Radon Testing Strategies for Tribal Housing Authorities Under US HUD PHA Radon Policy

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Topics

- US HUD Federal Housing Administration (FHA) Rules Overview
- US HUD Federal Housing Finance Agency (FHFA) Rules Overview – Rescinded 3/26/2025
- US HUD Public Housing Authority (PHA) Rehabilitation Requirements Overview
- Large Building Radon Testing Standards Quick Overview

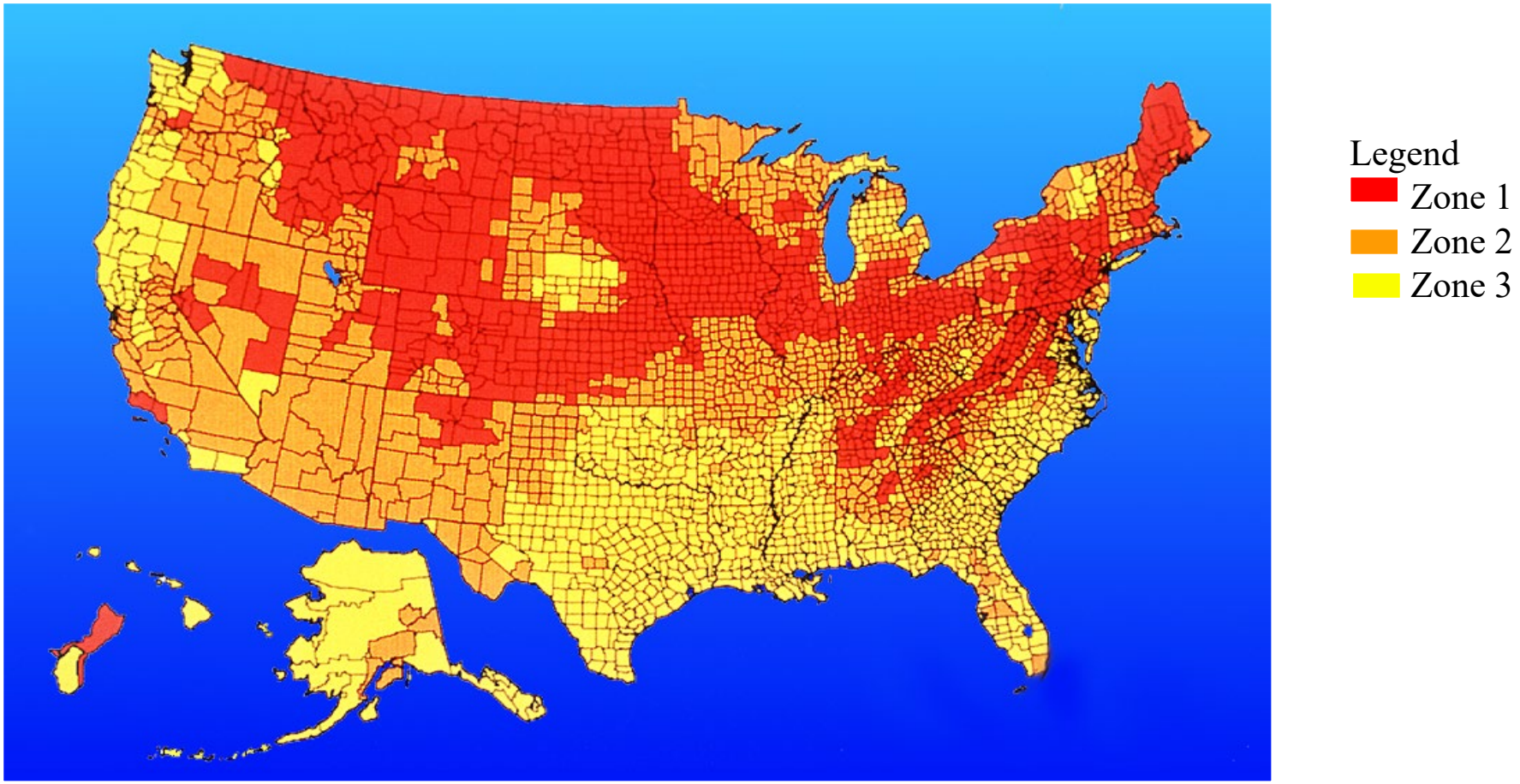
EPA Has Defined Radon Zones

Each of 3100 counties in the U.S. classified as:

- **Zone 1** - expect 4.0 pCi/L or greater
- **Zone 2** - expect 2.0 to 4.0 pCi/L
- **Zone 3** - expect 2.0 pCi/L or less

Zone designations based on five factors: indoor radon measurements, geology, aerial radioactivity, soil parameters, and foundation type.

U.S. Radon Zone Map



History of Radon Standards

- The U.S. EPA **RECOMMENDS** no longer using their now very dated standards
  - **RECOMMENDS** using the AARST-ANSI consensus standards

US HUD FHA & FHFA
Multi-family Rules Overview

US HUD FHA Multifamily Housing Radon Notice

- HUD Radon Announcement 2/4/2013
  - Requires radon testing be included in environmental reports for FHA-insured multi-family housing mortgages
  - Elevated levels will have to be mitigated
- HUD MAP 2020 Listed Projects
  - Requires use of **ANSI/AARST MAMF-2017 with 1/2021 REVISIONS**
    - 100% ground-contact unit testing, 10%/minimum 1 unit off ground contact
  - Requires national certification for measurement activities
  - Requires state-issued certification/license for measurement activities in states with adopted requirements
    - **Can be required to have dual-certification**

US HUD FHA Multifamily Housing Radon Notice

- Dual credentialing issue in Licensure States
  - State-issued radon license; &
  - Either
    - National Radon Proficiency Program (NRPP) credential
    - National Radon Safety Board (NRSB) credential
  - National credentialing requirements
    - Approved coursework for the credential
    - Passage of the appropriate exam(s)
    - Submission of paperwork and fees
    - Completion of a device performance test (DPT) for measurement credentials

US HUD PHA Housing Rehabilitation Requirements

Following slides courtesy of Glenn Schroeder, US HUD

HUD Departmental Radon Policy Notice

- On January 11, 2024 HUD published its departmentwide Radon Policy Notice, *Departmental Policy for Addressing Radon in the Environmental Review Process*
- With this Notice, HUD is addressing the risk of residential radon exposure across the entire Department ***for the first time ever***
- In 2020, the HUD Office of Inspector General (OIG) conducted an evaluation of HUD program offices' policies and approaches for radon.
  - As a result of the evaluation, the OIG recommended, among other things, that HUD "[d]evelop and issue a departmentwide policy that notes that radon is a radioactive substance and outlines HUD's requirements to test for and mitigate excessive radon levels in accordance with 24 CFR 50.3(i)(1) and 58.5(i)(2)(i)."

