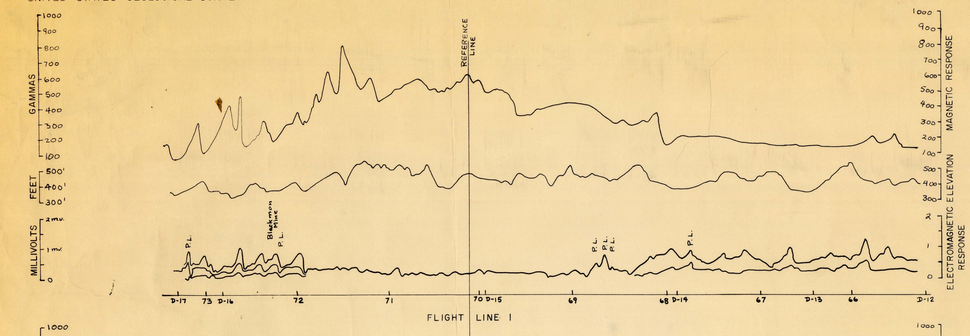
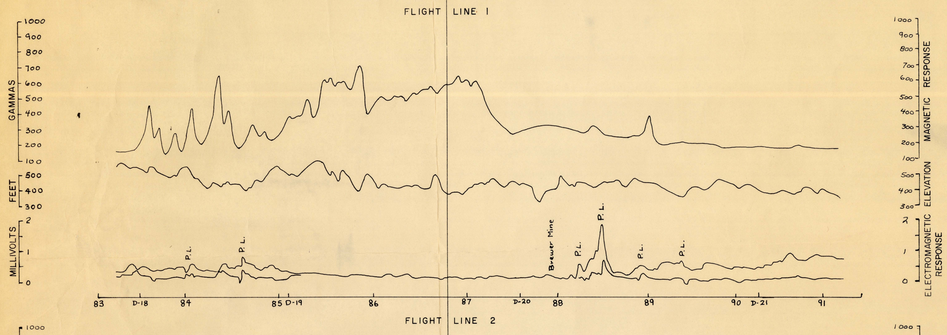
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

