Challenges of Radon Sampling in Large Multi -Family and Multi -Building Complexes

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LANDMARK
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Who am I?

- Work mostly in Minnesota, but with experience in most of Midwest
- Almost exclusively test multi-family properties
- Radon and Vapor Intrusion testing and mitigation
- Existing buildings and new-con
- Non-profit, senior living, shelters, market rate & low-income housing

Overview

1. Differences between single family and multi family
2. Case Study
3. Resident Considerations
4. Building Considerations
5. Future Mitigation Considerations

The Big Leap

Single family homes

- Usually placing one or two kits
- Direct interaction with homeowner
- Easy to coordinate
- More likely to follow closed building conditions
- In and out testing
- Can use any type of test

Multi -family homes

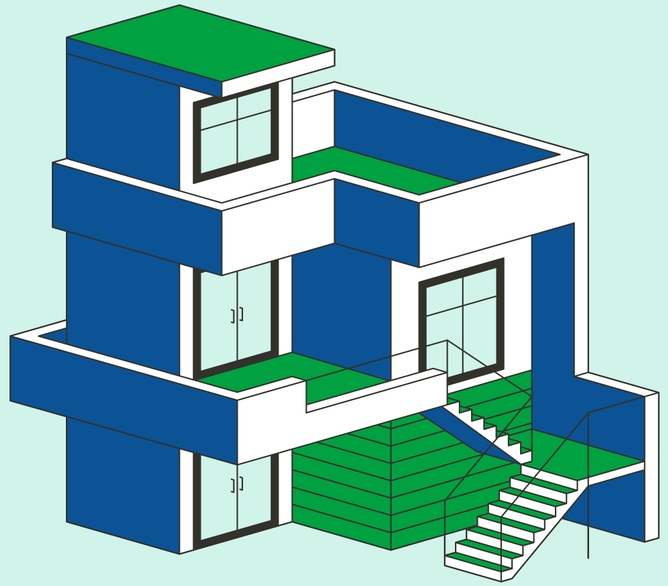
- Placing 10s - 100s of kits
- Mostly communicating through management company/client
- Time consuming (30 min to 8 hrs)
- Resident and building considerations
- Passive, one time use tests ideal

Multi -family Testing

MA MFLB 2023

Indoor Environments Association & Minnesota Department of Health (MDH)

- MDH: regulatory body for radon measurement and mitigation in Minnesota
- The Minnesota Radon Licensing Act (Minnesota Statutes 144.4961)
- Rules and laws built around ANSI/AARST Standards
- test all first -floor units (in contact with ground)
- test 10% of each upper floor



Case Study: North Metro Complex



Crunching the Numbers

- 23 buildings with tenants
- 3 floors in each building
- 4 units on each floor
- 6 units to test per building
  - Four on main floor
  - One on second floor
  - One on third floor
- 6 rooms in leasing/community building to be tested
  - Testing offices, community rooms, etc.

