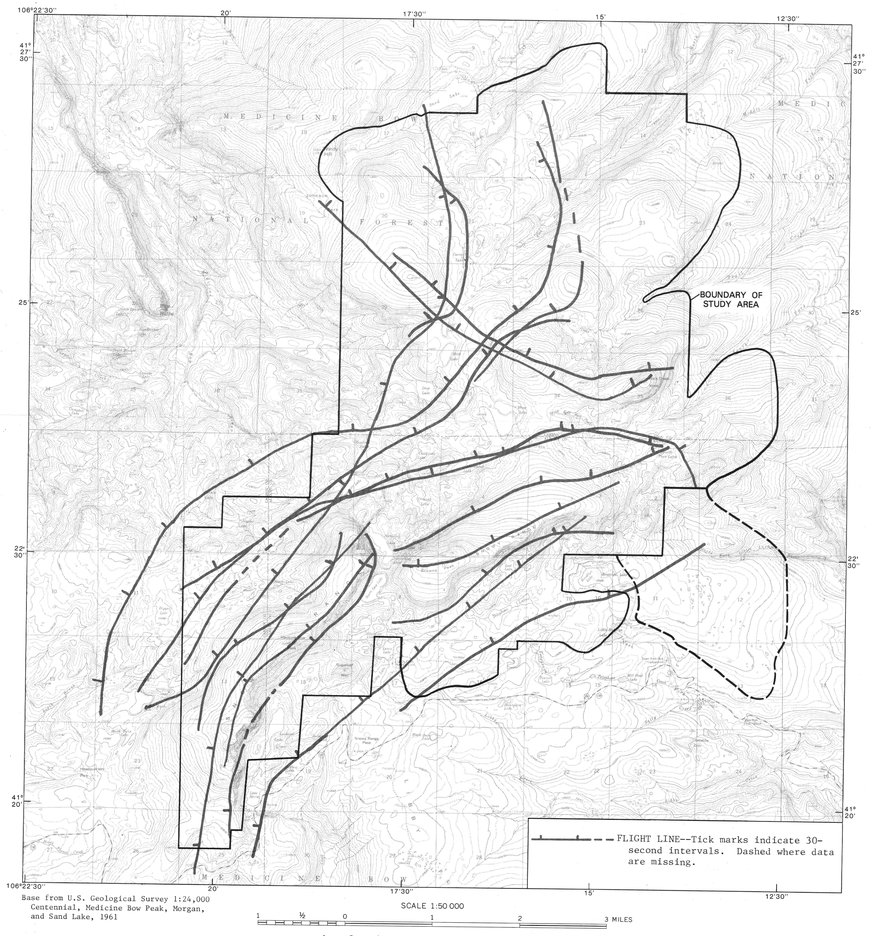
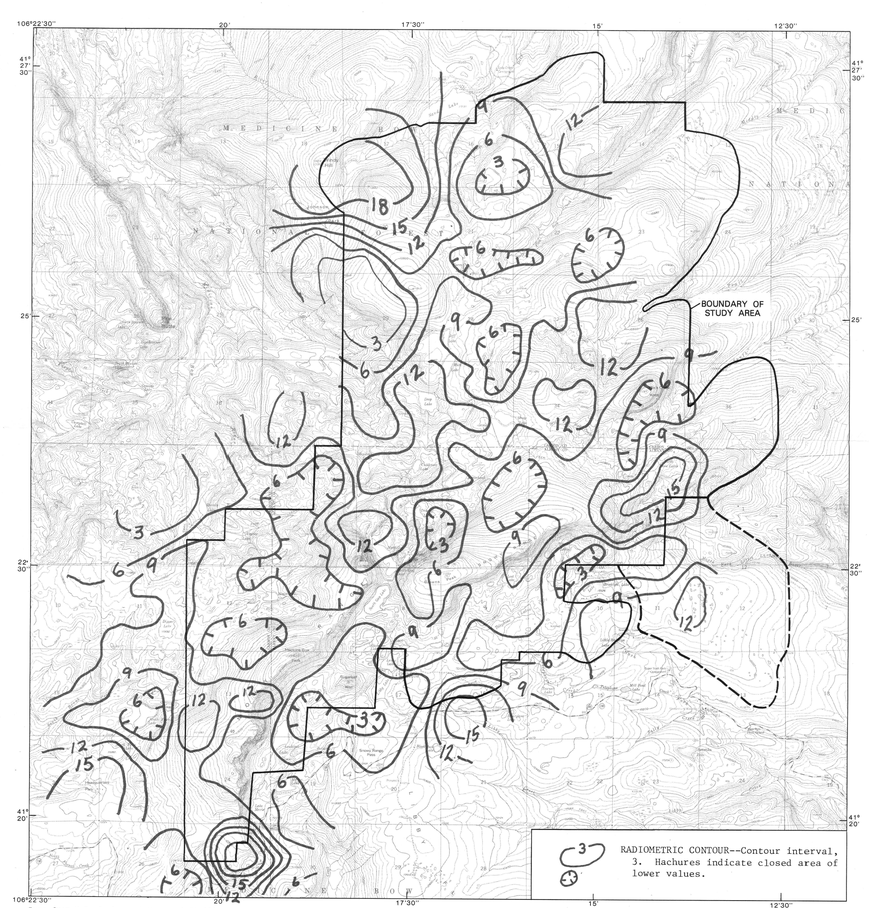
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