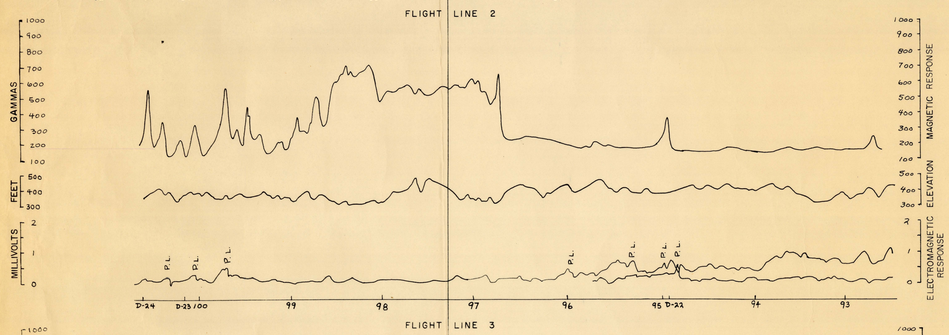
OPEN FILE—1968



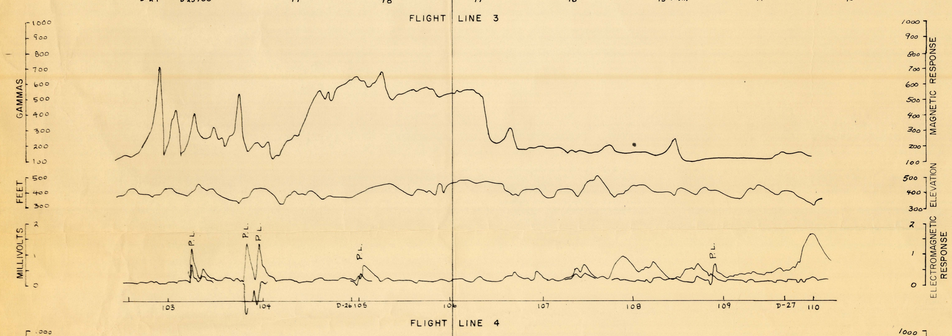
FLIGHT LINE 1



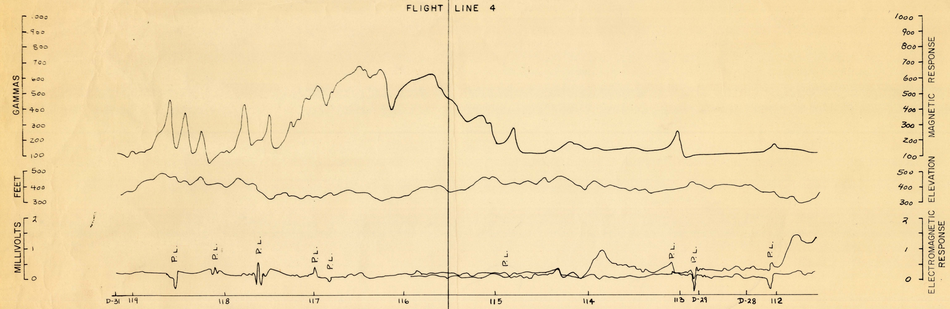
FLIGHT LINE 2



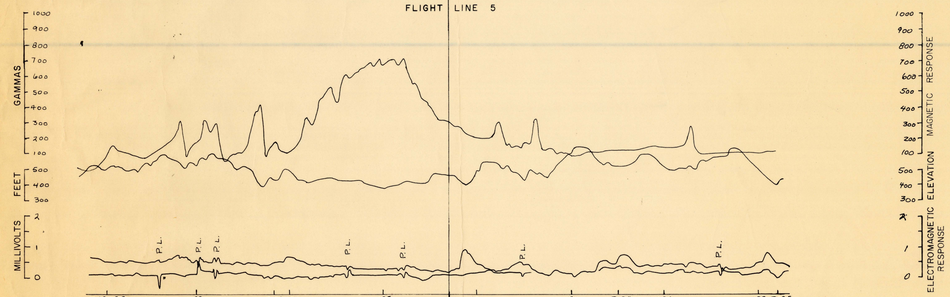
FLIGHT LINE 3



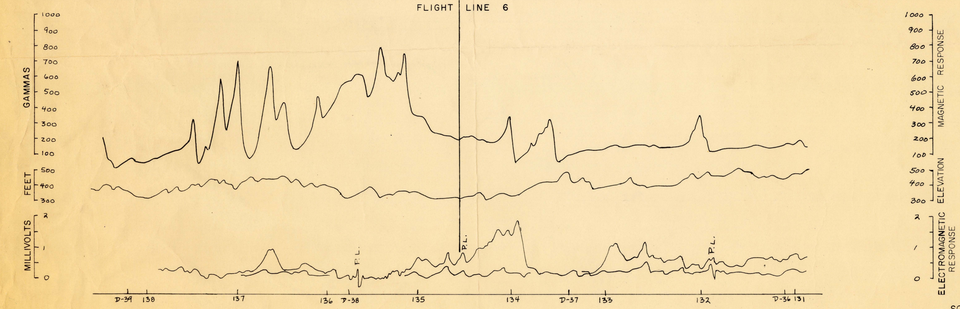
FLIGHT LINE 4



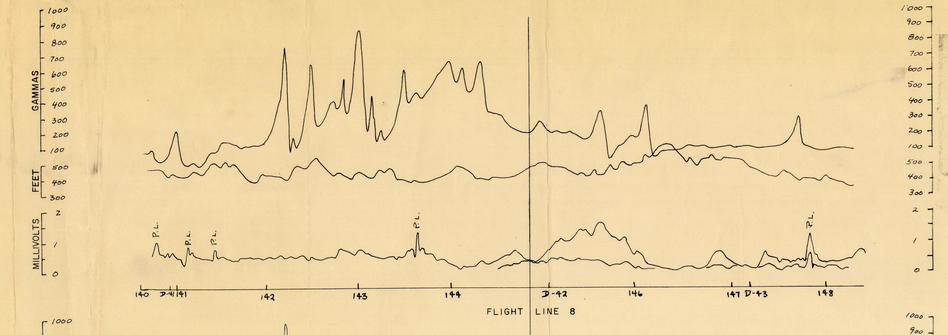
