and Production: U.S. Government Printing Office, 130 p.

Curtis, S. M., Rossiter, R., Ellersieck, E., Mayfield, C. F., and Tailleur, I. L., in prep., Gamma-Ray Values in the Misheguk Mountain Region, Northwestern Alaska: U.S. Geological Survey Open File.

McDermott, M., 1977, Field Surveys Using a Portable Gamma-Ray Scintillometer: GeoMetrics Inc., Technical Report No. 12, 11 p.

DISTRIBUTION OF GAMMA-RAY INTENSITIES



Histogram shows the number of samples within each intensity interval. Intensities are shown in counts per second(cps) as measured in this survey(see text), $\bar{X}$ is the arithmetic mean intensity, σ is the standard deviation.

Base from U.S.G.S. 1:250,000 TOPO SERIES Teshekpuk, 1955; Barrow, 1955; Harrison Bay, 1955, ALASKA Compiled by Base Maps Section, Menlo Park (12-78) (46-23) Tailleur

SCALE 1:250 000

5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

1955 Magnetic Declination at South edge of sheet varies from 25° to 30° East

MAP LOCATION

MAP SHOWING GAMMA-RAY INTENSITIES AT GROUND STATIONS

MAP SHOWS INTENSITIES IN COUNTS PER SECOND (SEE TEXT)