

Maine Radon in Water 'Proficiency Check'

OR

'Are these labs even close?'

Background

- **Maine Radon Registration Act (1989)**
definition of 'radon': "...the radioactive gaseous element and its decay products produced by the disintegration of the element radium in air, water, soil, or other media."
- **Maine Air & Water Radon Service Provider Registration Rules (1993)**
scope: "...these regulations apply to all persons or companies...that intend to conduct air or water radon services...in the State of Maine."

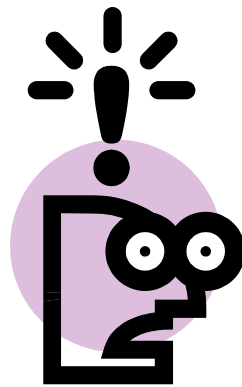
Background (cont'd)

- **Maine Air & Water Radon Service Provider Registration Rules (water lab requirements)**
“...participation in a certification program regarding gross alpha emitter measurement in water or measure radon in water according to the most recent method put forth by EPA, until EPA finalizes their radon in water measurement methods.”
- **SDWA Radon in Water rule (1991)**
if finalized, would force a certification program for radon in water labs.

Problems

- Gross alpha emitter measurement has nothing to do with radon in water measurement.
- No EPA radon in water rule after 13 years, so no certification program.
- No known lab intercomparisons in place for radon in water labs.
- Ten to 12 labs registered to analyze radon in water tests from Maine.

Maine has no way to ensure
that radon in water labs are
giving accurate results!



The Fix

- Step 1: Survey labs to see what they have been doing to ensure accuracy in radon water analysis.
- Result: two of 12 claimed to participate in some form of intercomparison. Several wanted to know how they could find an intercomparison. Two said “We stopped doing water. Didn’t we tell you?”

The Fix (cont'd)

- Step 2: Find a 'standard.'
- Result: two labs in Maine (UMaine Physics Dept. and State of Maine Health and Environmental Testing Lab-HETL) have radon in water standards obtained from US EPA Las Vegas lab from when that lab ran a national intercomparison for radon in water.

The Fix (cont'd)

- Step 3: Convince one of these two labs to act as the 'reference lab' in a proficiency check of all Maine registered radon water labs.
- Result: HETL refused (no federal certification program to fall back on); UMaine Physics Dept agreed to be the reference.

Proficiency check set up

- Radon staff reviewed UMaine QA, lab procedures, standards handling process, standards prep and dilution process, etc.
- A procedure was agreed upon for the proficiency check that included: number of labs to be checked at a time, the three concentrations to use in the check, and cost to participants.