FLIGHT LINE 5



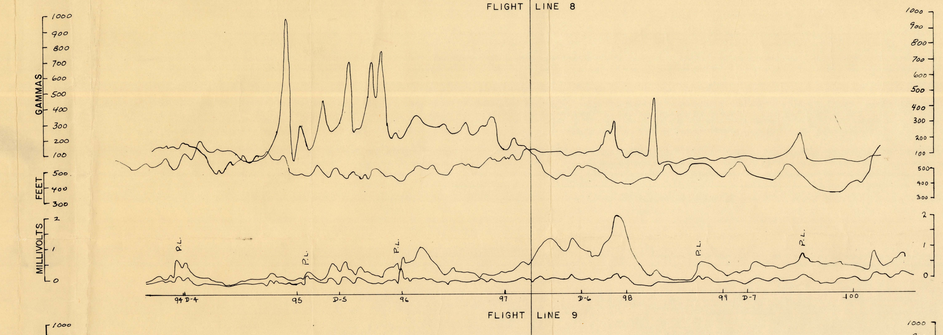
FLIGHT LINE 6



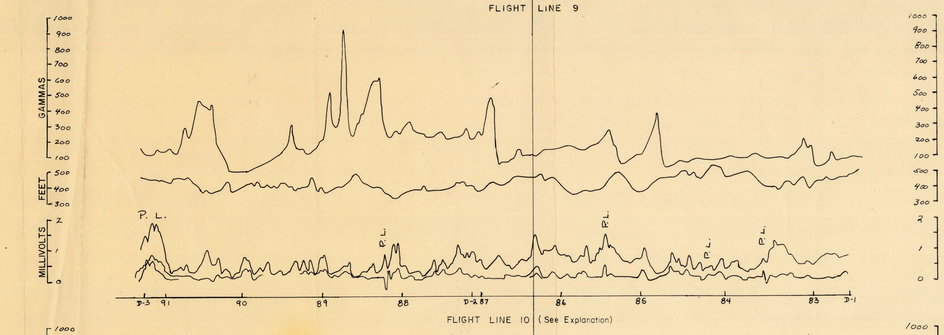
FLIGHT LINE 7



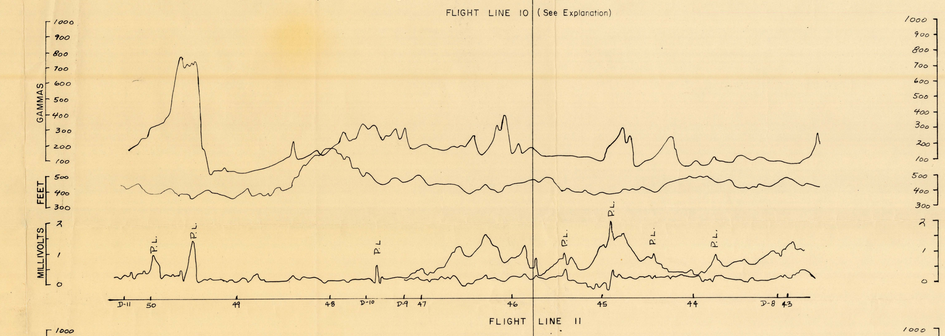
FLIGHT LINE 8



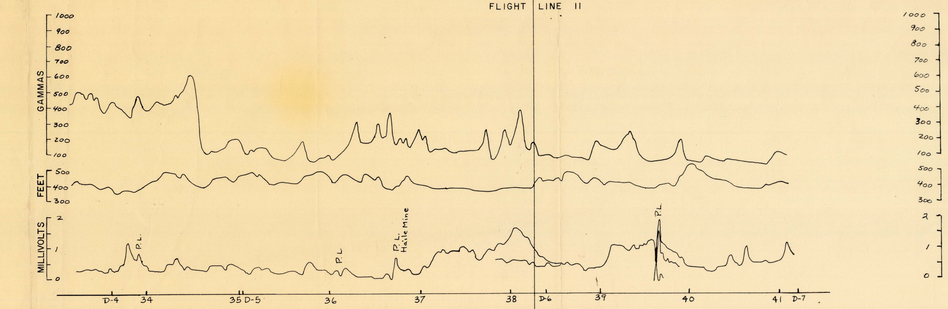
FLIGHT LINE 9



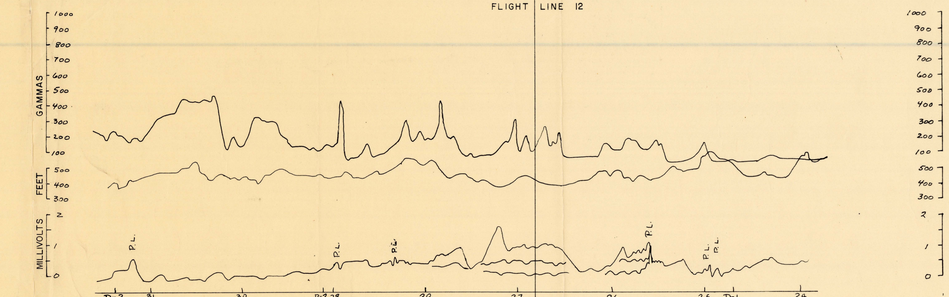
FLIGHT LINE 10 (See Explanation)



