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QA/QC Plan Guidance for Certified Radon Businesses

According to N.J.A.C. 7:28-27.33, any business wishing to obtain certification in New Jersey in the radon measurement business category must prepare and submit to the Radon Section for review and approval a quality assurance/quality control (QA/QC) plan for all radon testing services offered to the public. Any QA/QC Plan must discuss a complete program that is designed to produce results which are valid, scientifically defensible, and of known precision, bias, and accuracy. Any such program includes planning, documentation, and a system of activities to ensure a quality product. These activities would include measurements made to ensure and monitor data quality and would include calibrations, duplicate, blank and spiked measurements, interlaboratory comparisons, and internal and external audits.

QA/QC Plan Review Checklist

All sections in this guidance document and the accompanying checklist must be included and discussed in your QA/QC Plan. It is extremely important that the Table of Contents is accurate and that it follows the sections in this guidance document in exact order.

The responsible measurement specialist must indicate (check YES or NO) on the checklist whether the Plan follows the exact order of the items listed in the table for each device. If the answer is NO, the specialist must write the correct page numbers in the table for those sections that vary from the order listed in the table. This should only be done if the business has a valid reason for changing the order of a few sections. The specialist must also sign and date the checklist and it must be submitted with the measurement business application.

A. Title Page

The title page must include the following:

1. Name of the Document
2. Name of the Business
3. Physical Address of the Business
4. Month and Year of Preparation
5. Printed Name of the Responsible Specialist
6. Signature of the Responsible Specialist

If a business is approved to use multiple device types, then the name of the device type must be present on the title page if the business elects to have separate plans for each of the approved

device types. If a business has one plan for all approved devices, then no device types are needed on the title page.

B. Table of Contents

The table of contents must be revised accordingly when any changes are made to the plan. Revision numbers and the dates of revision must be listed here as well. Each section of the plan must have the correct page number(s) listed. The Table of Contents must contain all sections below (C- I)

C. Description of the Business Organization

1. There must be a chart or list which indicates the line of authority.

2. The names of all individuals involved in the process of analysis or data assessment must be listed, as well as an indication as to whether they are certified by the Radon Section.

D. Measurement Device Type

There must be a detailed description of each device type that the business is certified to use, which shall include a physical description. There must be an explanation as to method by which the radon concentration are to be measured so that a technical person unfamiliar with the method can understand the method used.

E. Deployment Procedure

Reference must be made to the EPA protocol documents listed on the latest approved business application. Discussions regarding deployment must include at a minimum:

1. Initial set-up of the device, such as how it is opened, powered up, or unscrewed.

2. Guidelines for detector location and closed house conditions.

3. Undesirable placement locations, such as kitchens, bathrooms closets, near gas appliances, crawlspaces, basements considered to be not livable, near windows, doors, fans, air conditioning units, areas of excessive heat or humidity, and on the floor.

4. Environmental conditions affecting the test, including heavy rain, snow cover, high winds, and rapid barometric pressure differences.

5. Typical testing period of time (hours, days, months)

6. Copies of instructions that are mailed to clients. These must contain all required information in order to populate all of the fields in the monthly report.

7. Retrieval procedures used when the device is ready to be picked up at the location at the close of the testing period.

8. All procedures developed by the business that ensures technicians understand and follow procedures. This could include documentation signed by each technician that indicates an understanding of these procedures.

F. Internal Quality Control Checks

Quality assurance procedures and quality control checks are vital to achieving accurate and reliable test results. Topics that must be included and discussed include the following:

1. Deployment procedures for duplicates and blanks. Indication must be made as to whether the business will report both results or say "average result of two QA tests" on the client report. Also, a discussion as to what type of device will be used for duplicate testing.

2. Relative Percent Difference (RDP) must be discussed and can be calculated using the following equation:

   RDP = [(A-B) / (A + B)/2)] X 100
   where A = higher test result

   - Both radon levels are greater than 4.0 pCi/L = < 36%
   - Both radon results are less than 4.0 pCi/L = < 67%
   - One radon result is greater and one is less than 4.0 pCi/L = the higher result must be less than two times the lower result.

3. An RDP difference beyond these limits must be deemed invalid and the homeowner must be notified to discuss the invalid results and to offer that the duplicate testing be redone. If the follow-up testing has an RDP greater than the limit, corrective action must be taken by the business. Discuss this review and the specific procedure to be followed when criteria are not met. Also, discuss corrective action for multiple days that exceed the RDP for one of the two samples, as well as the use of control charts.

4. When a continuous radon monitor (CRM) is used for testing, and there is no other CRM available, a charcoal canister may be used to conduct a duplicate test.

5. The number of monthly duplicates required by the protocol document is 10% or 50, whichever is less. Duplicates must be conducted systematically throughout all tests deployed, inclusive of all certified individuals handling detectors. The specific procedure for ensuring sufficient duplicates must be documented for distribution to technicians, homeowners (if appropriate) and any other clients (schools, counties, etc.). If your business conducts all or part of its testing through mail order, the business must document how this will be done systematically.

6. The number of monthly blanks required by the protocol document is 5% or 25 per month, whichever is less.

7. Background measurements performed with calibrations (numerical values only) if CRMs are used by the business.

8. When using electrets, reference cell usage must be discussed. The reference cells must be certified by the approved calibration facility at the same time that calibration is being performed on reader. The reference cells must be used at least once a week or every time in the field prior to a radon measurement. These certificates must be available during an inspection and must be submitted as part of the business renewal process.

