Counts Per Minute (CPM) Calculator

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CPM: http://epa-cpm.ornl.gov/index.html

What is CPM?

- CPM stands for Counts Per Minute.
- People can measure radioactive materials in the field in real time, using field meters (such as a Geiger Mueller Counter) that measure the amount of radioactivity in Counts Per Minute.
- Counts per Minute measurements have limited usefulness. These measurements cannot tell you if the radiation is harmful to human health. For that, you need to use the CPM Calculator.

What is the purpose of the CPM Calculator?

The CPM calculator translates Count Per Minute field-survey readings back to protective human health-based concentrations. This allows field technicians to gather real-time measurements of radioactivity in the field (in CPM), to determine if the amount of radioactivity will harm people.

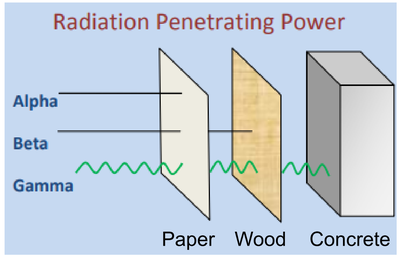
When do people use a CPM Calculator?

- The CPM Calculator allows a person to use a field instrument that will gather real-time CPM measurements to know if radioactive materials can harm people.
- Field technicians can screen materials such as soil, drywall, concrete, steel, wood and glass and determine if they are protective of residential, industrial and/or agricultural use. It does NOT replace sampling. Sampling of radiation-contaminated materials, with analysis using laboratory instruments, provides more accurate estimates of effects on people.

How does a CPM calculator work?

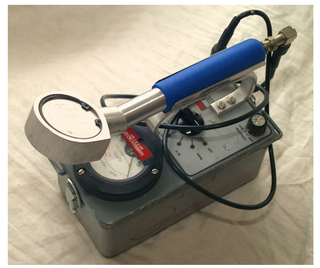
To understand how the CPM calculator works, you first need to understand radioactivity.

Radioactive materials can release radiation spontaneously. An unstable atomic nucleus that wants to give up some energy shifts to a more stable form. This released energy is radiation.



There are three major types of radiation: alpha and beta particles and gamma rays. Alpha particles are heavy, slow moving and can be blocked by a piece of paper or skin. Beta particles are lighter, faster moving and can be blocked by a thin piece of metal or wood. Alpha and beta particles can damage your health if they enter your body. Gamma rays are the lightest and are waves of energy that move fast, can be blocked by a thick wall of metal or concrete. All three types can damage internal organs

People cannot detect radiation through their five senses (see, hear, taste, touch or smell). Field or laboratory instruments have to detect it. People can detect these types of radiation in the field using field instruments that express the amount of radiation in CPM.



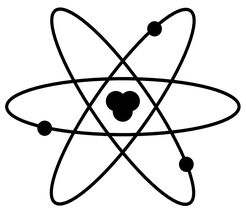
CPM-measuring field instruments have two parts: a probe that detects sources of radiation and a ratemeter, which connects to the probe. When the instrument detects a source of radiation, the ratemeter shows measurements of detected radiation in CPM.

The CPM Calculator calculates CPM measurements protective of human health. How does it do this?

The CPM Calculator calculates the appropriate CPM measurement based on:

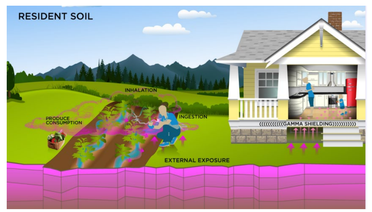
a) The type and amount of radioactive material.
b) The protective level for that radioactive material (for instance, to protect for residential, commercial or agricultural land use).
c) The type of CPM field instrument.

Radioactive Material Information



Radioactive material consists of radionuclides, which are elements such as uranium that are capable of releasing radiation. Each radionuclide has its own characteristics such as the type of radiation it can release (alpha, beta and/or gamma).

Protective Goal



EPA and others have developed protective goals for different types of radioactive materials.

CPM Field Meter Information

Several types of field meters use CPM. Each has unique capabilities that affect the CPM Calculator.

CPM Calculator

Requires the specific type of radiation and associated protective goal and the measured CPM information as inputs.

CPM Calculator Result

Protective level for a specific type of radiation in CPM.