

The dual tool generates in-situ, quantitative density logs commonly used in coal exploration and rock integrity work. Density logs, when combined with sonic velocity data are used to calculate engineering properties (Poisson's Ratio, Moduli information). Each of these is available with a photoelectric window and a Compton window so that Z/A ratios can be measured. The compensated density measurement is accomplished using a radioactive source and two radiation detectors. The detectors are designed for use with a  $^{137}\text{Cs}$  source (emits 662 KeV gamma particles). The detectors are shielded so that they only respond to gamma radiation from the same side of the tool that source energy radiates from. Radiation emanating from the source travels into the formation (into the side of the borehole opposite the bowspring), and is backscattered by Compton scattering. The detectors sense this backscattered radiation. Compton scattering results from gamma radiation interacting with the electrons in the formation, so electron density is measured rather than bulk density.