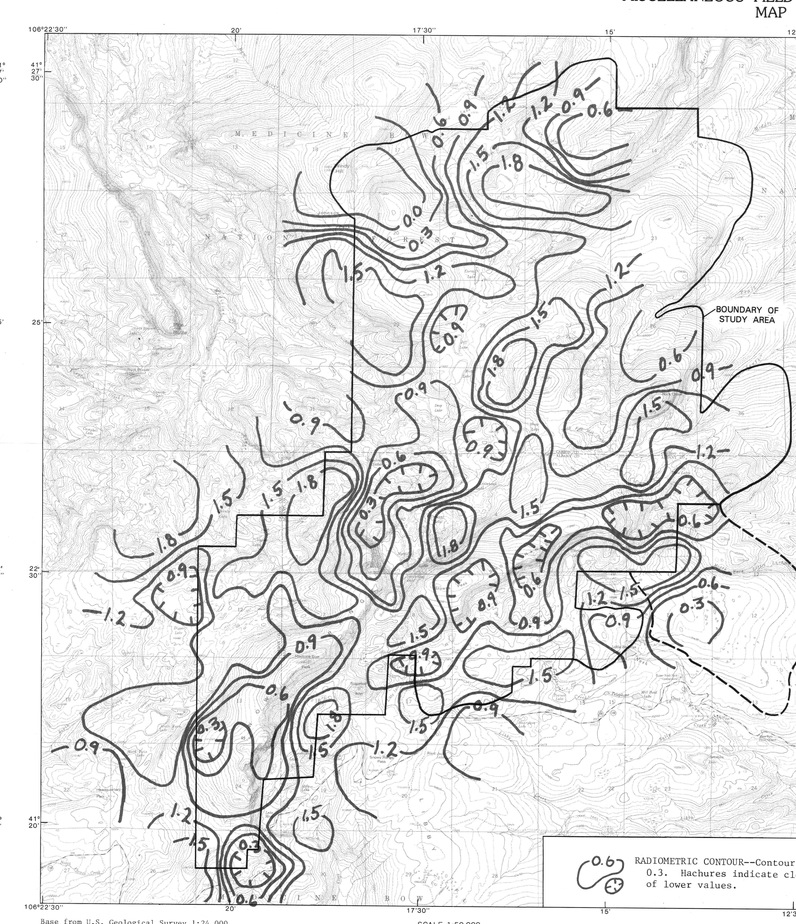
MISCELLANEOUS FIELD MAP



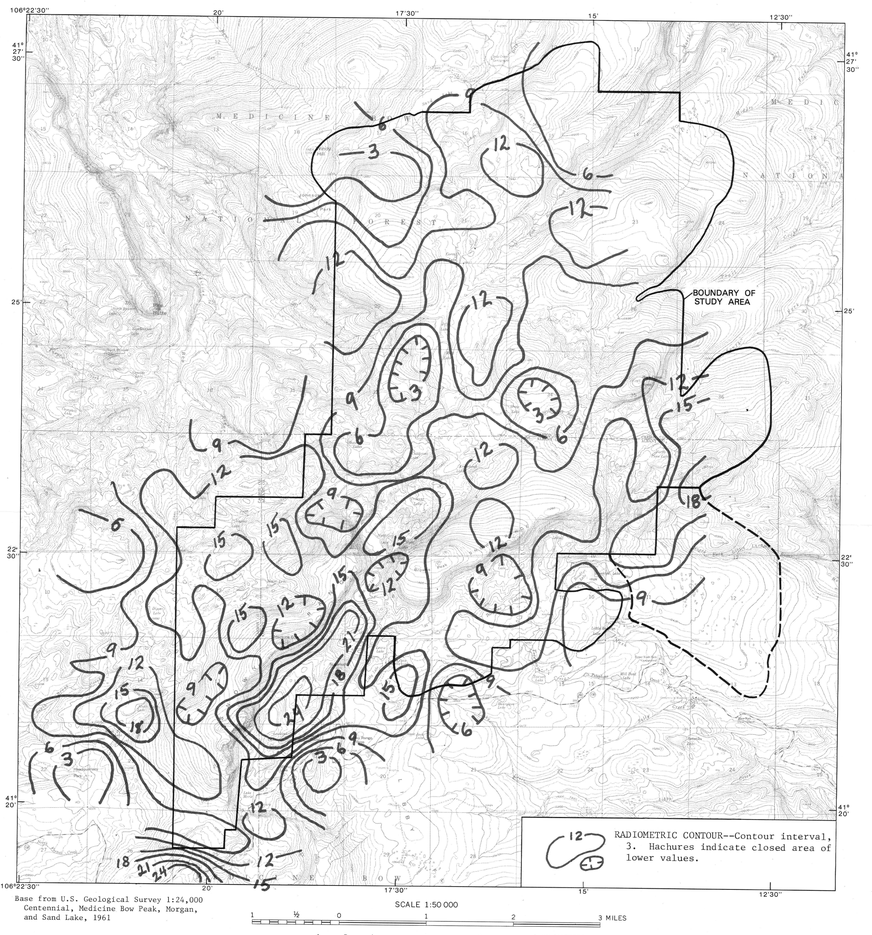
MAP A.-Map showing radiometric survey flight lines