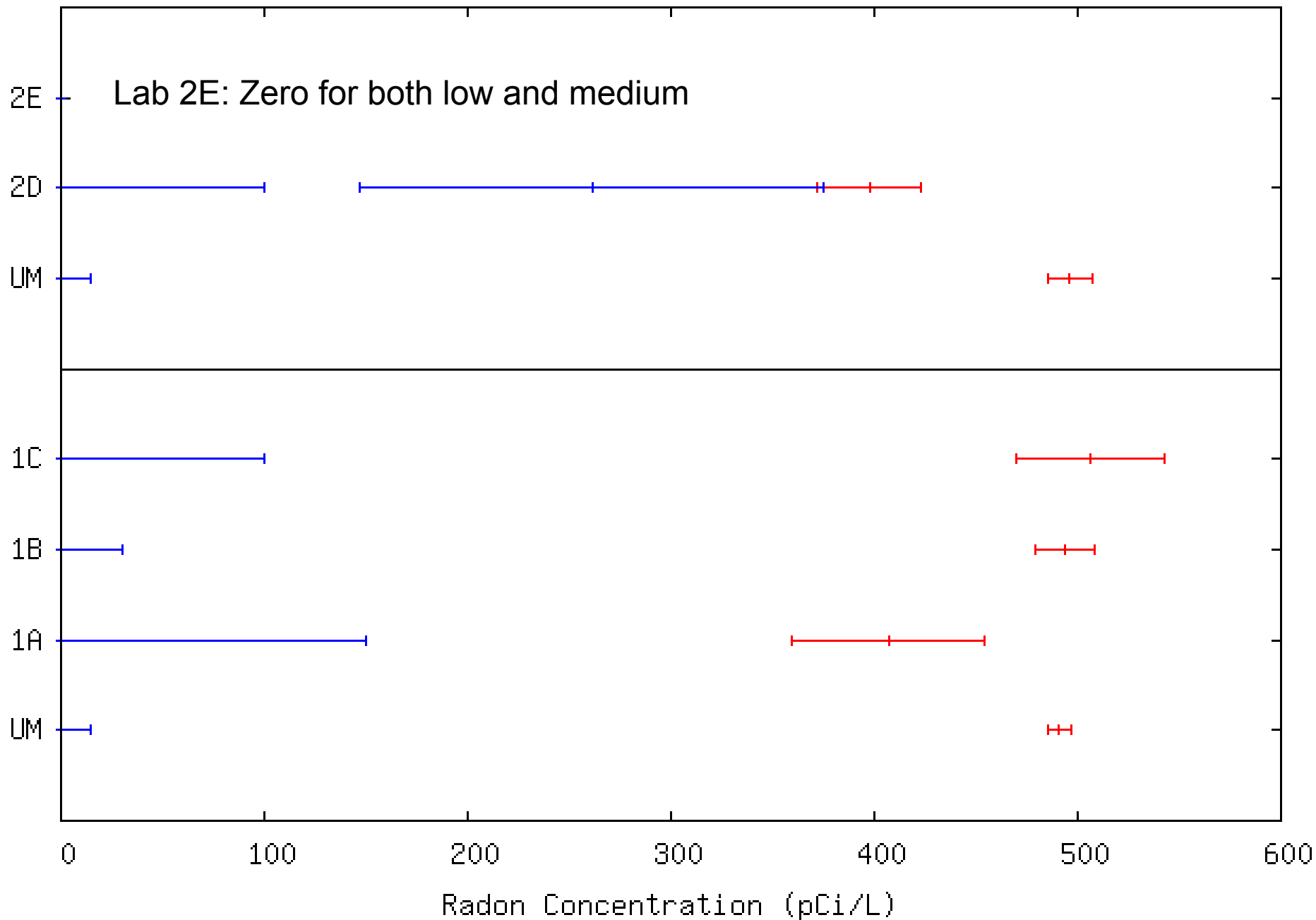
The Participating Labs

- Ten labs from ME, NH, MA, NY, NJ
- 9 use Liquid Scintillation, 1 uses E-Perm
- Count times range 10-55 min. among labs
- Shipping vials, 20-67 ml glass
 - 6 use rubber septum caps
 - 3 use aluminum or Teflon lined caps
- Standards
 - 7 use Ra-226 standards

