



Testing Correctly and Still Making Money

Dan Hylland

March 2020

About the Speaker

- Qualifications
 - Currently work for the Minnesota Department of Health – Radon Licensing Program
 - Owned and operated radon testing and mitigation company for 12 years
 - Started company with no prior knowledge of radon
 - Grew the company from one man shop to 5 employees doing about 450 mitigation systems a year
 - Over 12 years tested and mitigated thousands of homes, multifamily buildings and schools
 - Successfully sold the business in November 2018
 - Licensed contractor since 2006
 - Licensed real estate agent from 2005-2020

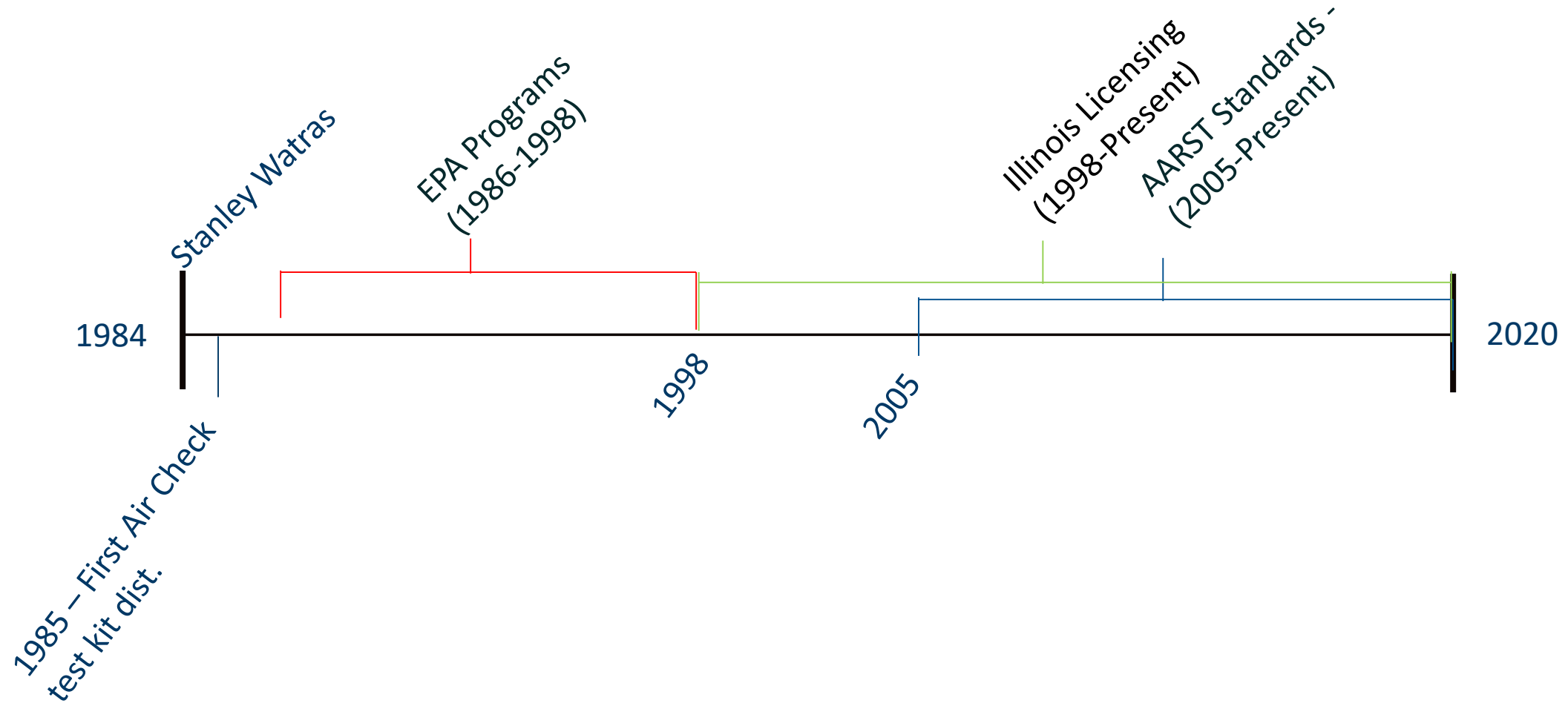
Agenda

- History and Challenges of the Radon Industry
- How to Deal with Competition
- Impact of Regulations
- How to Maintain Quality
- Efficiency = Profit
- Q & A

History of Radon

- 1984 – Boyertown, PA - The danger of radon exposure in dwellings was discovered by Stanley Watras, a construction engineer at the Limerick nuclear power plant.
 - 4,400 picocuries of radon per liter (pCi/L) of air in the cellar, 3,200 pCi/L in the living room, and about 1,800 pCi/L in each bedroom.