Authority for the Policy

- The authority for this policy comes from HUD's Contamination Regulations: 24 CFR 50.3(i) & 58.5(i)(2):
  - "(i) Also, it is HUD policy that all properties that are being proposed for use in HUD programs be free of hazardous materials, contamination, toxic chemicals and gases, **and radioactive substances**, where a hazard could affect the health and safety of occupants or conflict with the intended utilization of the property."
- These regulations require a "contamination analysis" to analyze for the potential or known presence of contamination at or near a site proposed for HUD support
  - As a radioactive substance, radon must be considered as part of the contamination analysis
  - **Note:** Radon testing is not required, but mitigation is required if the method used to consider radon shows levels at 4.0 pCi/L or greater

How To Consider Radon under the Policy Notice

- The policy provides one recommended best practice and three alternative options for considering radon in the contamination analysis:
  - **Preferred, Best Practice:** ANSI/AARST radon testing and mitigation standards
  - **Alternative strategies** that can be used (if testing not otherwise required by law/reg):
    - Do-It-Yourself (DIY) Testing: Use of individual DIY home radon test kits
    - Continuous Radon Monitoring Devices: for use by trained local government staff in remote areas
    - Review of science-based data on radon in the area where the project site is located: state/tribal geologic data, CDC radon test data
- **Note:** Actual testing for radon is not required under the policy

How to consider Radon under Notice?

Testing is the only way to know if building has excessive radon (4 pCi/L or higher)

Preferred, Best Practice: ANSI/AARST radon testing and mitigation standards

Other ways to Test: DIY + Continuous Monitoring Devices

Some Exceptions

Projects that don't involve structures that are occupied or are intended to be occupied less than 4 hours a day

Buildings with no enclosed areas having ground contact

Buildings with existing mitigation systems where radon levels are below 4 pci/L

How to Address High Test Results

- If use of any of the previous methods determine that indoor radon levels are or may be above 4 pCi/L, then the RE must document and implement a mitigation plan
- The mitigation plan must:
  - Identify the radon level; describe the radon reduction system that will be installed; establish an ongoing maintenance plan; establish a **reasonable timeframe** for implementation; and require post-installation testing by a licensed radon professional, where feasible
- Note: Mitigation under the Notice functions just as other mitigation under HUD's contamination regulations does

Radon Testing and Mitigation as Eligible HUD Program Costs

- The policy does not come with any of its own dedicated funding
- **However,** for all major HUD programs, reasonable expenses incurred for compliance HUD's environmental review requirements are eligible program expenses
  - This includes radon testing and mitigation *conducted under the Radon Policy Notice as part of a HUD environmental review*
  - This does *not, however*, mean that testing or mitigation on its own can always be paid for using HUD funds
    - Consult with HUD program office staff for specific program funding questions

Funding Testing and Mitigation For HUD Projects

- Bottom line: ***HUD Recipients can generally use existing HUD funds to cover radon costs as part of a HUD environmental review of a project***
- Funding for testing or mitigation for specific projects may also be available through other federal, or state sources as well
- HUD additionally is committed to supporting the strategies and aims of the National Radon Action Plan, including expanding the availability of credentialed radon practitioners, making it easier for HUD stakeholders to access and utilize practitioners

HUD Contamination Policy - Tribal Implications

After Tribal consultation and public comment, HUD published its department-wide radon policy notice, *Departmental Policy for Addressing Radon in the Environmental Review Process*

With this Notice, HUD is addressing the risk of residential radon exposure across the entire Department **for the first time ever**

When is mitigation required?

Tribe will need to mitigate anytime a radon test is at or above 4.0 pCi/L **OR** if a review of science-based data shows the project is located in an area with an average result of 4.0 pCi/L or greater and you choose not to test

Mitigation must be done for the Tribe to use HUD funding. However, radon mitigation does *not* need to be installed before a Tribe may use HUD funding on a building needing mitigation.

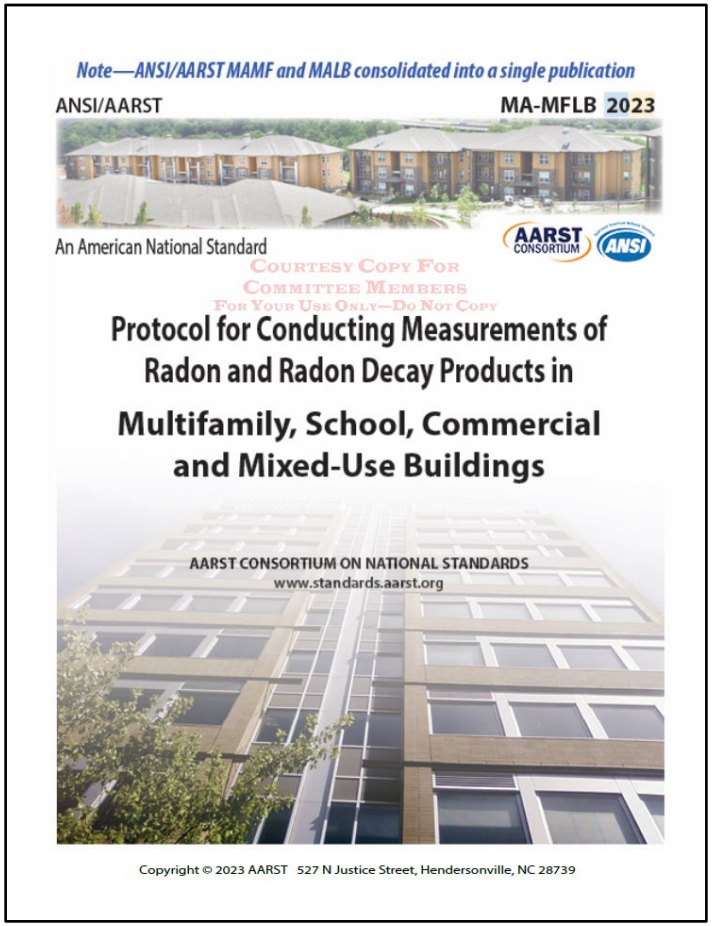
US HUD PHA Radon Contractor Implications