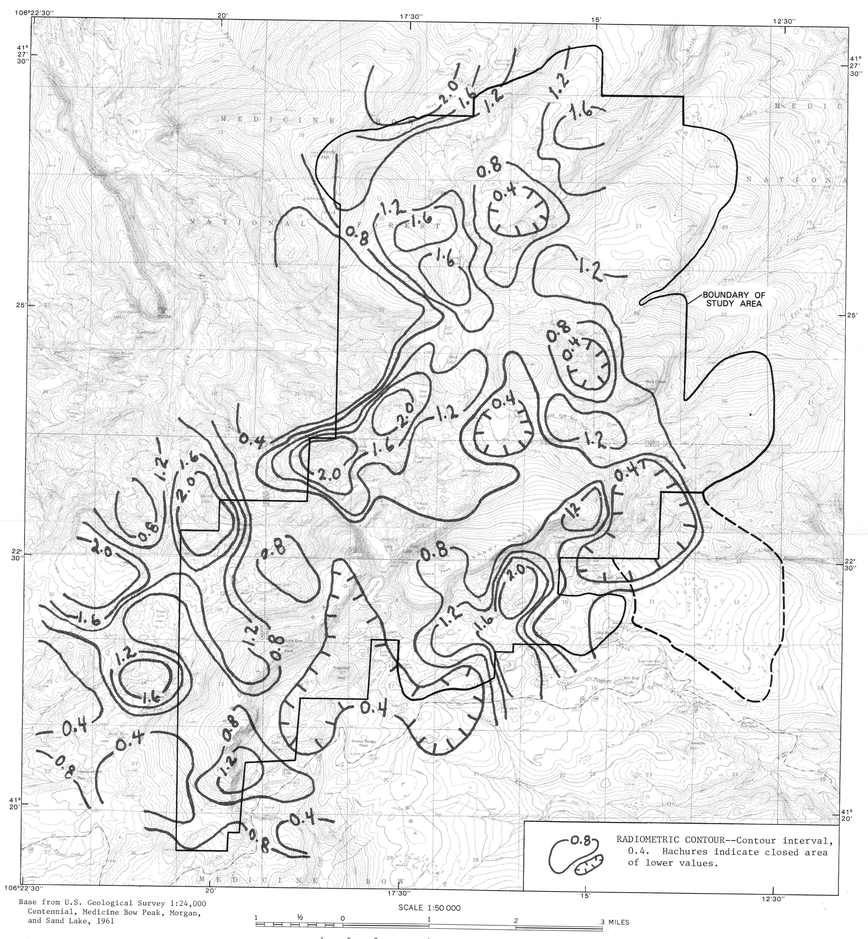
MAP B.-Radiometric map of apparent surface concentration of uranium (eU), expressed in parts per million