History of Radon Industry (36 years)



Some Important Dates

- **1986 EPA started the original Radon Measurement Proficiency (RMP) Program**
- 1988-89 EPA published some Interim Protocols
- ~1990-91 EPA Created the Radon Contractors Proficiency (RCP) Program
- 1992-93 EPA expanded the RCP to include Measurement Individuals (testers)
- 1992 EPA published their “Device Protocols”
- **1993 EPA published: Protocols for Radon Measurement in Homes**

Some Important Dates


- ~1993-94 EPA published their Radon Zone Map
- **1993 EPA published their Radon Mitigation Standards (addendum added in 1994)**
- 1995 EPA combined three proficiency program into the Radon Proficiency Program (RPP)
- **1995 EPA published their RPP Guidance on Quality Assurance (released in 1997)**
- **1998 EPA closed their RPP, and NRPP was born and associated with the National Environmental Health Association (NEHA)**
- 1998 Illinois starts licensing radon professionals
- 2004 WCCO aired the original Liz Hoffman radon story, and we finally figured out how to communicate the radon message.
- Peter Hendrick became the E.D. of AARST at a similar time and this started the pathway of having an actual radon industry.

Test Report – AARST Requirements from 2006

UNIVERSITY OF MINNESOTA

**Radon Training
for Professionals**
2005-2006

**Radon
Measurement
Course**


 **MURC**
MINNESOTA UNIVERSITIES RADON CONSORTIUM

Regional Radon Training Center
Founded by:
U.S. Environmental Protection Agency

Sponsored by:
University of Minnesota Extension Service
College of Human Ecology, University of Minnesota

Facilitated by:
College of Continuing Education, University of Minnesota
Division of Continuing Education, Kansas State University

www.cce.umn.edu/radon



Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (1/2)
6.5 Test Reports, Measurement Results

- Report shall contain all valid individual measurement results
- Measurements made in separate locations shall NOT be averaged
 - They must be reported individually
- The average of duplicate and collocated measurement devices shall be reported as well as the individual results
 - If the average of two measurements produces a result of 3.95 pCi/L, standard mathematical rules should be followed and such average shall be reported as 4.0 pCi/L.
- Any quality control measurements shall be reported as such
- Radon gas results shall not be reported to more than one figure after the decimal (e.g. 3.2 pCi/L)

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (1/2)
6.5 Test Reports, Test Conditions

- The report shall contain sufficient information to allow clients to compare the data and interpretations to any future tests
 - Should include**
 - A description of weather conditions
 - Any observed or discovered deviation from the required test conditions prior to or during the test period that the test company discovers, including deviation from a normal occupied temperature
 - Any deviations from standard measurement procedures
 - Whether the responsible individual signed the noninterference agreement
 - Description of the conditions of any permanent vents, such as crawl space vents or combustion air supply in combustion appliances and the rationale for their position during the test period.
 - Report shall document for the client that the test may not reflect the client's risk from radon if the conditions of the vents are altered from the conditions existing during the test period.

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (1/2)
6.5 Test Reports, Test Limitations

- The report should describe the general limitations of the test
 - An example is the following: "There is an uncertainty with any measurement result due to statistical variations and other factors such as daily and seasonal variations in radon concentrations due to changes in the weather and operation of the dwelling as well as possible interference with the necessary test conditions that may influence the results."
 - Recommendations
 - At least every two years or
 - When
 - Significant changes occur
 - To the home's structure (additions, alterations) or
 - To mechanical systems
 - Use of ground contact area not previously tested
 - Other (seismic shaking, earth quakes)

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test – Test Condition Verification

- The test should include methods to prevent or detect interference with testing conditions or with the testing device itself.
- The measurement professional or homeowner should be able to verify or provide documentation asserting that testing conditions were not violated during the testing period.
- Minimum requirements for verifying test conditions shall be fulfilled by
 - Informing the person responsible for building operation of the required test conditions
 - Obtaining or attempting to obtain a signed noninterference agreement
 - Posting a Radon Survey in Progress notification form
 - Conducting a visual inspection of the dwelling upon placement to assure all closed-building conditions are in tact

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (2/2)
6.5 Test Reports, Measurement Results

- Report shall contain all valid individual measurement results
- Measurements made in separate locations shall NOT be averaged (they must be reported individually)
- The average of duplicate and collocated measurement devices shall be reported as well as the individual results
 - If the average of two measurements produces a result of 3.95 pCi/L, standard mathematical rules should be followed and such average shall be reported as 4.0 pCi/L.
- Any quality control measurements shall be reported as such
- Radon gas results shall not be reported to more than one figure after the decimal (e.g. 3.2 pCi/L)

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (2/2)
6.5 Test Reports, Test Conditions

- The report shall contain sufficient information to allow clients to compare the data and interpretations to any future tests
 - Should include**
 - Hourly readings when available
 - Copies of signed noninterference agreements
 - If a permanently installed ventilation system (e.g., heat recovery ventilator or air-to-air heat exchanger) is active during the test
 - the report shall document for the client that the test may not reflect the client's risk from radon if the systems are operated differently than during the test period

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (2/2)
6.5 Test Reports – Maintaining Records

- Radon measurements can reflect a radiation exposure measurement.
- Because the effects of radiation exposure may not become apparent until many years have passed
 - Measurement data shall be kept for a minimum of five years
 - It is recommended that it be kept indefinitely.