FLIGHT LINE 11



FLIGHT LINE 12



FLIGHT LINE 13

SCALE
1:125,000
0 1 2 3 4 5 6 MILES

EXPLANATION

Magnetic data: Total intensity magnetic profiles expressed in gammas, relative to arbitrary datum. Profiles are uncorrected for instrumental drift.

Elevation data: Elevation of aircraft as recorded by radar altimeter, expressed in feet above ground.

Electromagnetic data: Electromagnetic response expressed in millivolts. Barringer Input MkV system was employed in making measurements. Profiles are approximately corrected for instrument lag time.

The Barringer Input system measures induced eddy current decay in the time domain. Half sine wave pulses are transmitted from a large loop surrounding the aircraft followed by a 2 millisecond period during which transmission does not occur. Eddy currents induced in the ground during the pulse period decay exponentially in the period of no primary field transmission. The secondary magnetic field associated with the induced currents is measured at 6 time intervals during this period by a receiving coil towed behind the aircraft. The time constant of the eddy current decay is proportional to the conductivity of the anomalous body in which the eddy currents are induced. Thus, the first two or three channels sample the rapidly varying portion of the exponential decay and contain responses from bodies of relatively low conductivity. Responses on additional channels indicate increasing conductivity. Only channels demonstrating a response are shown on the accompanying profiles. The broad anomalies shown on the accompanying profiles which affect chiefly one channel are believed to be due to clay layers in the Coastal Plain sediments. Noise sources may be generated by airframe eddy currents induced in the aircraft as well as atmospheric discharge fields, man-made electromagnetic noises such as power lines, voltages arising from movement of the receiving coil in the earths magnetic field and geologic noise. On flight line 10 the instruments were poorly compensated for airframe noise which generated false anomalies. Power line noise is recognizable since the alternating current field causes the various channel traces to go in a positive and negative direction. These anomalies are marked P.L. on the accompanying profiles.

Details of the electromagnetic system are as follows:

Transmitter: input power 56 volts, 40 amps average current. [peak pulse current 75 amps at 24 volts input.]

Pulse repetition rate: 288 per second

Pulse width: appr. 1.2 milliseconds

Transmitter loop: 6 turns, area approximately 1,000 ft.

Receiving coil: standard Barringer coil with axis horizontal.

Gate delays: (from end of pulse to center of gates) 300, 500, 700, 900, 1150, 1550 μ sec.

Gate widths: 200, 200, 400, 400, 500, 600 μ sec.

Sensitivity: 1 mv/in on Visicorder

Cable amplifier gain: double

Time constant: Standard

Length of tow cable: appr. 350 ft.

Position of bird beneath aircraft: appr. 40 ft.

References

Barringer, A. R., 1962, New approach to exploration--the Input airborne electrical pulse prospecting system: Mining Cong. Jour., v. 48, no. 10, p. 49-52.

Evenden, G. I., Frischknecht, F. C., and Meuschke, J. L., 1967, Digital recording and processing of airborne geophysical data. U.S. Geol. Survey Prof. Paper 575-D, p. 79-84.

D-4

Documentation Location

Specific ground location documented in air, to which Doppler navigation system time and angles are tied.

4 3

Time Location

Computed location based on time and Doppler angle

P.L.

Power line interference on electromagnetic record.

Airborne survey flown in 1967 by R.A. Sneddon. Compilation supervised by Peter Popenoe

Sheet 1 of 2

AIRBORNE ELECTROMAGNETIC AND TOTAL INTENSITY MAGNETIC PROFILES IN VICINITY OF THE HAILE BREWER, AND BLACKMON MINES, LANCASTER, CHESTERFIELD AND KERSHAW COUNTIES, SOUTH CAROLINA

1968