Goal: Solve Problems Related to the Uranium Facility Radon Decay Product 100-mrem Public Dose Limit.

This Dose is Quite Difficult to Measure;
Inaccuracy Can Lead to Reporting an Exceedance.

Radon dose is a function of two *key factors*:

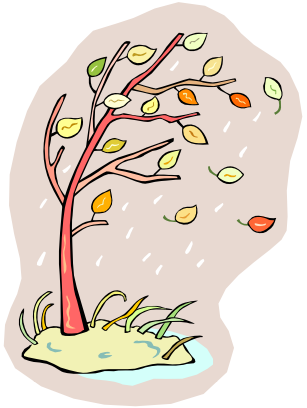
1) The measured *radon concentration* in air.

- To meet dose limits, we must measure radon accurately, long-term in the field at 0.1 pCi/l max.
- A lower Radtrak© MDC is preferable but difficult to achieve.
- *Also*, Colorado has recently determined that Radtrak detectors aren't sufficiently reliable for this measurement.
- Requires re-validation of Radtraks, by field-testing changes.

2) The *equilibrium fraction* (EF: Relative air concentration of short-lived radon decay products).

- To calculate dose, we must estimate the Efs. Field measurement of EF at low concentrations isn't feasible.

Complications in radon dose determination

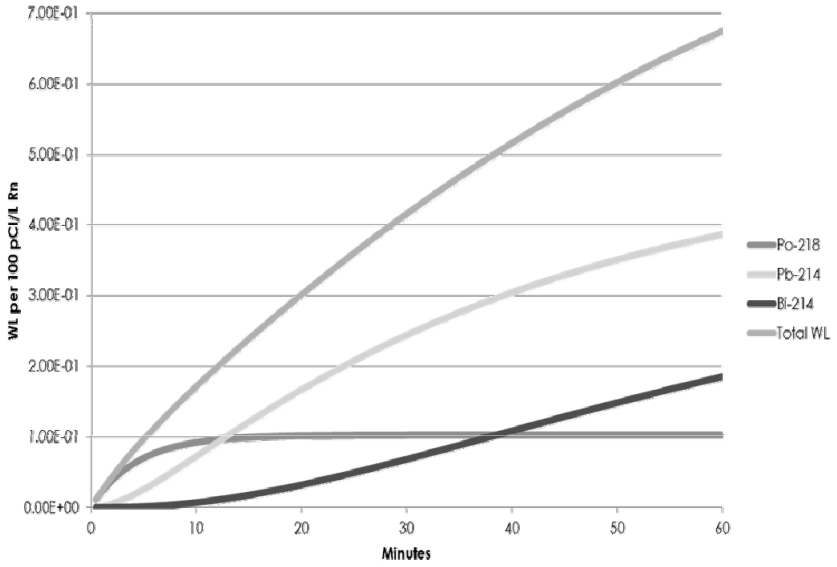


Rn-222 concentration in air

- Decreases (~by dispersion) with time as the gas moves away from its source
- Quickly becomes vanishingly small
- Required MDC can exceed Radtrak limits unless changes are implemented

Equilibrium fraction (EF)

- Increases with time, as radon decays to RDP
- Rate of increase is complex
- Field measurement is not feasible at low concentration



To better measure Rn-222 in air, we should perform a field study to re-validate Radtrak

NMA, NRC & Landauer should support a working group to study:

- Better measurements:
  - Reduce detector "physical background" variability
  - Increase the detector area scanned by lab
  - Improve bagging and inspection of Radtraks (per Landauer)
- More measurements:
  - Greater number at each location, to allow averaging
  - Greater number of measurement locations - develop data for onsite public receptors, low-lying areas
- Longer measurement periods
  - Increase effective detector sensitivity (AUC's Landauer data: 0.06 pCi/l MDC at 3 months, 0.04 pCi/l MDC at 4.5 months)
- Add pre-op years to establish long-term Rn variability and Bg

Improve the Equilibrium Fraction Estimate

- Background EF measurements before U ISR start-up merely reflect RDP concentrations from offsite sources.
  - The EF for distant sources can approach 1.
- The actual EF for ISR-released radon may be much less, since the source is close to the receptor and ingrowth time may be short.
  - Assuming EF=1 may greatly increase a facility's reported dose.
- **Recommendation**: Use site-specific meteorological data and MILDOS-AREA (or a new model) to calculate weighted EFs, all sources, at key locations on and near a site.

Summary: Goals for this Workshop

1. Agree to jointly design and perform a field study to improve, then re-validate Radtrak monitoring.

2. Agree on a method using MILDOS-AREA (or a newer model) to estimate weighted equilibrium fractions at key U facility locations.