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test – Test Condition Verification

- Minimum requirements for verifying test conditions shall be fulfilled by
 - Conducting a visual inspection of the dwelling upon retrieval of the detector including:
 - That all closed-building conditions are still being maintained.
 - Any changes in the detector placement
 - The condition of all sampler seals, and
 - Any abnormal variations in any of the measurements made
 - The measurement professional is not responsible for inspecting for closed-house conditions 12 hours before the start of the test or between placement and retrieval of the detectors

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (2/2)
6.5 Test Reports, Interpretations and Recommendations

- ... both written and verbal shall be provided in accordance with this document and as appropriate to
 - EPA's Home Buyer's and Seller's Guide to Radon and/or
 - EPA's Citizen's Guide to Radon
- The report shall include a statement outlining any recommendations concerning retesting or mitigation

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test (2/2)
6.5 Test Reports, Mitigation Status

- The test company shall include a statement in the test report if a mitigation system was observed in a dwelling during the placement or retrieval of the detector(s)
- Whether the mitigation system appeared to be operating
- A statement may be included in the report that the test company offers no findings as to the proper operation of the system

SAMPLE FORM:
NONINTERFERENCE AGREEMENT

I, the undersigned, agree to help ensure healthy conditions in my home. I understand that radon is a natural gas that is invisible, odorless, and tasteless. I understand that radon is a leading cause of lung cancer. I understand that radon testing is the only way to know if there is a radon problem in my home. I understand that radon mitigation is the only way to reduce radon levels in my home. I understand that radon testing and mitigation are the only way to protect my family's health.

I agree to the following conditions:

1. I will allow the radon test to be performed in my home for the required period of time.

2. I will allow the radon test to be performed in my home for the required period of time.

3. I will allow the radon test to be performed in my home for the required period of time.

4. I will allow the radon test to be performed in my home for the required period of time.

5. I will allow the radon test to be performed in my home for the required period of time.

6. I will allow the radon test to be performed in my home for the required period of time.

7. I will allow the radon test to be performed in my home for the required period of time.

8. I will allow the radon test to be performed in my home for the required period of time.

9. I will allow the radon test to be performed in my home for the required period of time.

10. I will allow the radon test to be performed in my home for the required period of time.

Conductive Measurements: AARST Standard – Additional Protocols

...Measurement Professionals: Performing the Test – Test Condition Verification

- The measurement professional is not responsible for inspecting for closed-house conditions 12 hours before the start of the test or between placement and retrieval of the detectors
- If at the initiation of the test the measurement professional discovers or observes that closed-house conditions were not maintained, one of the following options is required
 - Either the radon test can be postponed until at least twelve hours of closed-house conditions have been maintained prior to the test
 - Or, the radon test period can be extended to four days or more with an appropriate detector after closed-house conditions are initiated
 - Or with continuous monitors, device features or methods may be used to obtain an average reading that represents only data collected after at least twelve hours of closed-house conditions have been maintained



Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes

AARST CONSORTIUM ON NATIONAL RADON STANDARDS
www.radonstandards.us



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Late 80's Continuous Radon Monitor



SUN NUCLEAR RADON MONITOR Model 1023 PCi/I

Condition: **For parts or not working**

Price: **US \$119.00**

Buy It Now

Add to cart

[Add to Watchlist](#)

Longtime member

No returns

5 watchers

Shipping: **FREE** Standard Shipping | [See details](#)

Item location: Columbia, Missouri, United States

Ships to: United States | [See exclusions](#)

Delivery: Estimated between **Thu. Mar. 05** and **Mon. Mar. 09** to [?](#)

Payments:



PayPal CREDIT

No Interest if paid in full in 6 months on \$99+. [Apply Now](#) | [See terms](#)



Earn up to 5x points when you use your eBay Mastercard. [Learn more](#)

Returns: Seller does not accept returns | [See details](#)

Advances in Continuous Radon Monitor Options

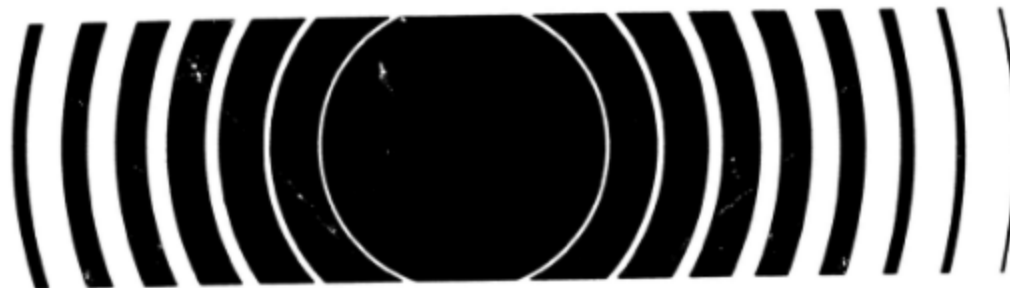
- NRPP currently has 35 approved CRMs
- New devices have much higher sensitivity
- Some units are much smaller
- New Bluetooth options
- Cloud based software
- Report customization

Make	Model	Sensitivity (cph/pCi/L)
Sun Nuclear	1027	2.7
	1028	2.7
	1029	6
	1030	15
AirThings	Pro	(4 sensors) 3.7
femto-Tech	510	18
Radalink	AirCat	25.2
RadStar	RS300	16
	RS800	24
	a310	10
	a516	16
	a830	28
Rad Elec	Recon	13-14
RWS	Breeze	30
RadonEye	RD200P	30