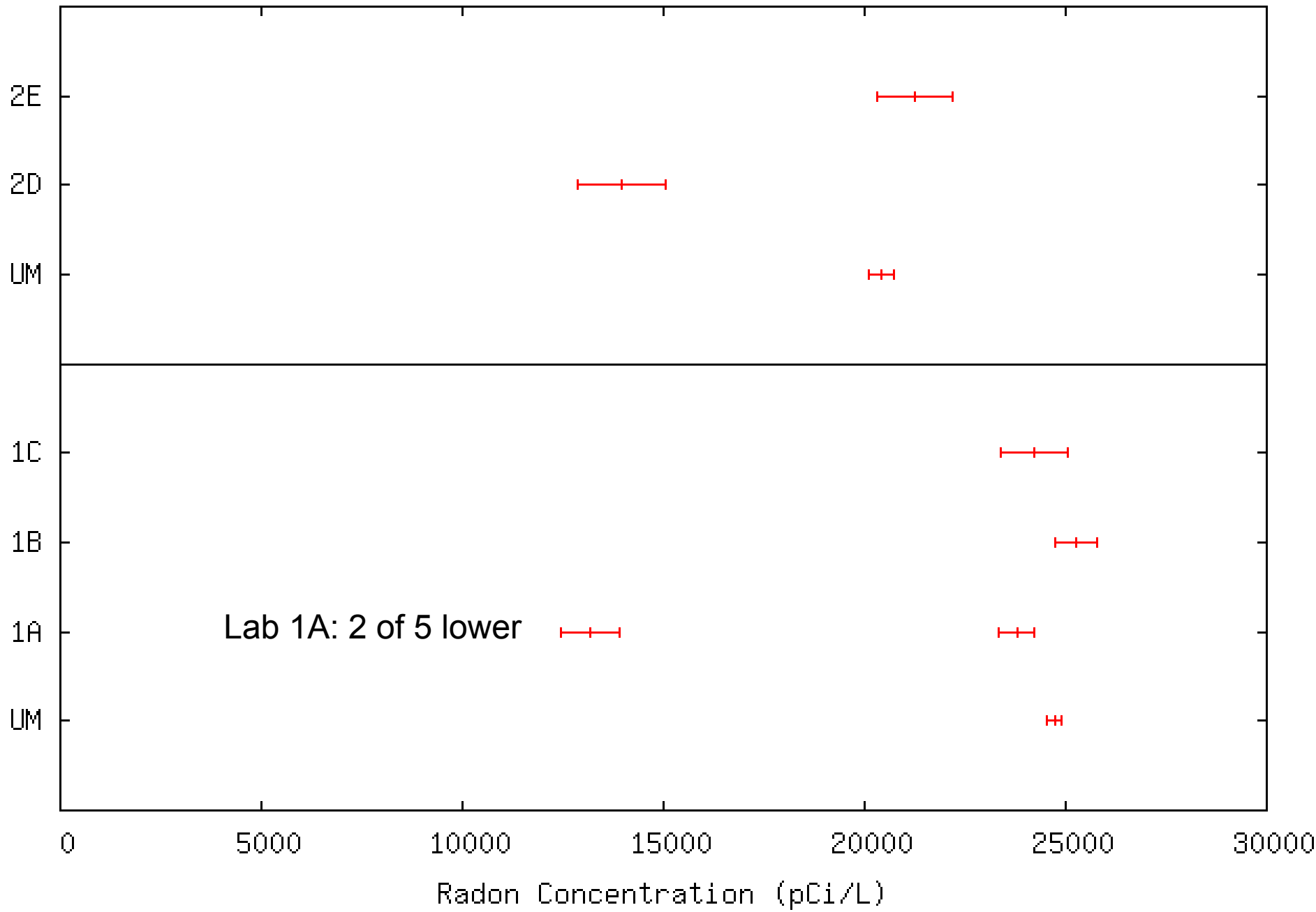
The Test

- The water sources:
 - Low radon: distilled water (check LLD)
 - Medium radon: Orono, ME town water
 - High radon: local well water
- Four rounds between Feb. – Aug. 2004
- For each round, 5 of each lab's shipping vials were simultaneously submerged in 3 liters of water and capped. Total of 15 samples per lab.

