**RRS Exam/Course Curriculum**

**26 November 2024**

**DRAFT**

Radon Source and Behavior Fundamentals (20%)

* Sources of Radon
* Radon from soil vs individual rocks/boulders
* Pathways through the soil
* Forces that create pressure differences between home interior and soil
* Common Radon Entry Points
* Building ventilation rate and relationship to radon measurement

Mitigation Theory and Design (10%)

Active Soil Depressurization (ASD) - Umbrella term for single direction depressurization system focused on removing soil gasses from outside the building envelope

Sub-Slab Depressurization (SSD)

Drain Tile Depressurization (Interior or Exterior) (DTD)

Crawl Space Depressurization (CSD)

Sub-Membrane Depressurization (SMD)

Block Wall Depressurization (BWD)

Stem Wall Depressurization (SWD)

When and how to use combinations of the above systems

Dilution by Ventilation Systems (5%)

Energy Recovery Ventilators (ERVs)

Heat Recovery Ventilators (HRVs)

How to calculate appropriate cubic feet / minute of ventilation per household size

Best practices for installing these units

How to seal ducts

How to plan out locations of interior and exterior vents and how to properly screen exterior vents

How to balance systems

Maintenance needed and client communication specific to these units

ASD Installation Process: (30%)

* + Walk-through to assess sources of negative pressure
  + Sealing of radon entry points (most appropriate to perform before pressure field testing)
  + How to create sealable covers for sewer clean-out traps
  + Building investigation
  + Pre-mitigation testing either with grab sampler, or setting out passive devices
  + Identification of ideal “exit point” for systems with suction from interior
  + Pressure Field Extension Testing (diagnostically with shop vac vs. confirmatory testing with fully excavated suction pit and radon fan)
  + Suction pit excavation process and best practices
  + Examining substrate composition and porosity
    - When and where do drill multiple test holes to find porosity
  + How to determine how many suction points will be needed and where would provide the most benefit
  + Using micromanometers and/or smoke to ensure that the entire structure is under negative pressure
  + Communication between block walls and floor
  + Managing water entry into piping - pitching pipe, when to add bypasses, ways to configure bypasses
  + What to do when finished interior space occupies all of the area between desired suction points
  + Balancing system pressure between multiple suction points
  + DTD systems - how to properly seal sump lids; how to properly connection suction piping to sump lids
  + How to read fan performance charts
  + How to match the correct fan for a given system type and foundational size
    - How to confirm that the installed fan performs as needed to guarantee reduction
  + Measuring whether systems create backdrafts or not
  + How to approach setting up electrical connections for systems
    - Low voltage unit options
    - When in doubt, follow local code
      * Ensuring that fans are connected to GFCI protected outlets or circuits

Crawl Depressurization Additional Considerations (10%):

* + Approach options taking into account if the crawl space is ventilated or not, already has a membrane, or has cement rat slab & whether or not and how the first floor is insulated.
  + Methods for installing membranes over dirt crawl spaces and where to route piping
  + How to seal membrane seams
  + How to properly affix membranes to conventional or varied fieldstone walls
  + How to seal around pipe penetrations into membrane or the home’s support columns
  + Health and Safety best practices specifically for crawl space work
  + When and where to use closed cell spray foam

Troubleshooting non or underperforming systems (10%)

* + What to do if system has not performed as expected
  + How to select areas for diagnostic survey
  + How to determine if upgrading the fan to a more powerful model will help or not
  + For non-functioning systems
  + Is it an electrical issue, or an issue with the fan itself?
  + Is pipe obstructed with water or other debris?
  + Is the system losing pressure anywhere?
  + Are all pipe connections glued properly
  + Was the suction pit dug out sufficiently
  + Is the system reaching all areas of the foundation - including sub-grade walls, or multiple slabs?

Mitigation Systems for Radon from water (5%):

* + May be limited by state to only licensed plumbers
  + Aeration
  + GAC filtration
  + Advantages & Disadvantages
  + Comparative performance and costs
  + All houses can be fixed – cost is the issue
  + Radon resistant new construction – How it works
  + Post-mitigation testing, system monitoring, and maintenance

Relation with Client (10%)

* + Client communication: Mitigator decides the technical method required to achieve the performance guarantee, When possible, collaborate with client providing options if multiple locations can be used
  + Risk communication of what could go wrong during installation and how that would be handled
  + Confidentiality
  + Going through the post-mitigation testing process
  + How to offer testing services, when appropriate, while acknowledging a conflict of interest
  + Interpretation of results for client
  + Based on radon test results, what should be done next?
  + Do nothing, retest, or amend system
  + Real estate transaction special considerations
  + Re-test when?
  + Who pays for mitigation if prior test shows level above, or below 4.0?
  + Negotiation and escrow possibilities