- Dual credentialing
  - **NOT necessary** if the work is outside of a US HUD FHA multifamily mortgage issue

ANSI/AARST Large Building Radon Testing Standards

A VERY quick review

ANSI/AARST Large Building Radon Testing Standards (In EXTREME Brief)



ANSI/AARST
MA-MFLB 2023
Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily, School, Commercial and Mixed-Use Buildings

(https://standards.aarst.org/MA-MFLB-2023/index.html#zoom=z)

Scope Summary and Introduction

- MA-MFLB consolidates the ANSI/AARST MAMF and ANSI/AARST MALB into a single publication
- This standard of practice specifies procedures and minimum requirements when measuring radon concentrations in shared structures, or portions of shared structures used for:
  - Residential
  - Non- residential
  - Mixed-use purposes
- These radon measurements are used to determine if radon mitigation is necessary to protect current and future occupants.
- These protocols address low-rise and high-rise structures and procedures for testing whole buildings but also for testing only one or several individual rooms or dwellings within a shared building.

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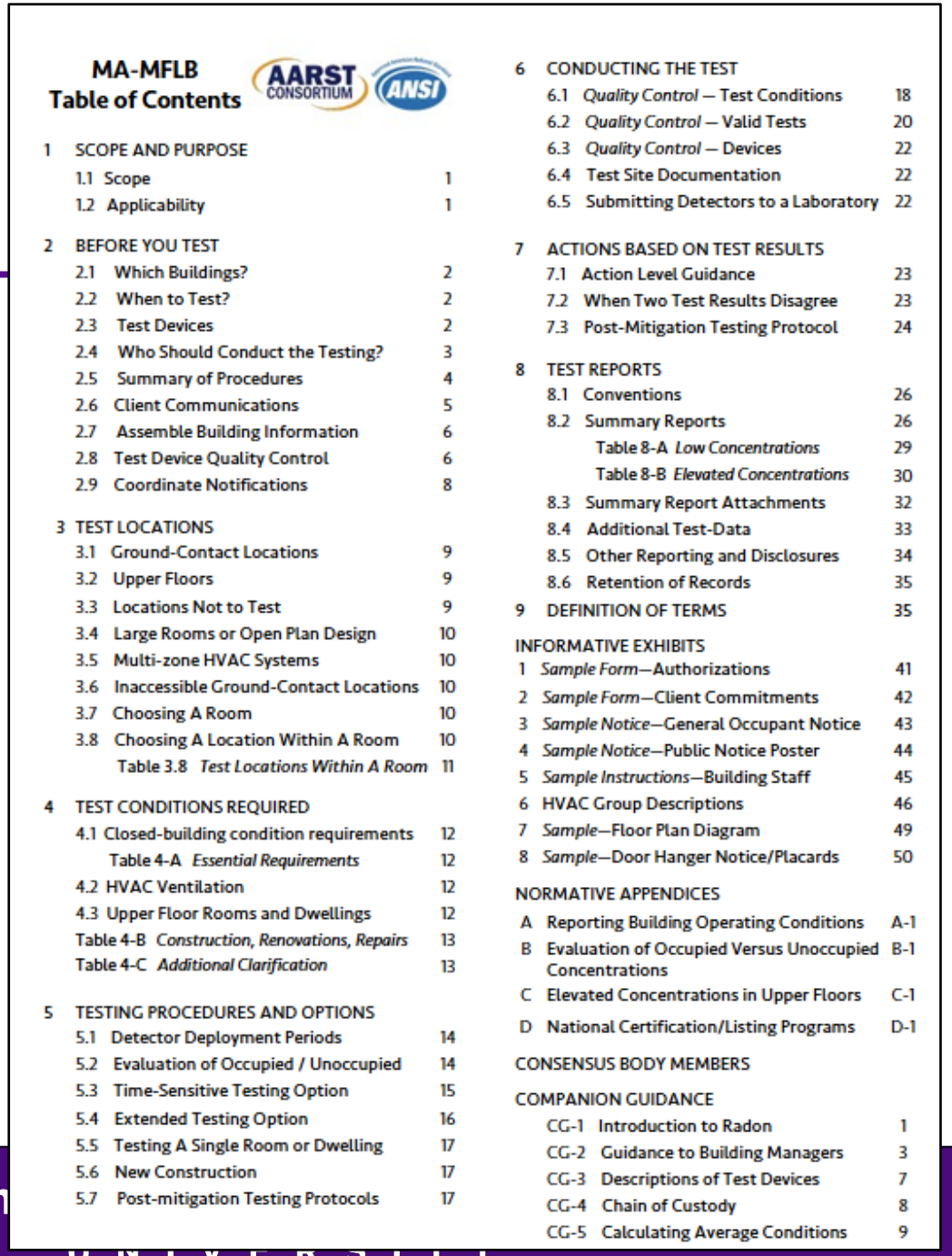


MA-MFLB
Table of Contents

PLEASE NOTE!!!!

This presentation paraphrases the language in the written standard for educational purposes.

ALWAYS have your physical standard handy for reference to the specific language in the standard

Which Homes Should Be Tested?

- Any home can have a radon problem
- Every home should be tested
- Radon levels cannot be predicted
- Testing is the only way to know the radon level

When to Test

- Homes can be tested any time during the year
- Test whenever moving to a new residence
- Avoid testing during unusual local severe weather for less than 3 days
- Tests when a heating/cooling system operates day and night are more likely to clearly characterize radon levels

When to Test

- If building is not occupied both day and night (i.e. non-residential) measurements **SHALL** be conducted at a time representative of normal occupied conditions
  - **EXCEPTION**: It **SHALL** be permitted to test any time of year when the purpose of the testing demands timeliness, such as a business transaction or health concerns

Testing Devices

- All test devices used for deciding if mitigation is warranted are to be listed by one of the following authorities for having proven to meet minimum quality requirements:
  - a) the National Radon Proficiency Program (NRPP), the National Radon Safety Board (NRSB), or
  - b) as required by local statutes for jurisdictions that have a program for evaluating and approving devices.
  - Test devices are to be used in compliance with both this standard and instructions provided by the manufacturer that relate to device-specific needs.