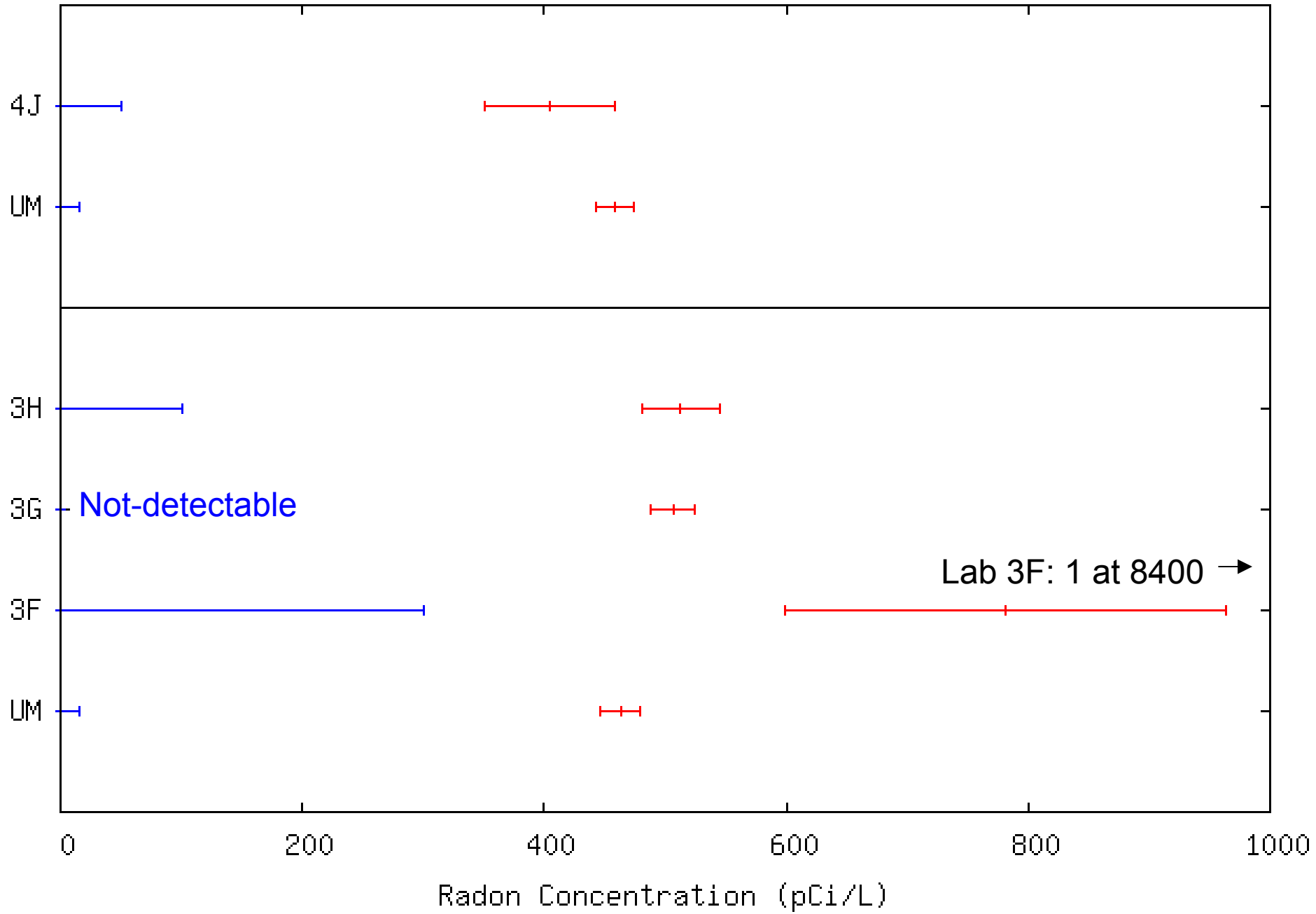
ME Radon Proficiency Check - Round 1 and 2: Low and Medium