The National Radon Measurement Proficiency (RMP) Program

Cumulative Proficiency Report



A Report Listing
Radon and Radon Decay Product Measurement Companies

Company Name	Street	City	State	Zip
DUPAGE HOME INSPECTION	5117 MAIN ST	DOWNERS GROVE	IL	60515
ECO SERVICES	RR #1	MCHAB	IL	61335
ELLIOT & ASSOCIATES	148 N DREXEL	LA GRANGE	IL	60525
ENVIR HEALTH CONSULTANT INC	1606 N PROSPECT	CHAMPAIGN	IL	61820
ENVIRONMENTAL RISK CONSULTANT	1683 DORRINGTON, SUITE 1290	EVANSTON	IL	60201
ENVIRONMENTAL SERVICES INC		WESTERN SPRINGS	IL	60558
ENVIRONMENTAL SERVICES MIDWEST INC	4343 W LINCOLN HWY SUITE 102	MATTESON	IL	60443
ENVIRONMENTAL SVCS OF ILLINOIS	302 WEST STATE STREET	O'FALLON	IL	62209
ENVIROTECH SERVICES	201 SOUTH PAUL	SPRINGFIELD	IL	62703
FIRST ALERT - BDK ELECTRONICS	700 MCCLURE ROAD	AURORA	IL	60504-2495
GENERAL ENVIRONMENTAL MONITORING INC	3312 COMMERCIAL AVE	NORTHBROOK	IL	60062
GENEVIEVE MENNSEN	RR1	SECOR	IL	61771
GLENWOOD LABS	2 SCIENCE RD	GLENWOOD	IL	60425-1588
GREAT TRACERS	3 SCHENBECK RD	PROSPECT HEIGHTS	IL	60070-1435
GRUBB ELECTRICAL HEATING & COOLING	200 SOUTH ST	DANVILLE	IL	61832
GSF HEATING & COOLING	120 N CHAMBERS	GALESBURG	IL	61401
QUITTER PREPS	1942 RAYMOND DR	NORTHBROOK	IL	60062
H READ WIDNER		BLUE MOUND	IL	62513
HAEBERLE & ASSOCIATES	130 W LAFAYETTE	OTTAWA	IL	61350
MARY STAHL PLUMBING & HEATING	219 NORTH WALNUT	PRINCEVILLE	IL	61559
HBI INSPECTION SERVICES, INC	5710 S CENTRAL AVENUE	CHICAGO	IL	60638
HEALTH PHYSICS ASSOC	3312 COMMERCIAL AVE	NORTHBROOK	IL	60062
HELPS INC	702 ELM ST	GLEN ELLYN	IL	60130
HENRY'S PEST CONTROL	1110 N JEFFERSON	ROBINSON	IL	62454
HOME ASSURANCE, INC	17 BIRCHWOOD DRIVE	NAPERVILLE	IL	60540
HOME ASSURENCE	1533 AMBLESIDE CIRCLE	NAPERVILLE	IL	60540
HOME BUYER CONSULTANTS		CRYSTAL LAKE	IL	60014
HOME INSP CONSULT GREATER CHICAGO	4019 RANDOLPH	OAK PARK	IL	60302
HOME INSPECTION SERVICE INC	1918 SOUTHLAND	HIGHLAND PARK	IL	60035
HOME RATERS	3000 SKOKIE HWY	HIGHLAND PARK	IL	60035
HOMEBUYERS INSPECTION SERVICE INC	1000 E CHICAGO AVE	NAPERVILLE	IL	60540
HOMEX-HOME INSPECTION SERVICES	211 MAPLE	MANTENO	IL	60950
HOUSE DOCTOR SERVICES INC	2213 LOWELL BLVD	SPRINGFIELD	IL	62704
HOUSECHECK INC	900 S BISHOP	CHICAGO	IL	60607
HOUSEMASTER HOME INSPECTION SERVICE	5230 SPRING CREEK	ROCKFORD	IL	61111
HOUSEMASTER OF AMERICA	40 E DOWNER SUITE 303	AURORA	IL	60505
HOUSEMASTER OF AMERICA	5725 ST. CHARLES RD SUITE 211	BERKELEY	IL	60763
HOUSEMASTER OF AMERICA	18023 CHERRYWOOD LN	HOMEROD	IL	60430
HUNN PEST CONTROL	922 E LONDON ST	PEDRIA	IL	61603
I B E M T INC		CARBONDALE	IL	62902
IL HOME INSPECTION SERVICE	30 W WASHINGTON	CHICAGO	IL	60602
INS SERVICES	8 SOUTH 350 800K RD	NAPERVILLE	IL	60540
INSECT PEST CONTROL	PO BOX 236	LAWRENCEVILLE	IL	62439
INSECTO PEST CONTROL	909 JEFFERSON ST	LAWRENCEVILLE	IL	62439
JAMESON HOME PRODUCTS	2820 THATCHER RD	DOWNERS GROVE	IL	60515
JANICES PEST CONTROL	2506 NORTH KNOXVILLE	PEORIA	IL	61604-3024
JERRY GALLAGHER			IL	62522

Contractors

- 66 measurement contractors in Illinois - 1990 National Radon Measurement Proficiency Program (RMP)
- 144 radon licenses in Illinois in 1998
- 570 current radon licenses in Illinois in 2020

