

Berkeley RadWatch

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Air Sampling Experimental Setup - System B

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UCB Air Sampling Experimental Setup - System B

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Radiation from Japan can be transported via air currents to other parts of the world. UCB has setup an air monitoring program that looks for such radioactivity to report to the public. On top of Etcheverry Hall is a commercial high-power vacuum pump running 24 hours a day. The intake of this vacuum is estimated to be a little over 3,500,000 liters of air in a 24 hour period. As radiation from the Fukushima site attaches to particulates in the air such as dust and other airborne debris, our vacuum filter, a 5-layer HEPA, captures approximately 99.97% of all such debris that is greater or equal in diameter to 0.3 microns. The vacuum system is mounted in a shelter on the roof of Etcheverry Hall, and the nozzle is approximately 4 feet above the surface of the roof to avoid taking in any particles deposited by rain on the ground.

After 12 to 24 hours of capture, the filter is removed from the vacuum system and taken to a 50% relative efficient germanium detector system in the basement of Etcheverry Hall. Here the filter fits around the detector ensuring a consistent geometric efficiency. The whole detection system is encased in a 2"-thick lead cave, shielding the detector from natural background radiation.

When any radioactive nuclei decay, gamma rays will be emitted from particles captured in the filter. These gammas will interact with the germanium, depositing their full energy. The electric current produced from liberated electrons in the germanium allows us to calculate the energy deposition and accumulate an energy spectrum over time. The measured spectrum will be compared with air samples from previous days and subsequent days to observe the presence of radioactive isotopes such as Cs-137.

*Images of WD1450 vacuum system courtesy of RIDGID®.

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