Test Device Types

- a) "Passive devices" are those that collect a time-weighted average and do not provide hourly readings.
- b) "Continuous monitors" are monitors that can integrate, record and produce reviewable readings in time increments of 1 hour, and can be recalibrated periodically.
- If a device is not capable of these functions or is not set to record readings each hour, it is functioning as a passive device and is not considered a continuous monitor under this protocol.

Passive Device Measurement Systems

- Charcoal adsorption detectors (CAD)CAD detectors employ activated charcoal that adsorbs radon from the surrounding air. Exposure durations are typically limited to 2-7 days. After exposure, detectors must be sent to the laboratory without delay. Detectors are configured for either Gamma-ray Spectroscopy or Liquid Scintillation Spectroscopy analysis.
- Alpha-track detectors (ATD)ATD detectors utilize a piece of plastic inside a container. Alpha particles emitted from radon strike the plastic detector and create damaged “tracks” that are visible with a microscope. The track density is determined by the laboratory to achieve an average radon concentration for the time period the detector is exposed.

Passive Device Measurement Systems

- Electret ion chamber detectors (EIC)EIC detectors use a chamber made of, or lined with, an electrically conductive material with an electrically charged electret as the detecting mechanism. The decay of radon discharges voltage from the electret. The radon concentration is calculated by comparing the electret voltage measured before and after exposure.
- Electronic integrating devices (EID)An EID is an electronic measuring device similar to a continuous monitor that is not recording a retrievable time series of 1 hour measurements. EID devices are categorized as passive devices because such devices do not provide additional measurement data points needed for making mitigation decisions.

Continuous Radon Monitors CRM

- A CRM is an electronic device that is automatically recording a retrievable time series of numeric measurements of radon concentration averaged over time intervals of 1 hour or less. These additional data points can help to judge whether or not there was an unusual occurrence during the test that might invalidate the overall measurement.

Who Should Conduct the Test?

- Qualified Measurement Professionals (QMP)
  - The person or team who is conducting the measurements in MF must operate under a QA program
  - An individual that has demonstrated a minimum degree of appropriate technical knowledge and skills to place/retrieve/analyze radon detectors and implement quality control procedures
  - Meets the certification requirements of either a national program or by local/state licensure programs
  - Must be present during placement/retrieval of devices and be available for control activities of others placing/retrieving devices

Who Should Conduct the Test?

- Non QMP individuals are permitted to assist the QMP
  - If it is allowed by state/licensure program
  - Name and qualifications are to be available upon request and retained for QC records
  - Pariticipation is approved by QMP and QMP provides specific work plan for the non qualified individual
  - Must demonstrate appropriate training/skills for detector placement/retrieval within the last 2 years

Client Communications

- Prior to designing a testing plan the QMP must obtain information about the building to identify testing locations
- The client will be informed of:
  - closed building condition requirements and normal occupied building operation conditions for similar local buildings
  - The normal occupied building operation condition for similar local buildings
  - Requirements for valid measurements in all test identified test locations
  - Potential additional expense when test locations are not accessible and closed buildings conditions are not observed

Client Authorizations

- The client will provide information on who can receive test data and when test data will be requested
- Signed statements from the clients/staff commiting to closed building conditions
- Onsite supervisor will distribute notices to occupants and provide access to test locations
- HVAC/building supervisor will provide HVAC system information and affirm that the HVAC systems are set up appropriately for closed building condition requirements

5.0 Testing Procedures & Options

5.3 Time-Sensitive Testing Option

- **NOTE -** This protocol builds upon protocols developed by EPA in the "Home Buyers and Sellers Guide to Radon"

Table 5.3	Time-Sensitive Testing Option—Required Procedure and Summary	
Step 1 Options	*Simultaneous Testing Option*	Tests at each test location are conducted using two short-term test devices at the same time, 4 to 8 inches (10-20 cm) apart.
	Continuous Monitor Option	Tests at each test location are conducted using a monitor that records retrievable hourly measurements.
		Evaluations of occupied versus unoccupied radon concentrations are additionally recommended for non-residential locations.
Step 2	**Decisions to Fix the Building**	
	Mitigation decisions are to be based on the average result from a continuous monitor or the average of two test results conducted at the same time in the same location. [1,2] Fix the building if test results meet or exceed the action level, e.g., 4 pCi/L. Consider fixing the building if results are greater than half the action level, e.g., between 2 and 4 pCi/L.	