Challenges – Competition

- Low barriers to entry in unregulated states
- Race to the bottom to be cheapest
- Turnover rate of providers
- Low quality providers hurt the industry – snake oil salesman

Benefits of Competition

- Marketing increases awareness of the service/industry
- Competition increases quality – keeps you on your toes
- Even competition reinforces price points for customers
- Friendly competition (associations)
 - Learn from each other
 - Raise the professionalism of the industry

Overcome Competition

- What sets you apart?
 - Marketing
 - Brand loyalty
 - Price - create value
 - Availability – ease of scheduling
 - Quality service
 - Be the expert
 - Most experienced

Challenges – Regulation

- Extra paperwork
- Reporting
- CE
- Quality Control Requirements

- Weed out the “bad guys”
- Level the playing field
- Standards can be used to backup your decisions
- Increases quality of service
 - Keeps you honest

How to Overcome Regulation

- Know the rules
- Create processes to streamline the requirements

Challenges Pricing

- Price Limits
 - What competitors charge – supply/demand
 - Limit on what some buyers can afford
 - Limit on what can be negotiated to have seller pay for (tight market = less leverage)
- How to set pricing
 - Cost + %
 - Standard pricing or charge extra for extra tests or by location/distance
 - Guess?

Testing Process

- __5__ minutes - Receive call from customer or real estate agent
- __7__ minutes - Gather information on property
- __4__ minutes - Send out pre-test notification forms
- __20__ minutes - Drive to location
- __3__ minutes – Set tester
- __5__ minutes - Inspect property for multiple foundations / closed building conditions

Testing Process

- 20 minutes - Drive to location
- 5 minutes - Inspect property for closed building conditions and retrieve device
- 2 minutes - Download test data
- 4 minutes - Create report
- 5 minutes - Create invoice / collect payment / communicate results to client
- 3 minutes - Report to state agency if needed
- 2 minutes - Track results and possible QC tests
- 85 minutes total

Cost Approach

- \$16.88 - Test device (rent or purchase + yearly calibration)
 $(\$135/(2*4))$
- \$23.00 - Mileage/vehicle usage @ 57.5 cents / mile $(40*0.575)$
- \$38.73 – Labor $(83 \text{ minutes} * \$28/\text{hr Labor})$
- \$2.00 - Extra tests needed for quality control checks $(16.88/10)$
- \$80.61 Total Costs (also need to add other overhead costs)

- Licensing / training of technician
- Advertising to get the job
- Administrative costs
- Shop
- Unbillable hours

Cost Approach

Job Name:			
Address:			
Date:			
Installer: Dan / David			
Fan	Qty	Price	Total
HP 190	-	108.87	-
HP 2190		112.00	-
HP 220	-	140.50	-
HP 2133	-	102.50	-
GP501	-	188.50	-
Flex Couplings			
4" - 4"		5.00	-
4" - 4" White	-	10.25	-
4" - 6"	-	7.45	-
4" - 3"	-	5.10	-
4" - 4.5"	-	5.40	-
3" - 3"	-	4.10	-
2" - 2"	-	4.29	-
1.5" - 1.5"	-	2.60	-
Fan Cord		5.95	-
Manometer		7.75	-
Pipe Flashing		13.65	-
Cap			
4"		5.00	-
3"	-	4.75	-
Sump Cover			
21"	-	14.00	-
24"	-	19.00	-
28"	-	25.00	-
Grommets			
4"	-	6.50	-
3"	-	5.50	-
1.5"	-	4.00	-
EC	-	4.50	-
Fire Collar			
4"	-	27.00	-
Pipe Insulation (Feet)			
Large		0.78	-
Small	-	0.73	-
Foam (Cans)	-	2.50	-
Caulk (Tubes)	-	3.60	-
Misc.		5.00	-
Audible Alarm	-	49.95	-
Plastic (sq/ft)			
4.5 Mil		0.08	-
6 Mil		0.10	-
Exterior Mounted System			
Electrical Box	-	3.25	-
Switch Cover	-	3.40	-
Fan Guard	-	11.50	-
Conduit Fittings	-	2.00	-
Fan Cover			
Black		85.00	-
White	-	89.00	-
Downspout Material			
Downspout Coupling		3.09	-
Downspout Pipe		14.33	-
Downspout Elbow A		1.89	-
Downspout Elbow B			-
Sump Pump			
Zoeller Pump		125.34	-
Check Valve		10.32	-
1.5" Pipe		4.49	-
1.5" Male Adaptor		0.93	
1.5" 45		0.73	
1.5" 90		0.61	-
4" Pipe / Fittings			
Pipe		10.29	-
90		3.50	
90LT	-	6.99	
90 Street	-	5.77	-
45	-	2.89	-
45 Street	-	2.68	-
22.5	-	4.50	-
22.5 Street	-	4.99	-
60	-	8.99	-
Coupling		1.67	-
Slip Coupling	-	5.50	-
Cap	-	4.50	-
4x4x4 Tee (Double Cleanout)	-	14.25	-
4x4x4 Tee	-	4.59	-
4" SDR - 4" DWV	-	4.94	-
SDR Coupling	-	1.14	-
3" - 4" Reducer	-	3.89	-
Plastic J Clamp		0.79	-
Adj. Pipe Hanger	-	1.97	-
Plastic C Clamp	-	0.65	-
Metal U Clamp	-	1.42	-
3" Pipe / Fittings			
Pipe 3"	-	7.89	-
90	-	1.73	
90 LT	-	4.10	-
90 Street	-	2.64	-
45	-	2.34	-
45 Street	-	1.57	-
22.5	-	3.50	-
22.5 Street	-	3.79	-
60	-	5.99	-
Coupling	-	1.14	-
Slip Coupling	-	3.54	-
Cap	-	3.25	-
4x3 Closet 90	-	4.10	-
4x4x3 Tee	-	9.99	-
3X3X3 Tee	-	2.50	-
2" - 3" Reducer		1.42	

