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# Total Gamma Ray Core Logger

## Introduction:

The natural gamma ray radiation emitted from rocks varies with the lithology. The radiation comes from the radioactive decay of Uranium, Thorium, and Potassium, which are present as trace elements. Shale typically contains more of these elements than clean sandstone or limestone. Generally, formations with higher shale content release more radiation.

A gamma ray well log is a recording of the natural gamma radiation of the formation around the well bore and is almost always run in conjunction with other well logs. Because the gamma ray log does not change with well treatment or production, it can be used to correlate the depths of the other well logs and the core gamma ray log from the same hole.



## Method of Operation:

The Model 510 Total Gamma Ray Logger measures and records the sum total of the natural radiation emitted from a core sample. The core gamma ray log is recorded on the same vertical (depth) scale as the well log so that the values of the two correlate. The quantity of gamma radiation from the core is proportional to that measured in the well, although not the same because of the difference in the masses of the core and that of the earth surrounding the well bore.

The Core Gamma Ray Logger is built around a 6" wide by 7.5' long (15 cm x 2.3 m) conveyor belt. The speed is variable from about .25 to 6 feet/minute (.08 to 2 meters/min). Slower speeds provide greater definition in the log of a small-diameter core. Belt speed and radiation data are collected by a PC. The belt is synchronized to the gamma ray readings with a shaft encoder interfaced to the PC. The gamma ray detector is a 3" x 3" NaI crystal mounted under the conveyor belt so that the distance between the core and detector will not vary with the core size. Approximately 450 lbs (204 kg) of low activity lead protect the detector from ambient radiation. The detection electronics include preamplifier, amplifier, discriminator, and high voltage bias supply.

During the test, the PC records the data from the core and displays it on-screen in real time. After the test, the data, including information about the core sample, is saved to disk for later recall. The log can then be printed on any continuous-feed printer.

Units with longer tables are also available.

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