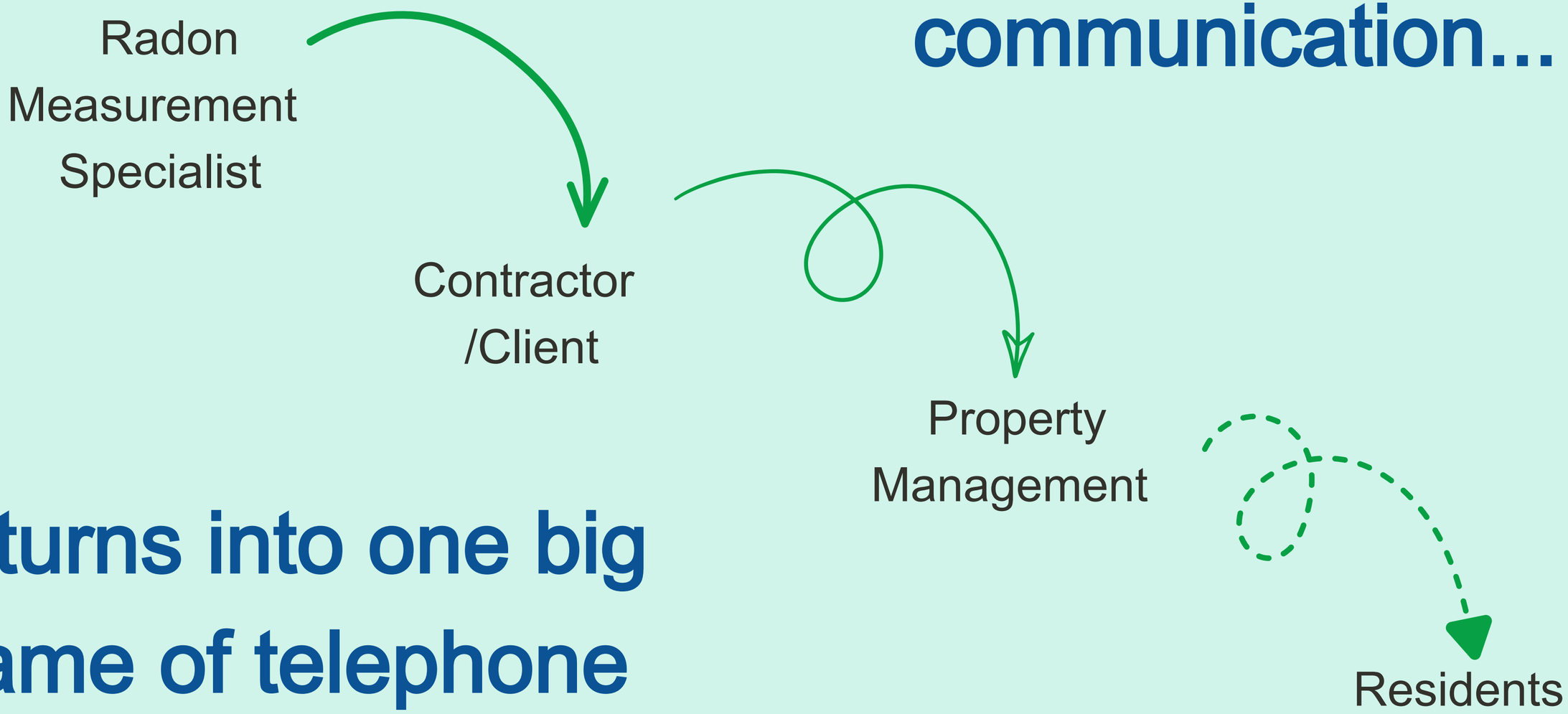
- 144*0.05 = 7.2 -> 8 blanks
- 144*0.10 = 14.4 -> 15 dupes

(assumes spikes have been completed)

167 total kits needed

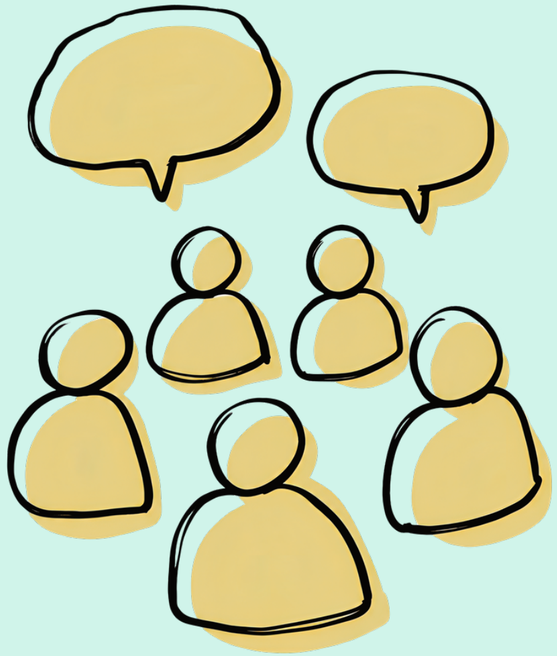
at a minimum

when measurement communication...