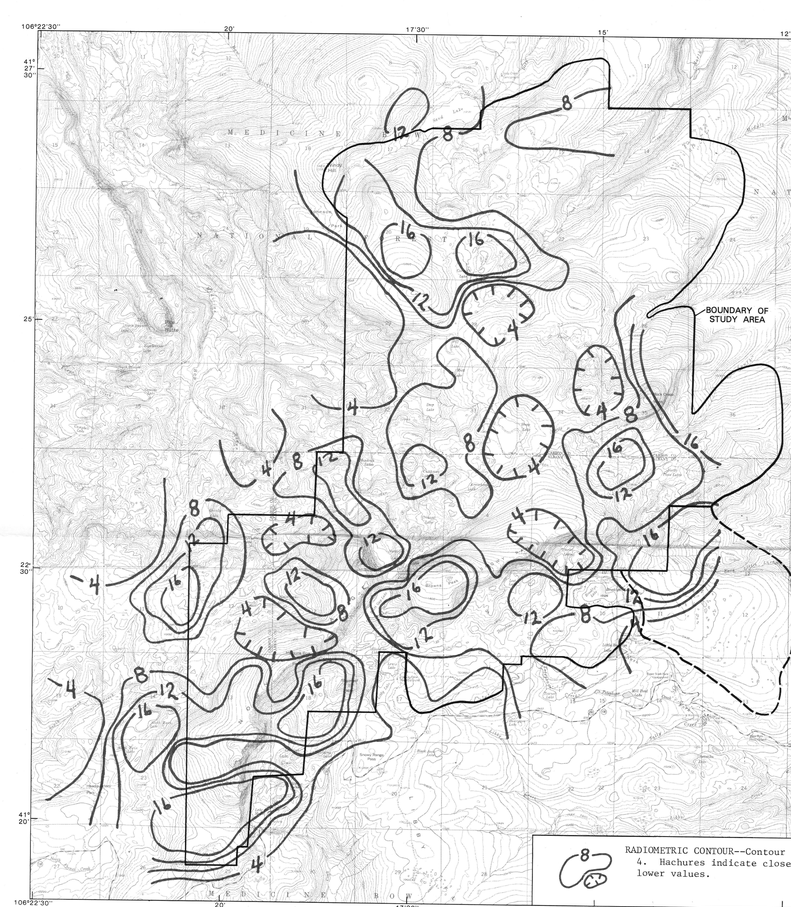
MAP C.-Radiometric map of apparent surface concentration of potassium (K), expressed in percent