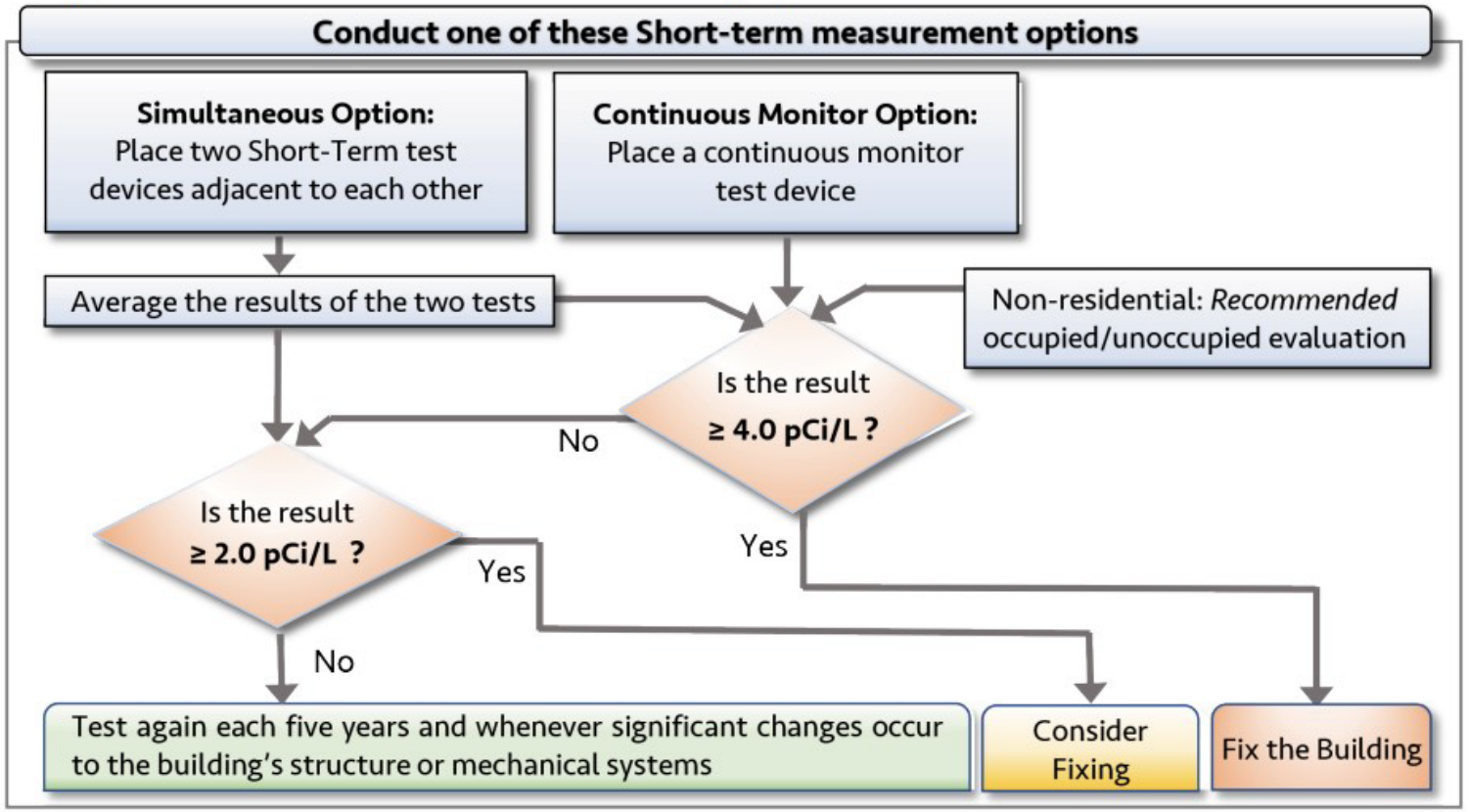
[1] Where evaluations of occupied versus unoccupied concentrations have been conducted in accordance with Section 5.2, report recommendations shall account for radon exposures indicated by the evaluation.

[2] Section 7.2 provides requirements for when the test result from two short-term test devices disagree in terms of making a mitigation decision.

5.0 Testing Procedures & Options

5.3 Time-Sensitive Testing Option

Figure 5.3 **Time-Sensitive Testing Option Flowchart**



5.0 Testing Procedures & Options

5.4 Extended Testing Option

- **NOTE -**This protocol builds upon protocols developed by EPA in the "A Citizen's Guide to Radon"

Table 5.4		Extended Testing Option—Required Procedure and Summary
Step 1	*Initial Test*	Testing at each location is conducted using a single short-term device.
		Evaluations of occupied versus unoccupied radon concentrations are additionally recommended for non-residential locations.
Step 2	*Follow-up Test Options*	Retest locations that meet or exceed the action level, e.g., 4 pCi/L. Follow-up testing requirements allow the following options: [1, 2]
	a)	A second test with a short-term device is conducted. Where a first test is twice the action level or greater, this confirmation test should be conducted without delay; or
	b)	Where a first test is less than twice the action level, testing can be conducted with a long-term test device for an extended period if the situation allows a closer evaluation of annual average to radon concentrations; or
	c)	Evaluation of occupied versus unoccupied radon concentrations for non-residential locations.

5.0 Testing Procedures & Options

5.4 Extended Testing Option

- **NOTE -**This protocol builds upon protocols developed by EPA in the "A Citizen's Guide to Radon"

Step 3	Decisions to Fix the Building
	Mitigation decisions are to be based on the average of the two test results from short-term devices or the results from long-term testing [3, 4] Fix the building if test results meet or exceed the action level, e.g., 4 pCi/L. Consider fixing the building if results are greater than half the action level, e.g., between 2 and 4 pCi/L.

[1] Where follow-up testing is not completed within 12 months after completing Step 1, the testing procedure shall be restarted with Step 1, in accordance with either Section 5.3 or this Section 5.4.

[2] Note—While decisions to mitigate at any time are not prohibited, the second test aids confidence that decisions are not being made based on a faulty test device or unexpected conditions.

[3] Note—Section 7.2 provides requirements for when the test result from two short-term test devices disagree in terms of making a mitigation decision.

[4] Where evaluations of occupied versus unoccupied concentrations have been conducted in accordance with Section 5.2, report recommendations shall account for radon exposures indicated by the evaluation.

