

Radon Mitigation QA Plan Background

- A 50 page QAP template was developed for use in an eight hour workshop
 - Participants brought laptops to the workshop and, as a group, we discussed options at each stage, and each individual customized their own mitigation QAP
 - The template incorporated reference to U.S. thresholds, measurement units, and standards
 - ANSI/AARST 2016 *Soil Gas Mitigation Standard*
 - The framework of this QAP template are applicable to Canada
 - But, much of the content would need to be revised

Radon Mitigation QA Plan Introduction (1:2)



- Why should you want a mitigation QA Plan? According to a large radon mitigation firm, after they implements a QA Plan, they found:
 - **Increased profitability** – gross revenue increased 3 to 8%
 - **Decreased labor costs** – 1 to 3%
 - **Decreased material overages** – 8 to 22%
 - **Fewer call-backs** – 17 to 46%
 - **Fewer customer complaints**

(Stokah 2016)

Radon Mitigation QA Plan Introduction (2:2)

- Most licensing states in the U.S. require measurement but not mitigation QA plans (QAPs)
- In late 2015, AARST announced that all NRPP certified radon mitigation professionals should have a QAP
 - AARST further stated that by June 1, 2016, all new applicants for and those seeking renewal NRPP certification will be required to self-declare they have a QAP
 - AARST provided a rough template for development of this QAP
 - The template we use in this workshop builds off the AARST template

16 Factors Affect Mitigation Quality?

- Initial Client Contact
- Building Investigation
- Diagnostic Testing Procedures and Results
- Atmospheric Vented Combustion Appliances
- Mitigation System Design
- Suction Point Location and Configuration
- Pipe Routing and Assembly
- Exhaust Location and Configuration
- Fan Selection and Location
- Sealing and other passive procedures
- Operating, Maintenance and Monitoring (OM&M)
- Post-mitigation inspections and retests
- Quality Control Measures
- Complaint/Suggestion Follow-up
- Corrective Action
- Reports and Record Keeping

There is Not One Approach that Fits All

- While we will focus on one QAP template, it is important to remember:
 - The best QAP for you is one that you will use
 - You do not need to complete all aspects of your QAP today - - - QAPs build over time
 - Over time, you should expect that the majority of problems or concerns may be concentrated in a few areas and as you apply corrective action, the problems or concerns will morph or change
 - Furthermore, problems revealed by your QAP will often result to various degrees from multiple causes



Example: Iowa Mitigation QA Outline (IDPH undated)

Major Sections

1. Organization and Responsibility
2. General Practices
3. Building Investigation
4. System Design
5. System Installation and Materials
6. Monitors and Labeling
7. Post Mitigation Testing
8. Contracts, Documents and records

Comments: Iowa Mitigation QA Plan

- This 27 page QA Plan:
 - Is clearly organized and easy to follow
 - Most of the content appears to reflect U.S. EPA's *Radon Mitigation Standard* (1994)
 - Some provisions go beyond minimum standards (e.g., requires air flow measurements in completed systems)
 - Includes:
 - Radiological Safety Plan and Mitigation SOP Guidelines
 - Brief descriptions of radon measurement devices, labels, manometers, caulks, fans, fan accessories, smoke devices, and a employee WLM tracking sheet

Mitigation QAP: SWAT Example (SWAT 2014)

Major Sections

- 1.0 Scope**
- 2.0 (none)
- 3.0 (none)
- 4.0 Quality Management**
- 5.0 Management Responsibility**
- 6.0 Resource Management**
- 7.0 Design Planning**
- 8.0 Analysis and Improvement**
- 7.0 Post Mitigation Testing**
- 8.0 Contracts, Documents and Records**

Comments: SWAT Mitigation QAP (SWAT, 2014)

- This 13 page quality assurance program follows ISO 9001: 2008 and is for multifamily radon mitigation and it:
 - Is concise and well organized
 - Cites the provisional ANSI-AARST *Radon Mitigation Standard for Multifamily Buildings*
 - Includes a 1 page descriptive list of ASD materials, each ranging between one to a few lines in length
 - Includes a 5 page section on a worker protection plan
 - With one point citing worker possession of an OSHA 10 hour Construction Industry Safety Card
 - Includes paragraphs on management commitment, customer focus, annual review, and human resource management