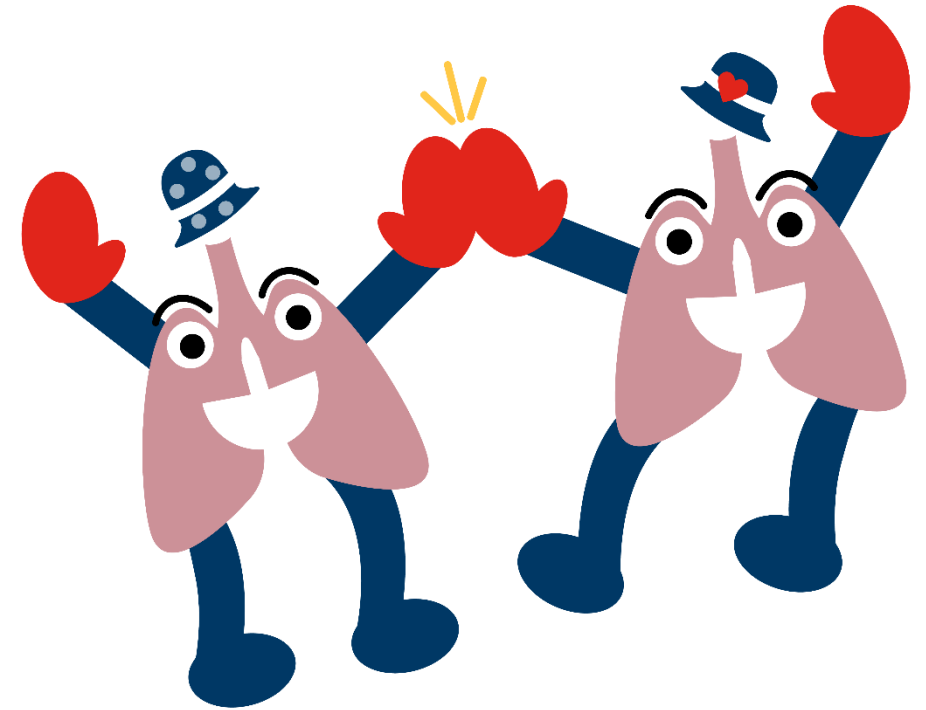
Maintain Quality – Why is a Radon Test Performed?

- Decide to mitigate
 - Provide a clear characterization of the radon hazard
 - Compare test result to an action level



How to Maintain Quality

- Was it a “good” test?
 - Variables
 - Person doing the test
 - Device used
 - Testing environment
 - (similar to what occupant would be exposed to)



Home's Radon Level Fluctuations

- Seasonal
- Weather related
- Home use
 - Dryer
 - HVAC balance
 - Bathroom fans
- Time of day
- Location of tester

Maintain Quality

- Report captures and records everything about the test
 - If a tree falls in the woods...