5.0 Testing Procedures & Options

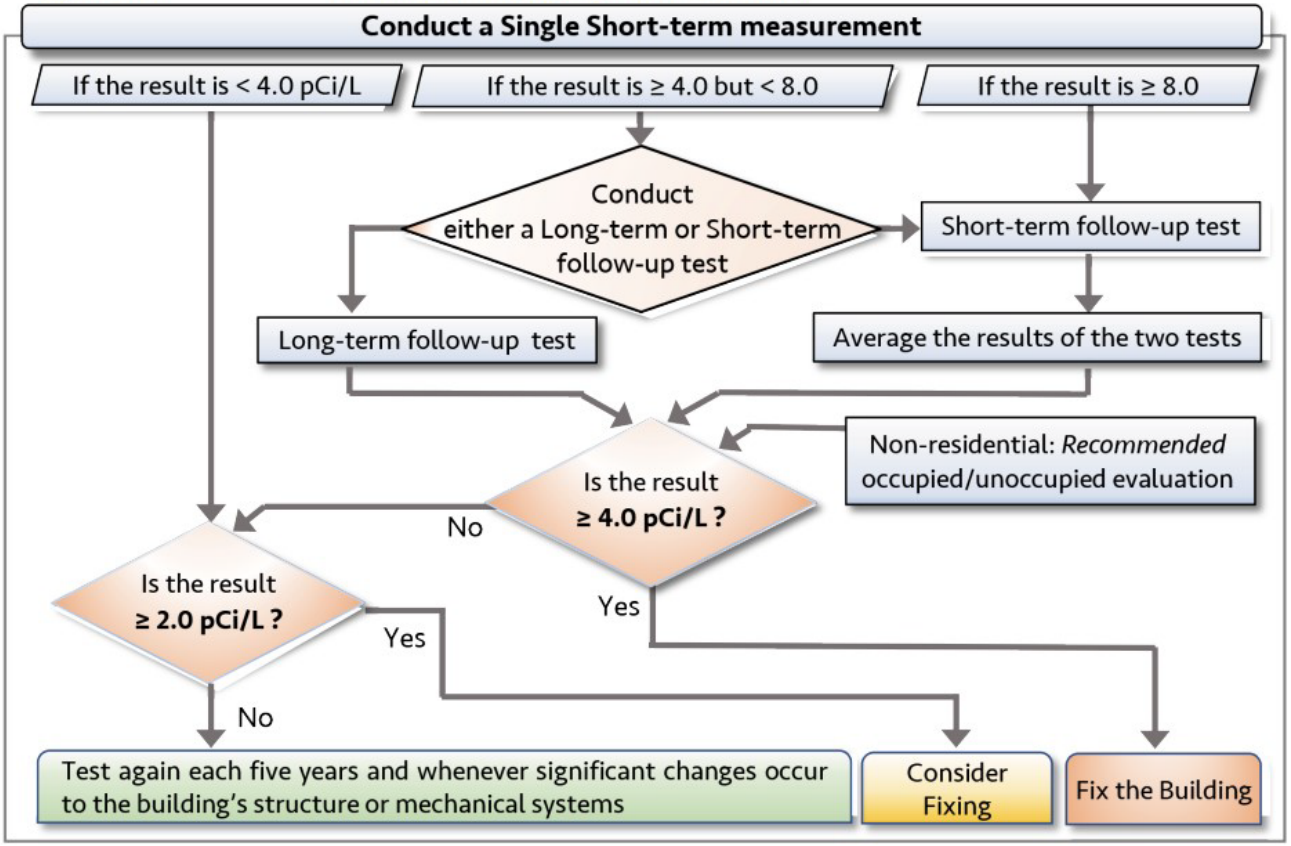
5.4.1 Client Advisory **REQUIRED**

- If choosing to use the extended testing option under a time-sensitive situation, the client **SHALL** be informed in writing prior to conducting the tests that:
  - Test results from Steps 1 and 2 of the Extended testing protocol are to be used for mitigation decisions, and
  - Time- sensitive situations will often not permit long test periods to more closely evaluate annual exposures to radon

5.0 Testing Procedures & Options

5.4 Extended Testing Option

Figure 5.4 **Extended Testing Option Flowchart**



5.0 Testing Procedures & Options

5.4.2 Long-term test option

- Mitigation decisions are permitted based solely upon testing that is conducted with a long-term test device at each test location where the test period meets requirements in Section 5.1.4 to account for seasonal conditions and either:
  - Test location is a residential dwelling/living space, or
  - Test location is non-residential with HVAC systems not operated under differential setbacks due to non-continuous occupation of the space
- **NOTE** – Test periods employed for this purpose in the U.S. are commonly those greater than 90 days. Tests that are longer than 2-7 days can reduce the influence of short-lived temporary conditions on test results.
  - Any correlation between the test result and the annual average radon concentration depends upon building conditions during the test

4.0 Test Conditions REQUIRED

4.1 Closed-building protocol requirements

- Closed-building conditions (per winter heating/summer cooling seasons) are **REQUIRED** to be:
  - initiated 12 hours prior to starting tests for tests lasting less than 72 hours, and
  - Maintained throughout testing for tests up to 90 days duration

Table 4-A ESSENTIAL CLOSED-BUILDING PROTOCOL REQUIREMENTS	
Windows	Keep closed on all levels of the building including areas not being tested
Exterior doors (except for momentary entry and exit)	
Heating and cooling systems	Set to normal occupied operating conditions with normal temperatures between 65˚and 80˚ F (18˚ - 27˚ C)
Systems that temporarily ventilate with outdoor air for seasonal comfort or energy savings	Set to the lowest seasonal ventilation
Bathroom fans	Operate normally
Exhausts Systems (that temporarily draw air from the building such as from laundries, workshops, community kitchens or for local control of fumes)	Avoid excessive operation
Fireplaces (that burn solid, liquid or gas fuels unless a primary/normal source of heat for the building)	Do not operate

4.0 Test Conditions REQUIRED

4.2 HVAC Ventilation

4.2.1 Outside air for combustion appliances

- Openings to outside air designed to provide air needed for combustion appliances **SHALL NOT** be closed

4.2.2 Ventilation with outside air

- If the HVAC system includes temporarily increasing outdoor air ventilation for seasonal comfort/energy savings
  - Outside air inlet damps **SHALL** be configured to provide only the minimum volume of outdoor air needed at all times of the year the building is significantly occupied

4.2.3 Temperature control via air volume

- For VAV systems
  - Thermostats **SHALL** be set to a normal occupied temperature in all portions of the building being tested that are served by the system

4.0 Test Conditions REQUIRED

Table 4-C ADDITIONAL CLARIFICATION ON CLOSED BUILDING PROTOCOL REQUIREMENTS FOR SPECIFIC COMPONENTS	
Windows and Doors on all levels of the building including areas not being tested	
Broken windows or doors	Seal closed
Interior partition or stairway doors	Operate normally
Exterior doors into non-residential rooms	Keep closed (except for momentary entry and exit of individuals who customarily enter the building)
Garage doors and doors leading into a garage	Keep closed (except for momentary entry and exit).
Small Appliances	
Ceiling fans and portable fans	Do not blow fans directly towards testing devices
Window fans	Remove or seal shut and do not operate
Humidifiers and dehumidifiers	Operate normally
Crawl Spaces	
Passive crawl space vents	Set vents to the condition that prevails during the greatest amount of time each year
Crawl space humidity control systems	Operate normally
Mechanical Systems	
Passive vents for combustion air makeup	Leave open
Combustion appliance fans	Operate normally
Fans installed in attics to ventilate only attic air	
Window air conditioners	Operate in recirculation mode only
Evaporative cooling systems	Do not operate and do not cover