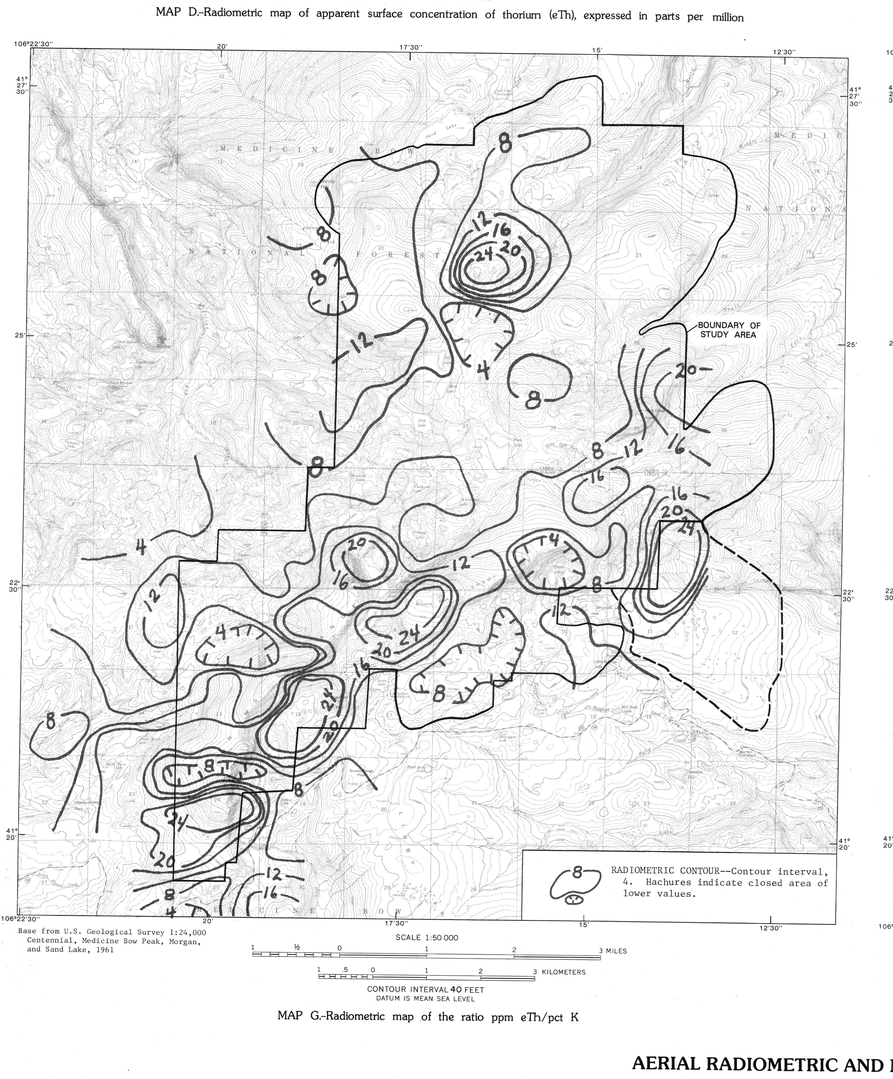
MAP D.-Radiometric map of apparent surface concentration of thorium (eTh), expressed in parts per million



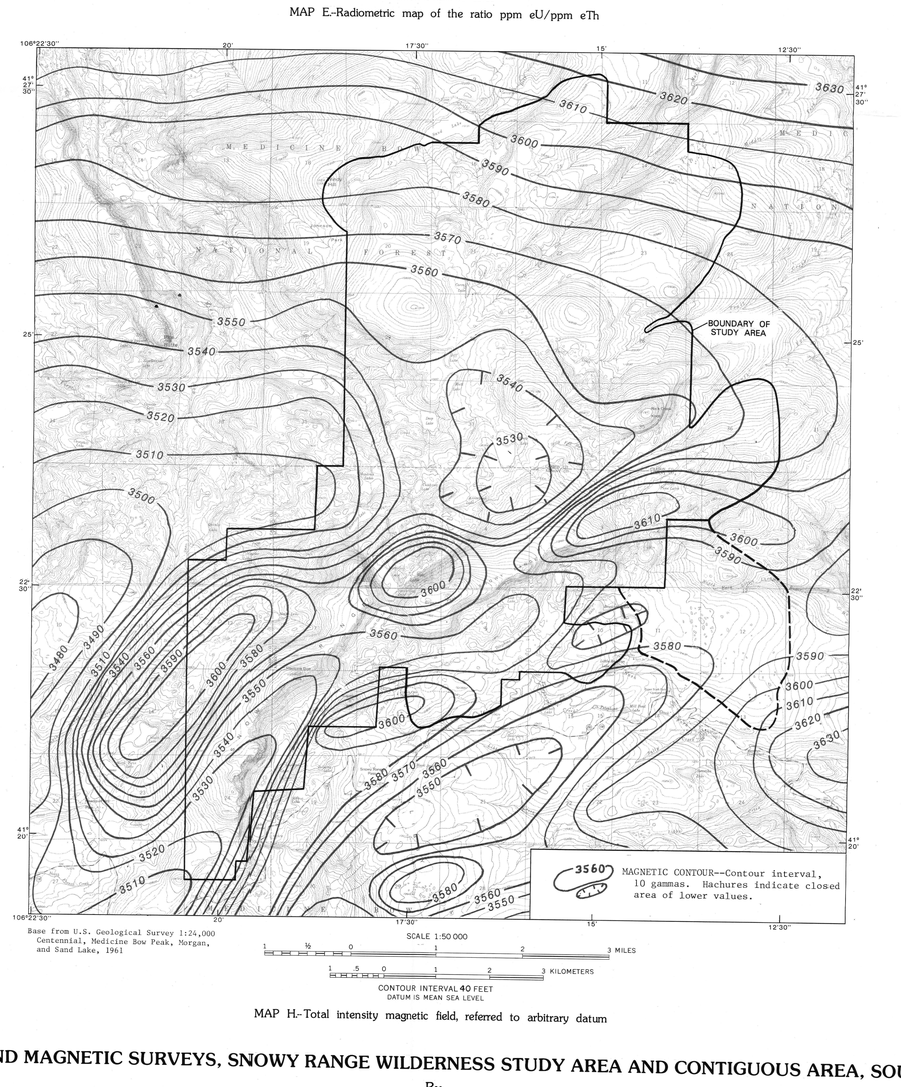
MAP E.-Radiometric map of the ratio ppm eU/ppm eTh