Basic Device Printout

```
-----  
Professional  
Radon Monitor  
  
Start Date :  
Start Time :  
End Date :  
End Time :  
Serial # :  
Location :  
  
Signature:  
  
Data in pCi/l  
Time Interval 1 Hr  
  
2.0 2.0 2.0  
5.6 3.2 4.8  
3.6 3.6 3.6  
5.2 2.4 3.6  
  
4.0 2.4 3.6  
2.4 0.3 4.8  
3.6 1.5 4.4  
2.8 2.4 5.6  
  
3.2 2.8 4.8  
3.2 5.6 2.4  
4.8 2.8 6.0  
5.6 3.6 4.0  
  
4.0 6.4 3.6  
3.6 5.2 4.4  
4.4 3.2 2.8  
2.4 4.8  
  
Overall Avg.= 3.7  
EPA Protocol Avg.= 3.8  
0 4 8  
  
|+-|+-|+-|+-|+-|+-|+-|+-|  
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- Anyone who reviews the test results needs to be able to evaluate it

- Mitigator

- ANSI/AARST SGM-SF 2017 4.1.1 Available test results

Any available test results **shall** be reviewed in developing an appropriate mitigation strategy. If the most recent radon tests were not performed in accordance with the EPA, state or ANSI/AARST measurement protocols, the client shall be informed, and a retest **shall** be recommended.

- Buyer/Seller
 - Customer
 - Radon measurement providers (and you)
 - Certifying / licensing entity

- Protect yourself from:
 - Retesting for free
 - Angry customers
 - Lawsuit?
- Set yourself apart as a “professional” and justify the cost
- Use regulations to defend yourself, “I did the test according to the standard”

< RADON TEST REPORT >

START DATE 8/25/08

START TIME 16:34

OPERATOR Dan Holland

SERIAL NO. - CRM5106040
C/F (CPM/pCi/l) .353
BKG (pCi/l) .6

Hr	Conc. pCi/l	L B	RH %	B/P °F	Def
----	----------------	--------	---------	-----------	-----

1	28.2				72
2	28.2				71
3	28.2				71
4	28.2				71
5	28.2				71
6	28.2				72
7	28.2				72
8	28.2				72
9	28.2				71
10	28.2				71
11	28.2				71
12	28.2				71
13	28.2				71
14	28.2				71
15	28.2				71
16	28.2				71
17	28.2				71
18	28.2				71
19	28.2				71
20	28.2				71
21	28.2				71
22	28.2				71
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24	28.2				71
25	28.2				71
26	28.2				71
27	28.2				71
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29	28.2				71
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31	28.2				71
32	28.2				71
33	28.2				71
34	28.2				71
35	28.2				71
36	28.2				71
37	28.2				71
38	28.2				71
39	28.2				71
40	28.2				71
41	28.2				71
42	28.2				71
43	28.2				71
44	28.2				71
45	28.2				71
46	28.2				71
47	28.2				71
48	28.2				71
49	28.2				71
50	28.2				71
51	28.2				71
52	28.2				71
53	28.2				71
54	28.2				71
55	28.2				71
56	28.2				71
57	28.2				71
58	28.2				71
59	28.2				71
60	28.2				71
61	28.2				71
62	28.2				71
63	28.2				71
64	28.2				71
65	28.2				71

66	7.5	63	27.9	71
67	7.2	63	27.9	72
68	7.4	63	27.9	72
69	7.3	63	27.9	72
70	7.5	63	27.9	72
71	6.8	63	27.9	72
72	6.6	63	27.9	72
73	6.4	63	27.9	72
74	6.3	63	27.9	72
75	6.1	64	27.9	72
76	6.7	64	27.9	72
77	10.3	64	27.9	72
78	9.1	64	28.0	72
79	11.2	63	28.0	71
80	10.8	61	27.9	69
81	10.4	61	27.9	67
82	10.2	61	27.9	67
83	10.7	61	27.9	67
84	5.7	61	27.9	67
85	7.1	61	27.9	67
86	7.0	61	27.9	67
87	7.6	61	27.9	68
88	7.7	60	27.9	69
89	8.2	60	28.0	70
90	9.9	59	28.0	72
91	10.5	59	28.0	72
92	12.2	60	28.0	72
93	10.5	60	28.0	72
94	10.8	61	28.0	72
95	10.5	61	28.0	72
96	9.8	61	28.0	72
97	9.4	62	28.0	72
98	8.7	62	28.0	71
99	8.7	62	28.0	71
100	6.7	62	28.0	71
101	5.5	63	28.0	71
102	6.2	63	28.0	71
103	6.0	63	28.0	70
104	6.1	63	28.0	70
105	7.2	63	28.0	70
106	8.2	64	28.0	70
107	10.6	64	28.0	69
108	10.1	64	28.0	69
109	9.7	64	28.0	69
110	9.9	63	28.0	69
111	11.5	63	28.0	69
112	10.7	62	28.2	70
113	11.9	62	28.2	71
114	9.4	61	28.2	72
115	9.8	61	28.2	72
116	10.0	61	28.2	73
117	9.2	61	28.0	72
118	9.7	62	28.0	72
119	7.0	62	28.0	72
120	7.5	62	28.0	72
121	7.6	62	28.0	72
122	8.6	63	28.0	72

123	7.4	63	28.0	72
124	5.8	63	28.0	72
125	5.8	63	28.0	72
126	4.7	64	28.0	72
127	4.7	64	28.0	72
128	5.2	64	28.0	72
129	5.1	64	28.0	72
130	4.4	64	28.0	71
131	5.9	64	28.2	71
132	7.4	64	28.2	71
133	8.2	64	28.2	70
134	8.4	64	28.2	70
135	9.9	64	28.2	70
136	9.3	64	28.2	72
137	9.0	63	28.2	72
138	7.7	63	28.2	74
139	7.5	62	28.0	74
140	6.6	62	28.0	74
141	5.0	62	28.0	74
142	4.4	63	28.0	74
143	4.6	63	28.0	73
144	3.8	63	28.0	73
145	3.1	63	28.0	73
146	2.8	63	28.0	73
147	2.4	63	28.0	73
148	2.7	63	28.0	73
149	2.4	64	28.0	72
150	1.9	64	28.0	72
151	2.5	64	28.0	72
152	2.4	64	28.0	72
153	2.7	64	28.0	72
154	3.2	64	28.0	72
155	3.1	64	28.0	72
156	3.2	64	28.0	72
157	2.8	64	28.0	71
158	3.1	64	28.0	71
159	2.4	64	28.0	71
160	2.8	64	28.0	72
161	3.9	63	28.0	73
162	2.8	63	28.0	74
163	3.7	63	28.2	75
164	3.6	64	28.2	75
165	3.5	64	28.2	75
166	2.5	64	28.2	75
167	2.1	65	28.0	75
168	1.9	65	28.2	75
169	2.4	66	28.0	75
170	1.7	66	28.0	75
171	2.0	66	28.0	75
172	1.6	68	28.0	75
173	.5	70	28.0	75
174	.4	70	28.0	76
175	.2	68	28.0	75
176	.3	66	28.0	72
177	.6	64	28.0	71
178	.9	63	27.9	69
179	.5	63	27.9	68
180	.8	64	27.9	68
181	.9	64	27.9	68

Elapsed Time (min.) 10860
Total Count 26289
Avg. (pCi/l) 6.2

Radon Test Report

Company Name

Client Information

Name:

Test Address:

City: State: Zip Code:

Device Information

Test Unit #1

Manufacturer & Model: Serial #: Calibration Date:

Test Location:

Start Date: Start Time: End Date: End Time:

Average Radon Level: pCi/L

Test Unit #2 Not applicable: ☐ Duplicate for QA: ☐ Different Foundation: ☐