3.0 Test Locations

3.1 Ground-Contact Locations

- A measurement **SHALL** be conducted in all dwellings/non-residential rooms that are occupied, or intended to be occupied, that:
  - Have floors/walls in contact with the ground, and
  - Are closest to ground over untested ground-contact locations
    - Crawl spaces, utility tunnels, parking garages or other non-habitable ground-contact space

3.0 Test Locations

3.1.1 Ground-contact dwellings

- For each ground-contact dwelling or living unit, a measurement **SHALL** be conducted in the lowest level that serves or could serve:
  - As a living area
  - As sleeping quarters
  - Office
  - Playroom
  - Any space that could otherwise be occupied for residential use at some point in the future

3.0 Test Locations

3.1 Ground-Contact Locations

3.1.2 Non-residential ground-contact locations

- For non-residential ground-contact locations, a measurement **SHALL** be conducted in all ground-contact:
  - Rooms
  - Offices
  - Classrooms
  - Other general use areas that are occupied or intended to be occupied

3.0 Test Locations

3.1.1/3.1.2 Examples

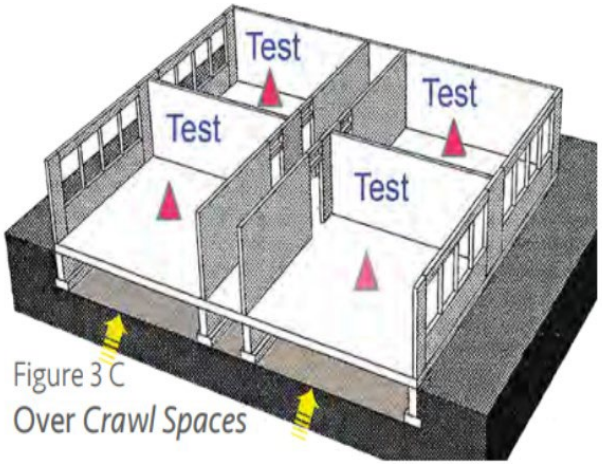


Figure 3 C
Over *Crawl Spaces*

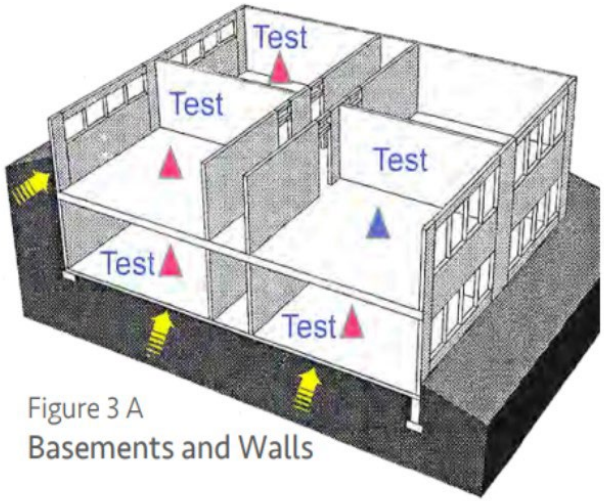


Figure 3 A
Basements and Walls

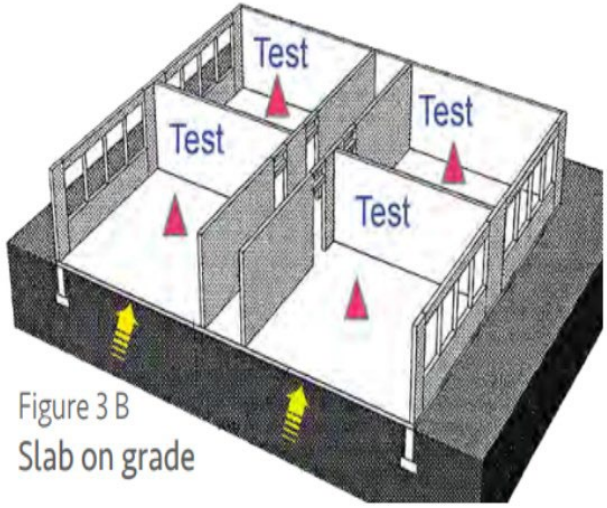


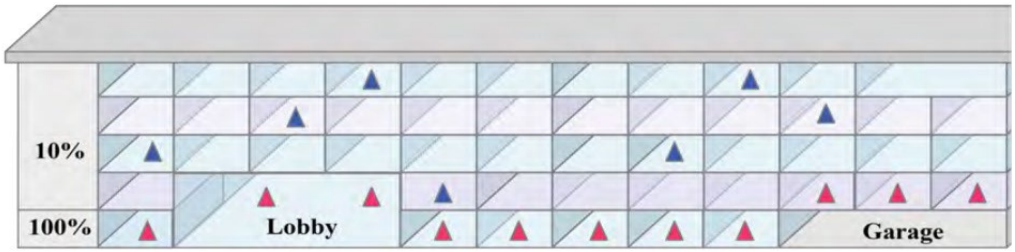
Figure 3 B
Slab on grade

3.0 Test Locations

3.2 Upper Floors

- On each upper floor
  - A measurement **SHALL** be conducted
    - In AT LEAST 1, and
    - Not LESS THAN 10%
  - Of all dwellings and non-residential rooms that are occupied/intended for occupation
- These measurements **SHALL** be in addition to tests performed in ground-contact locations and rooms or dwellings that adjoin immediately above untested ground-contact locations

Figure 3 D
Upper floors



3.0 Test Locations

3.3 Locations Not to Test

- Except for investigative purposes, test locations **SHALL NOT** include
  - Hallways, closets, bathrooms/shower areas (unless open to other rooms that are occupied)

3.4 Large Rooms or Open Plan Design

- For large rooms/open plan designed areas that may include partitioned rooms that do not have closeable doors:
  - One or more detectors **SHALL** be placed every 2,000 square feet of the room or open area for any remaining portion of the area that is less than 2,000 square feet

Figure 3 E
2,000 Sq. Ft.