MAP F.-Radiometric map of the ratio ppm eU/pct K



MAP G.-Radiometric map of the ratio ppm eTh/pct K



MAP H.-Total intensity magnetic field, referred to arbitrary datum

Studies Related to Wilderness

The Wilderness Act (Public Law 88-577, Sept. 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the Administration and the Congress. This report presents the results of a geophysical survey of the Snowy Range Wilderness Study Area and Contiguous Area, Wyoming.

DISCUSSION

Aerial radiometric and magnetic surveys of the Snowy Range Wilderness Study Area (see index map) are presented in this report. The radiometric maps presented include the apparent surface concentrations of potassium (K), uranium (eU), and thorium (eTh), and the ratios eU/eTh, eU/K, and eTh/K. The aerial radiometric surveys of the study area were made during August, 1977 and October, 1978. Data from an aerial magnetic survey of the same area (U.S. Geological Survey, 1976) are presented in this report for the convenience of the reader. These geophysical data are intended to provide information to be used in the mineral assessment of the study area.

The equipment used for this survey consists of a four-channel gamma-ray spectrometer with its associated electronics, a large-volume (113.3 liter) plastic detector (Duval and Pitkin, 1978), a radar altimeter, a digital magnetic tape recorder, an analog strip-chart recorder, and a 35-mm track recovery camera. Data from the spectrometer, radar altimeter, and a digital clock were measured during one-second time intervals and recorded on magnetic tape. The 35-mm camera photographed the flight path of the aircraft at two-second intervals. All equipment was mounted in a single-engine Pilatus Porter[1] STOL aircraft.

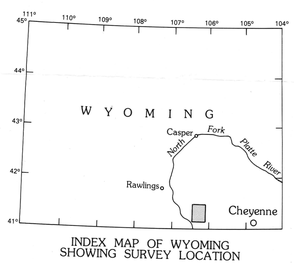
The aerial magnetic data (U.S. Geological Survey, 1976) were obtained using a proton precession magnetometer.

The radiometeric data were measured at a nominal ground clearance of 122 m and a speed of about 160 km/hr. The effective ground area measured at this height above the ground is a strip along flight line about 244-m wide. Eighteen flight lines, 5- to 16-km long, were flown in a generally northeast-southwest direction at irregular intervals on the order of 2 km. The flight direction approximately parallels the topographic grain in the area. Flying parallel to the topographic grain was necessary in order to do contour flying at 122 m above ground surface. The flight lines as flown are shown on Map A.

The data were processed to obtain contour maps of the apparent surface concentrations of potassium (K), uranium (eU), thorium (eTh), the ratios eU/eTh, eU/K, eTh/K. These maps are shown on Maps B-G. The e-prefix (equivalent) is used because of the potential for disequilibrium in the U- and Th-decay series.

Background corrections were applied to the radiometric data to remove counts due to cosmic rays and aircraft contamination. The data were also normalized to the nominal survey altitude (122 m) to remove variations caused by changes in the ground clearance. The corrected radiometric data were reduced to apparent surface concentrations of the radioelements using equations based upon calibration data obtained at the calibration pads established by the U.S. Department of Energy at Walker Field airport, Grand Junction, Colorado. For some areas of the contour maps, negative radioelement concentrations resulted from the calculations. The negative numbers are caused by a combination of actual low concentrations coupled with statistical fluctuations in the measured count rates and errors inherent in the calibration equations.

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



INDEX MAP OF WYOMING SHOWING SURVEY LOCATION

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AERIAL RADIOMETRIC AND MAGNETIC SURVEYS, SNOWY RANGE WILDERNESS STUDY AREA AND CONTIGUOUS AREA, SOUTHEASTERN WYOMING

By

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1981

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