AARST QAP Template Introduction

- The AARST QAP template includes:
 - Components found in the International Standards Organization's (ISO) *Quality Assurance* (ISO 9001: 2015)
 - Content from a variety of U.S. radon mitigation standards
- The template must be amended to reflect your organization's structure and operations
- The QAP template does not fulfill requirements for quality control (QC)



Our QAP Template Contents: Sections

Title – Signature Page

1. Introduction
2. Description of Operations
3. Organization and Responsibilities
4. QA Goals, Objectives, and Standard Operating Procedures
5. Building Investigation and Diagnostic Tests
6. Mitigation System Design
7. Active Soil Depressurization System Installation
8. Post-Mitigation
9. Data Collection and Validation
10. Internal Quality Control
11. Quality Assurance Audits and Reports
12. Corrective Actions
13. Quality Assurance Training
14. Quality Assurance Standard Operating Procedures
15. References



7. ASD System Installation

- This section layouts the beginning of consideration involving standards and quality practices including:
 - Health and safety
 - ASD
 - Suction points
 - Pipe
 - Exhaust discharge
 - Fans
 - Sealing
 - Additional requirements for all systems



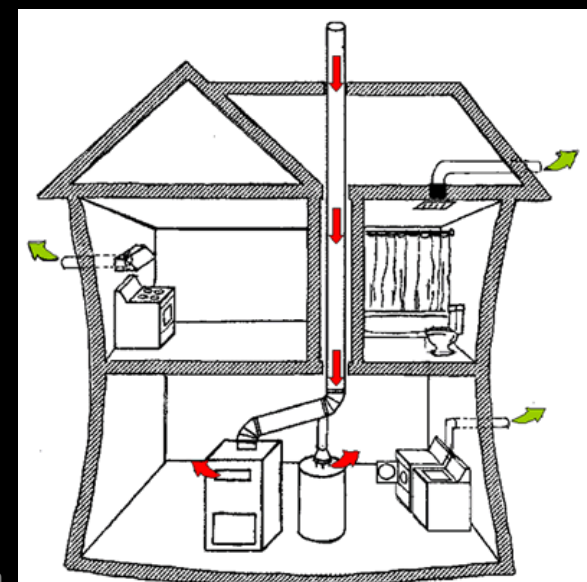
Our QAP Template Contents: Exhibits

Exhibits

- A. Client Contact Form**
- B. Access Notice**
- C. Visual Inspection Form**
- D. Client Notice: Atmospherically Vented Combustion Appliance**
- E. Pressure-Field Extension (PFE) Testing**
- F. ASD Suction Points**
- G. ASD Pipe**
- H. ASD Exhaust Discharge**
- I. ASD Fans**
- J. Sealing**
- K. Requirements for All Systems**

Exhibit D. Combustion Appliance Notice

- This notice is intended to inform the client:
 - Atmospheric ventilated appliances have been found
 - The importance that the client have these appliance inspected for proper operation by a qualified person
 - The risk of spillage of combustion pollutants into the home
 - The mitigator does not have the expertise to assess spillage potential
 - Radon mitigation seldom causes backdrafting
 - Where to obtain further information



Our QAP Template Contents: Appendices

Appendices

- A. Proposals and Notifications**
- B. Contracts, Warranties, and Limitations**
- C. Health and Safety Standard Operating Procedures**
- D. Mitigation Job Tracking Form**
- E. Complaint or Suggestion Form**
- F. Investigation and Corrective Action Form**
- G. Chain of Authorization and Duties**
- H. Internal Audit Checklist**

Appendix A. Proposals and Notifications

- According to the *Soil Gas Mitigation Standard*:
 - Written Proposals
 - Must include:
 - Mitigator's essential information
 - Description of the proposed system
 - Conditions of any warranty
 - Estimated installation and operating costs
 - Any contractor stated limitations
 - May include a number of items such as:
 - Estimated of time to complete installation
 - Design options for energy savings or amenities
 - Notifications



Rn Mitigation QAP

References

AARST undated circa 2013 *Quality Management Systems for Mitigation Professionals*, Fletcher, NC: American Association of Radon Scientists and Technologists

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ISO 2015 *ISO 9001: 2015 How to Use It*, Geneva, Switzerland: International Standards Organization

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