U.S. Geological Survey Open File Report No. 75-91 1975

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Airborne radioactivity survey of parts of Carbon, Schuylkill, and Monroe counties, Pennsylvania

The data presented in this report were obtained in an airborne radioactivity survey of parts of Carbon, Schuylkill, and Monroe counties, Pa. that was conducted by Mr. W. J. Dempsey and other geophysicists of the U.S. Geological Survey in 1954. The study was made in conjunction with other reconnaissance investigations and detailed studies of uranium occurrences by the U.S. Geological Survey on behalf of the U.S. Atomic Energy Commission. The results of the airborne survey were not previously published because no large highly radioactive zones that were considered to be indicative of uranium deposits were recorded. Because of renewed interest in exploration for uranium in the eastern United States and because of the posssibility that this data may be of some use to modern investigators, maps have been prepared showing the relative levels of total gamma radioactivity detected along the flight lines in the following 7 1/2 minute quadrangles in Pennsylvania:

Blakeslee	Hickory Run	Pohopoco Mountain
Buck Hill Falls	Lehighton	Saylorsburg
Brodheadsville	Mount Pocono	Weatherly
Christmans	Nesquehoning	
Hazleton	Pocono Pines	

The flight lines as shown on these maps are only approximately located because for much of the area they have been plotted from locations shown on older 15 minute topographic maps. These lines, however, are probably located with sufficient control for reconnaissance purposes. Radioactivity measurements were made only along lines 47 through 80. Odd numbered lines were flown in a southwesterly direction and even numbered lines were flown heading northeasterly.

Total gamma radiation was measured using a scintillation counter coupled with a chart recorder to provide a continuous record during the traverses along the flight lines.

After observation of the records it was decided, arbitrarily, to identify six ranges of intensity of radioactivity on the maps. For the most part, these are interpreted to be related to the differences in amounts of uranium and thorium disseminated in the near-surface bedrock. Areas in which the radioactivity was found to be very low (less than about 150 counts per second) are believed to be underlain in the near surface by rocks almost barren of uranium. No pattern is shown for this range along the flight lines drawn on the maps. Three low to intermediate level ranges-150 to 200 c.p.s., 200 to 250 c.p.s., and 250 to 300 c.p.s. are believed to be related to uranium and thorium disseminated in rocks of moderately different bulk composition, but generally not to distinct uranium occurrences. Areas having a higher level of radioactivity - in the range of 300 to 400 c.p.s. - probably contain abundant shale or sandstones that have slightly higher amounts of disseminated potassium, thorium, and uranium. In a few places where the radioactivity was found to be greater than 300 counts per second there are known uranium occurrences in sandstone. In one small area near the center of the northern part of the Pohopoco Mountain 7 1/2 minute quadrangle along Flight line 56 the level of gamma radiation measured was between 400 and 500 c.p.s. and adjoining areas along the flight line gave readings in the range of 300 to 400 c.p.s.. The most strongly radioactive zone is indicated by the darkest pattern.

The cause of the higher background of radioactivity in this area was not determined. It may have been caused by disseminated uranium and thorium in shales, by distinct uranium occurrences in sandstone, or by "fallout" from atomic weapons tests.

There may be some areas along or near the flight lines where the background radioactivity measured was low, but where there are small or poorly exposed uranium occurrences in sandstone. The extreme differences in surface elevations made it impossible to maintain very uniform distances between the aircraft and the ground, so that a zone of strongly radioactive rock cropping out near the bottom of a steep-sided valley might be difficult to detect at flight level. Conversely, a layer of only weakly radioactive shale on a prominence on a plateau might appear as an anomaly in comparison to adjoining barren rock, as indicated in the levels of radioactivity recorded.

Note that on flight lines 55, 56, and 58 the zones of highest radioactivity are not centered over the river valley where uranium occurrences crop out near the level of the railroad. Apparently there was a slight lag in the system of recording and the highest intensities were recorded about 1/4 mile or more beyond the sites of outcropping uraniferous rock. Thus the source of the radioactivity in the anomalous zone along line 56 in the north central part of the Pohopoco Mountain quadrangle may be southwest of where the highest readings were obtained.

For information concerning the uranium occurrences in northeastern Pennsylvania and the general geology of the area, see the following publications:

Klemic, Harry, 1962, Uranium occurrences in sedimentary rocks of Pennsylvania, U.S. Geological Survey Bull. 1107-D, in Contributions to the geology of uranium, U.S.G.S. Bull. 1107, pp. 243-288.

McCauley, John F., 1961, Uranium in Pennsylvania, Commonwealth of Pennsylvania Dept. of Internal Affairs, Topographic and Geologic Survey, Bull. M43, 71 p., map, Harrisburg, Pa.

Commonwealth of Pennsylvania, 1960, Geologic map of Pennsylvania, edited by Carlisle Gray and others, Commonwealth of Pennsylvania, Dept. of Internal Affairs, Topographic and Geologic Survey.

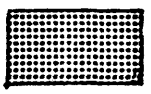
U. S. Geological Survey Open File Report No. February, 1975

Prepared by Harry Klemic and Margaret Cooper

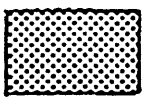
Airborne radioactivity survey of parts of Carbon, Schuylkill, and Monroe coutnies, Pennsylvania (measurements made in 1954)

Explanation

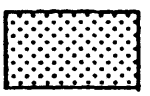
Approximate ranges of total gamma radioactivity recorded along flight lines (counts per second).



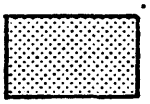
400 to 500



300 to 400

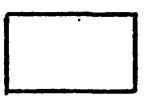


250 to 300



200 to 250

150 to 200



0 to 150