3.0 Test Locations

3.4.1 Pod Design

- Where an open-plan or pod design area has moveable walls that can physically separate an area into individual rooms:
  - The movable walls **SHALL** be configured to divide the area into individual rooms and
  - Each resulting room **SHALL** be measured separately
  - Where moveable walls are absent or inoperable, the area **SHALL** be measured as one room

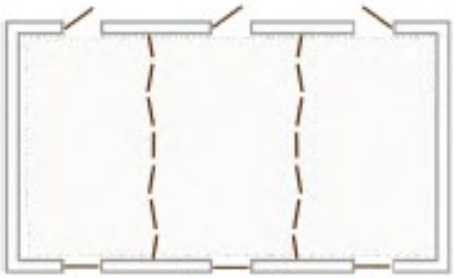


Figure 3 F Moveable walls

3.0 Test Locations

3.5 Multi-zone HVAC Systems

- **Informative Advisory:**
  - Multi-zone HVAC systems are sometimes found for larger open rooms or dwellings
  - When encountered, it is **RECOMMENDED** to place enough additional detectors to adequately characterize and record differences between areas or rooms served by different HVAC systems

Figure 3 G
Multi-zone HVAC

3.0 Test Locations

3.6 Inaccessible Ground-Contact Locations

- When restricted access is imposed by independent owners of ground-contact locations
  - The lowest accessible level of the building closest to ground **SHALL** be tested

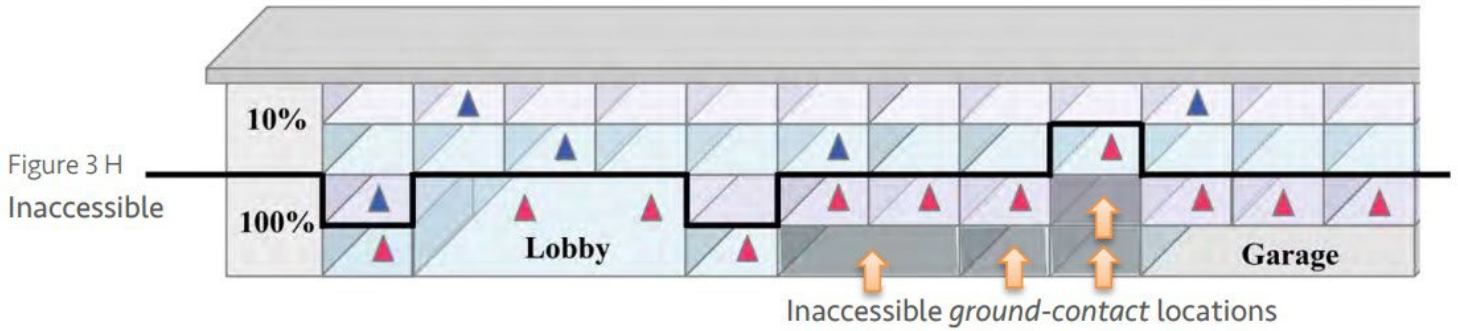


Figure 3 H
Inaccessible

7.0 Actions Based on Test Results

7.1 Action Level Guidance

Countries worldwide have adopted action levels for radon exposures. The action level observed should comply with the guidance of the country, state or local jurisdiction of authority where the test is being conducted.

U.S. Action Level. The following action level descriptions reflect guidance from the United States Environmental Protection Agency (EPA):

- 4 pCi/L or greater (≥ 150 Bq/m^3)

  Fix the building. The higher the radon concentration, the more quickly action should be taken to reduce the concentrations.

- Below 4 pCi/L (< 150 Bq/m^3)

  Consider fixing the building if test results indicate that radon concentrations are greater than half the action level, such as between 2 and 4 pCi/L (75 and 150 Bq/m^3).

  With observance that hazards from radon are virtually the same for radon concentrations that are near action level thresholds, it is noteworthy that the World Health Organization recommends limiting long-term exposures to less than 2.7 pCi/L (100 Bq/m^3).

  When measurement devices indicate concentrations lower than about 2.0 pCi/L (75 Bq/m^3), test data should normally be interpreted as being lower than the test device can accurately measure.

7.0 Actions Based on Test Results

7.3 Post-Mitigation Testing Protocol

- **REQUIRED** to determine if additional mitigation efforts are warranted

7.3.1 General procedures- Post-mitigation testing

- One or more short-term test devices **SHALL** be deployed at each test location to evaluate effectiveness of the mitigation efforts.
- These measurements **SHALL** be conducted no sooner than 24 hours after activation of a mitigation system fan or completion of other mitigation efforts.
- In addition, closed building conditions **SHALL** be maintained for 12 hours before starting the test; Testing **SHALL** either
  - Be postponed until both conditions are met, or
  - Extended if testing with a CRM where device features **SHALL** be used to obtain an average reading that represents no less than 46 contiguous hours of data

7.0 Actions Based on Test Results

7.3.2 Clearance testing

- Clearance testing to verify all portions of a building are below the action level **SHALL** comply with all 7.3.2 requirements
  - Test locations
    - Test locations **SHALL** include all ground-contact dwellings/non-residential rooms, to include not less than 10% of dwellings/non-residential rooms on each upper floor, AND
    - Where any active soil depressurization (ASD) system exhausts below the roof, a test **SHALL** also be conducted in the room(s) immediately adjoining the outside exhaust location

7.0 Actions Based on Test Results

7.3.2 Clearance testing

- Clearance testing to verify all portions of a building are below the action level **SHALL** comply with all 7.3.2 requirements
  - Clearance testing- failed locations
    - Where clearance testing reveals a need for additional mitigation efforts, testing specific locations after additional mitigation efforts **SHALL** be sufficient if the following requirements are met:
      - Where the mitigation method is ASD and the mitigated locations are served by individual HVAC systems (Basic Heating and Cooling): Testing **SHALL** include all locations where clearance testing revealed elevated radon concentrations.

7.0 Actions Based on Test Results

7.3.2 Clearance testing

- Where mitigation methods rely on HVAC mechanical systems to provide dilution or pressurization of indoor air, testing **SHALL** include:
  - All locations **REQUIRED** in Section 3 within each unique sector mitigated, and
  - At least one measurement in each adjoining sector served by a different HVAC system

7.0 Actions Based on Test Results

7.3.3 System performance testing

- Performance testing mitigation systems by testing only locations where elevated radon concentrations have been found **SHALL NOT** be reported as clearance testing.
- Performance testing mitigation systems **SHALL** be limited to evaluations of active systems prior to clearance testing or related to maintenance of active systems.

Questions?

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