WARNING! CESIUM-137 RELEASED INTO AIR

Three kilograms of Cesium-137 has been released into the air at the Fukushima Nuclear Power Plant.

About Cesium-137:

- Cesium-137 is the product of Uranium and Plutonium after they have undergone nuclear fission and taken in neutrons. Fission is the splitting of nuclei into two smaller nuclei.
- It was discovered my Margaret Melhase, an undergrad at Berkeley, and Glen Seaborg, a scientist.
- Cesium-137 is a silver-white, soft, malleable metal. It has 55 protons, 55 electrons, and 82 neutrons. It has a half-life of approximately 30.17 years. It is one of few metals that are liquid at room temperature, or 83 degrees.
- Cesium 137 is used in gauges of various types, such as, moisture density, leveling, and thickness gauges. It is also used to help treat cancer.
- When it gives of a beta and gamma particle, Cesium-137 decays to Barium-137, Barium-137 is the daughter element of Cesium-137. Barium can be very harmful, especially in large doses over a long period of time.
- Cesium-137 can cause an increased risk of cancer, especially from waste materials, contaminated sites, and nuclear accidents, like those from the Chernobyl accident. In rare cases, the mishandling of large amounts of Cesium-137 can cause severe burns and possibly death.

$$Exponential\ Decay\ Formula: N = N_o e^{-\lambda \frac{t}{t1/2}}$$

The above formula is used to find how long a radioactive material will stay. N = number of radioactive atoms, N_o = initial number of atoms, λ = decay constant, t = timespan of decay, $t_{1/2}$ = half-life of element.

$$N = 3000e^{-0.0231(\frac{10}{30.17})}$$

$$N = 3000e^{-0.008}$$

$$N = 3000(0.9924)$$

$$N = 2977g\ of\ Cesium\ left\ after\ 10\ years$$

$$5 = 3000e^{-0.0231(\frac{t}{30.17})}$$

$$\frac{5}{3000} = e^{-0.0231(\frac{t}{30.17})}$$

$$ln0.0016 = lne^{-0.0231(\frac{t}{30.17})}$$

$$ln0.0016 = -0.0231(\frac{t}{30.17})$$

$$\frac{-6.44}{-0.0231} = \frac{-0.0231\ (\frac{t}{30.17})}{-0.023}$$

$$278.78 = \frac{t}{30.17}$$

$$8411.03 = t$$

The equation above says that it will take 8411.03 years for the amount of Cesium to reach safe levels of 5 grams.