

# RADON MEASUREMENTS AND ANALYSIS FOR CENTRAL PENNSYLVANIA COUNTIES HAVING ELEVATED RADON LEVELS

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## **ABSTRACT:**

The USEPA, identified South Central Pennsylvania as a region having elevated radon levels. The thrust of this paper is to examine in some detail the TCS Industries Inc., TCS, data base for eight Central Pennsylvania counties having a combined population of about 1.7 million people, which is 14% of the state population.

TCS has been making and analyzing radon measurements since 1986. During the period 1986 to 1999 more than 125 thousand measurements were recorded in the TCS data base. The data consisted of analyzed results from four subsets. Results were from mail order charcoal canisters, bulk orders from RMP certified companies for their placement, wholesales to retail vendors, and also direct home placement of canisters, track detectors, and continuous radon monitors. The data base for the eight South Central Pennsylvania counties for the thirteen year period consists of more than 23,000 screening measurements from non-duplicated addresses.

The results were assembled into three interesting studies. The locations of the measurements were converted into individual latitude and longitude values. The data were divided into four blocks of concentrations from 20 picocuries per liter, pCi/l, (.74 kBq/m<sup>3</sup>) to over 120 pCi/l (4.44 kBq/m<sub>3</sub>). The data were plotted on computer generated maps for South Central Pennsylvania. The plots indicated both hot spots and regions of relatively uniform chronic levels of 20 to 40 pCi/l (.74 to 1.48 kBq/m<sup>3</sup>).

An average value of the basement to first floor concentrations ratio was constructed from measurements made by TCS for real estate purposes. The ratio represents 1608 sets of simultaneous measurements of basements and first floor radon values above 1 pCi/l (37 Bq/m<sup>3</sup>). The measurements were made by trained personnel performed under the EPA protocol for closed house conditions. The ratio was 2.3 at one standard deviation of 0.05 of the mean.

A third study assembled all of the data into First floor radon concentrations, and separately for addresses with only basement values. The average concentration data within each of the eight counties, were converted into dosimetry values and compared with occupational values for nuclear power plant workers. This study illustrates the importance of a continuing strong measurement and remediation program in South Central Pennsylvania .