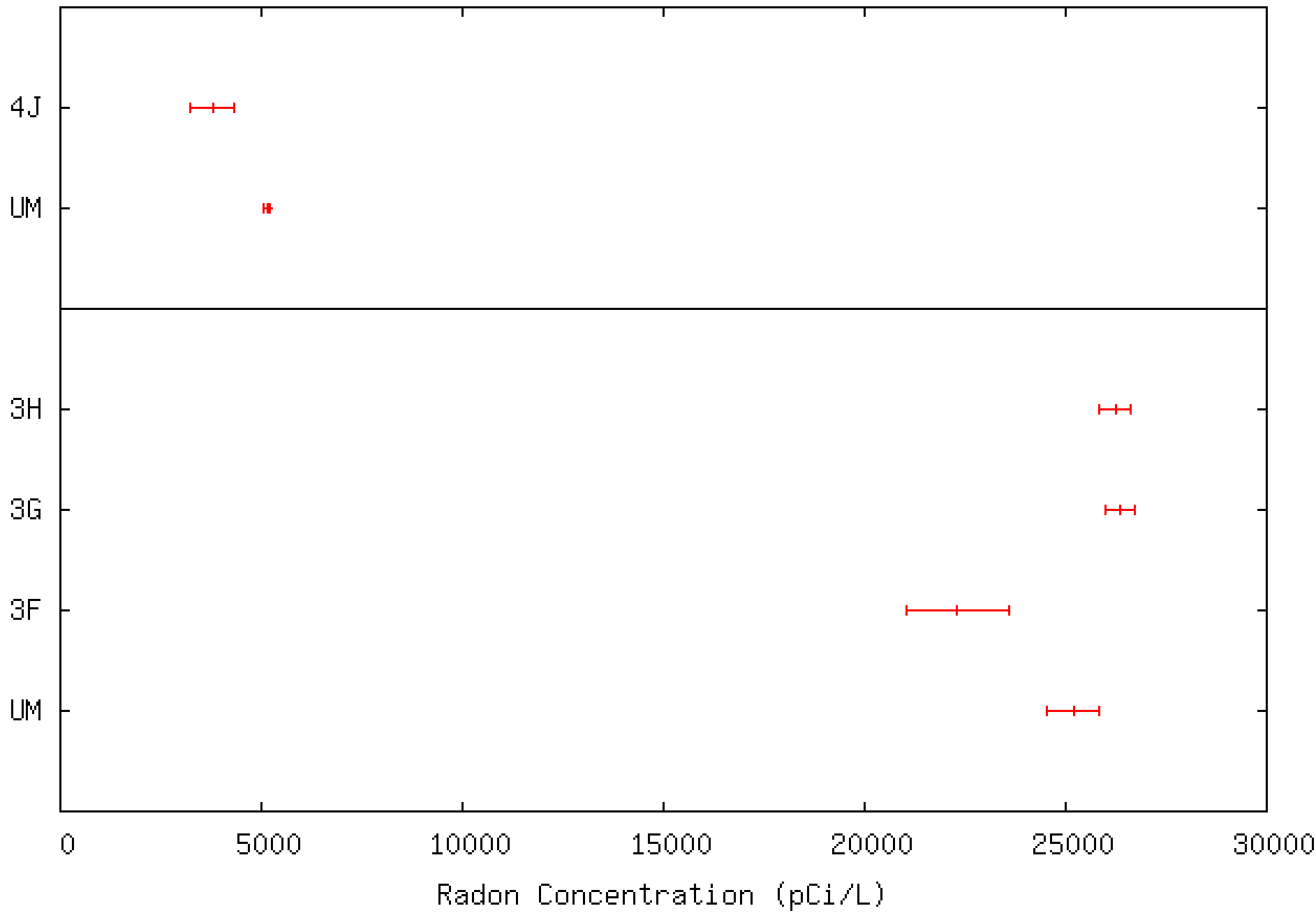
ME Radon Proficiency Check - Round 1 and 2: High



ME Radon Proficiency Check - Round 3 and 4: Low and Medium



ME Radon Proficiency Check - Round 3 and 4: High



Breakdown of Results

Lab	Strikes	% diff. (med, high)	Oddity among labs
1A	2	17%, 21%	Al-lined caps
1B	0	1%, 2%	
1C	0	3%, 2%	
2D	3	20%, 32%	No Ra-226 standard
2E	1	100%, 4%	
3F	2	69%*, 11%	E-Perm, Teflon lined caps
3G	0	9%, 5%	
3H	0	11%, 4%	
4J	1	12%, 26%	

Where are we now?

- Formal notification to labs has not taken place due to internal discussions on data analysis methods/interpretation. Informal notification to labs (by phone/email) of general results has taken place.
- Determining next steps.