...turns into one big game of telephone

poor communication = poor sampling experience



- only able to sample
  - 100% of ground floor units
  - third floor units
- required a second mobilization to the property

how do you improve? holistic approach

- communicate with both client/contractor and property management
- use layman's terms - not everyone knows radon like you!
- request building plans to ensure accuracy - look for fire maps onsite

But Did Anything go Right?

in multi -family, efficiency is everything

- key turners knew tenants
- two groups of staff for large # of buildings
  - each radon group was a measurement specialist, transcriber, and key turners
- utilized foldable carts for moving several boxes of radon kits throughout property
- staff and key turners were ready for radon related questions
- kept placement locations relatively uniform



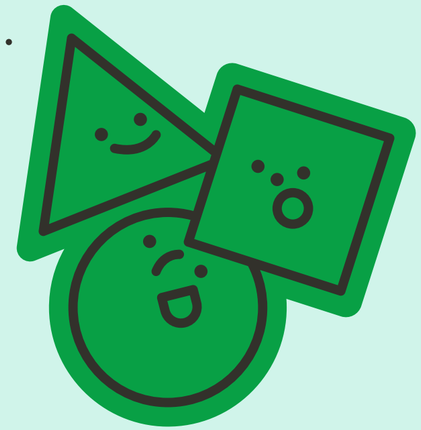
So, how do you set yourself up for success?

Expect the Unexpected!

easier said than done…

Resident Considerations

- Expect people to have not read the sampling notice
  - Be ready to give info on radon and the test itself
  - Not everyone will speak English, helpful to have small info sheet in local prominent languages
- Kids might answer door; do not enter unit until adult is present.
- Remind residents of when you will return to pick up test
- Beware of pets and kids who can tamper
- Pick up will go much faster than deployment - **start later**



Building Considerations



- Units may be converted for other uses
- Unit numbers on plans may not match, bring printed plans to annotate, or sketch it out
- Not always one large building, plan accordingly for walking between buildings
- Set up your transportation system between units to be adaptable for buildings without elevators
- Buildings may not have air conditioning; failure with closed door conditions more common
  - know tampering thresholds

Building Considerations
new construction





- Testing prior to move -in is far easier than after
- Schedule testing to be close to finish of project as possible
  - need HVAC to be operational
  - need doors on units
- Discuss with GC what work is planned during scheduled sampling time
- Bring supplies to ensure testing in breathing zone
- Workers/cleaners likely won't get notices
  - bring door signs and test signs

Managing Tampering

a) Where all valid measurement results at the property are less than 4.0 pCi/L (150 Bq/m³) and all valid measurement results in the building are less than 2.7 pCi/L (100 Bq/m³), the number of missing valid tests shall not exceed the allowance in Table 6.2.1.[6]

Table 6.2.1

Test Locations:	3-5	6-10	9-11	12-16	15-20	18 or more
Allowance:	1	2	3	4	5	≤ 33%

b) Where any valid measurement at the property is 4.0 pCi/L (150 Bq/m³) or more, or where any valid measurement result in a building is 2.7 pCi/L (100 Bq/m³) or more, the number of missing valid tests for the property or for the building, respectively, shall not exceed the allowance in Table 6.2.2.[7]

Table 6.2.2

Test Locations:	< 4	4-7	8-11	12-15	16-19	20 or more
Allowance:	0	1	2	3	4	≤ 25%

Note—This allowance observes that the parcel of land where buildings reside has been shown to produce radon in soil sufficient to lead to elevated indoor radon concentrations.

ANSI/AARST MA -MFLB 2023 6.2

Thinking Ahead to Mitigation

- Utility access stored differently than single family homes
  - Even though not testing, take note of locations of utility rooms, first place to look for pathways!
- Buildings may have in-place systems that may unintentionally act akin to radon mitigation system







Large Utility Openings



Discreet Pipe Runs

Planning Large Scale Sampling

1. Communicate directly with building management
2. Accurately determine necessary amount of kits
3. Coordinate with staff to ensure smooth and efficient sampling
4. Deploy test kits: expect surprise!
5. Pick up test kits: evaluate effectiveness of tactics
6. Send off kits for testing
7. Write report

Questions?

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