9. Routine maintenance procedures, such as cleaning, replacement parts, and battery checks.

10. Spike testing must be routinely performed, a minimum of 3 per year or a maximum 6 per month for passive devices only. Discuss the procedure set up with the facility.

11. Data validation procedures must be included. For example, this could include proofreading a percentage of all files to see that all information entered into the computer fields from chain of custody forms is correct. Also, calculations that were electronically performed can be hand-checked.

12. Documentation of any errors found during validation checks, by whom, the date, and how these errors were resolved.

13. Name(s) or position(s) of key individuals responsible for handling data, reporting results, and maintaining confidentiality.

14. Predetermined limits of data acceptability must be listed. Provide a range of upper and lower limits at which the result can be deemed valid for radon activity, such as between 0.5 pCi/L up to 100 pCi/L.

15. A detailed description of Corrective Actions (CA) instituted if any of following occur:

    - radon results are outside of the predetermined limits
    - problems were found during an internal audit
    - deviations from routine circumstances are found

16. Names of those responsible for initiating and approving CA.

17. Procedure for CA to be taken and documented. A timeframe for CA to be initiated and take effect must be included in the documentation and should be included in a QA Report.

18. Procedure for investigation into anomalous (abnormal) data.

19. Calibration Procedures used by the business.

20. List device(s) to be calibrated.

21. Frequency of calibration (1/year for all devices) must be stated. Calibration certificates must be submitted with renewal application and must be made available during an inspection.

22. Name of calibration facility used.

23. A dated log (list) of reference cell usage. Provide a copy (page) of the log, indicating Specialist quarterly oversight.

G. Chain of Custody Procedures

1. A description of all procedures to be followed, including that the form must be filled out completely, in the field, by a certified individual or homeowner.

2. The positions and duties of those that receive incoming field samples and verify the entry of information into custody records must be documented.

3. The following must be included:

    a. A copy of all chain of custody forms, filled out completely, for each device type and model used.

    b. Copy of the confidentiality waiver which, if used, must be signed by the HOMEOWNER ONLY, allowing test results to be given to others, usually in a real estate transaction

    c. A copy of a filled out mail order info card, if applicable

    d. Detector custody documented in log format, where unused (new) and used devices (from homeowners and businesses) would be listed. This log would be used to keep track of where devices are at any given point in time.

4. Required data tracking information is listed below and must be on all chain of custody forms and mail order information cards.

    a. Test location
        1) Homeowner Name
        2) Address
        3) City/Town, State
        4) Zip Code of test location
        5) Incorporated municipality
        6) County
    b. Client Information (if different from test location)
        1) Client Name
        2) Address
        3) City/Town, State

4) Zip Code

c. Device model number (Portable only)
d. Sample reference number or device serial #
e. Device type (if use more than 1 type)
f. Floor/Location
g. Closed house conditions must be maintained
h. Building Type (list all types approved to test)
    1) Residential
    2) Public school
    3) Child care
    4) Non-residential
    5) Child care in a public school
i. Structure Type
    1) Basement
    2) Crawlspace
    3) Slab on grade
    4) Various other possibilities (see monthly report)
j. Test type
    1) Standard
    2) Duplicate
    3) Blank
k. Real Estate Transaction: Yes No (circle one)
l. Post Mitigation test: Yes No (circle one)
m. Deployed by:
    1) Certification number
    2) Date
    3) Time
n. Retrieved by:
    1) Certification number
    2) Date
    3) Time

H. QA reports submitted to Management

1. The business must identify all individuals responsible for reporting to Management.

2. There must be a description of the form and contents of the anticipated reports.

3. These reports are a periodic internal assessment of testing procedures, including duplicates, blanks, background checks, and reference cell use. The reports must be as detailed as possible.

4. The report must include the annual proficiency results from an approved facility, such as Bowser-Morner or TCS Industries.

5. The report must include results of internal or external audits (high background checks on a % of incoming new and used canisters, package integrity).

6. All significant QA/QC problems encountered and the recommended solutions must be documented.

I. School Testing

1. Deployment procedures must be discussed, particularly what rooms must be tested and when the testing can be conducted. The document, EPA 402-R-92-014, "Radon Measurement in Schools" must be used as a guidance document and must be able to be produced during an inspection.

2. School testing must include 10% duplicates or 50, whichever is smaller, and 5% blanks or 25, whichever is smaller, per school, independent of other testing done. Specific procedures to ensure that blanks and duplicates are conducted for each school must be discussed.

3. Discuss that the room number or name will be listed on the:

   a. chain of custody form
   b. monthly report to the Radon Section.

4. Discuss that a record of device placement will be maintained at the business and be made available during any inspections.

5. Describe any of the following steps to ensure proper testing conditions are met.

   a. meet with principal or administrators
   b. request that principal meet with teachers and staff to discuss testing
   c. the document "Fact Sheet for School Staff" is distributed to teachers and staff
   d. post signs in testing locations ("Radon Testing in Progress")
   e. take additional steps

6. Discuss how deviations from closed building conditions will be handled.

7. Discuss how and when results that are 4 pCi/L or higher will be reported to the DEP.

If there are any questions, please contact the Radon Section at (800) 648-0394.