Manufacturer & Model: Serial #: Calibration Date:

Test Location:

Start Date: Start Time: End Date: End Time:

Average Radon Level: pCi/L

- If test #2 was for QA, the average radon results is pCi/L. This value should be used for mitigation decisions.
- If multiple foundation types were tested, consider the results separately for mitigation decision.

Radon Test Data

Attached to this report is a copy of the actual test data taken from a Minnesota Department of Health approved testing device. The test was performed in accordance with the current ANSI/AARST standards and guidelines accepted for radon testing.

Placed Test Device:

Licensed Radon Professional MDH License Number

Email: Phone:

Retrieved Test Device:

Licensed Radon Professional MDH License Number

Email: Phone:

CONDITIONS OBSERVED DURING THE TESTING PERIOD

Radon levels in a home can be influenced by many factors including weather, season, living conditions, and occupancy patterns. Temporary conditions observed during the test period may cause the test to not reflect the client's risk from radon. The radon levels stated for this time period had the following situations present:

The noninterference agreement was: **Signed / Not Signed** (circle one)

The required test conditions were observed at deployment and retrieval (circle one): **Yes / No** (Deviations described below)

- ☐ Property was vacant during testing.
- ☐ Testing device(s) was placed in a location that doesn't meet minimum requirements of this standard and the reason was unavoidable because, _____.
- ☐ Closed building conditions were not found.
- ☐ Building temperature was outside of normal occupied range of 65 – 80 degrees.
- ☐ Radon testing device was moved during the test.
- ☐ In the measurement professional's opinion, test data produced by the CRM may indicate interference or deviation from testing protocols.
- ☐ Tamper resistant features of the device or other methods, indicate possible interference with testing conditions.
- ☐ A radon mitigation system was observed. It appeared to be operational. (circle one): **Yes No Unknown**
- ☐ A temporary mitigation strategy were observed. (describe) _____
- ☐ A heat recovery ventilator or air-to-air heat exchanger, is installed in the building. **YES / No**
 - Operating during the test? **Yes / No** at _____ setting
 - Functional and properly maintained? **Yes / No / Unknown** _____
 - Intake free of obstacles/debris? **Yes / No** _____
- ☐ Unusually severe storms or periods of unusually high winds occurred during the test.
- ☐ Passive crawlspace vents to the outside **Open / Closed**.
- ☐ Active or passive air supplies to the building or to combustion appliances were **operating as intended / blocked**.
- ☐ Forced-air HVAC System? **Yes / No**
 - Fan Setting **On/Auto/Off**.
- ☐ Sub-slab return ducts? **Yes / No**
 - Air handler fan activity was minimal during test period? **Yes / No** _____

☐ Unavoidable construction activities were being done to the house that could possibly have affected radon levels, described as: _____

☐ Other temporary factors that could have influenced the test results, including: _____

RECOMMENDATIONS

Test result is 4 pCi/L or greater:

- ✦ Fix the building if test results indicate occupants may be exposed to radon concentrations that meet or exceed the EPA recommended action level of 4 pCi/L.
 - Efforts to reduce radon concentrations are not complete until retests provide evidence of effectiveness
 - Initiate short-term radon testing no sooner than 24 hours after a mitigation system is operational and within 30 days after installation of the system(s).
 - If radon mitigation has been conducted, test at least every two years to ensure the system remains effective.

Test result is between 2 and 4 pCi/L:

- ✦ Consider fixing the building if test results indicate radon concentrations greater than half the action level (2-4 pCi/L)
- ✦ Tests conducted when heating systems are active both day and night are more likely to provide a clear characterization of potential radon hazards.

When to Retest:

- ✦ Retest the building at least every five years if no mitigation system is installed.
- ✦ Retest in conjunction with any sale of new or existing buildings.
- ✦ In addition, be certain to test again when any of the following circumstances occur:
 - a new addition is constructed or alterations for building reconfiguration or rehabilitation occur;
 - a ground contact area not previously tested is occupied, or a home is newly occupied;
 - heating or cooling systems are significantly altered, resulting in changes to air pressures or pressure relationships;
 - ventilation is significantly altered by extensive weatherization, changes to mechanical systems or comparable procedures;
 - significant openings to soil occur due to:
 - groundwater or slab surface water control systems that are altered or added (e.g., sumps, perimeter drain tile, shower/tub retrofits, etc.) or,
 - natural settlement causing major cracks to develop;
 - earthquakes, construction blasting, or formation of sink holes nearby; or
 - a mitigation system is altered, modified or repaired.

RADON INFORMATION

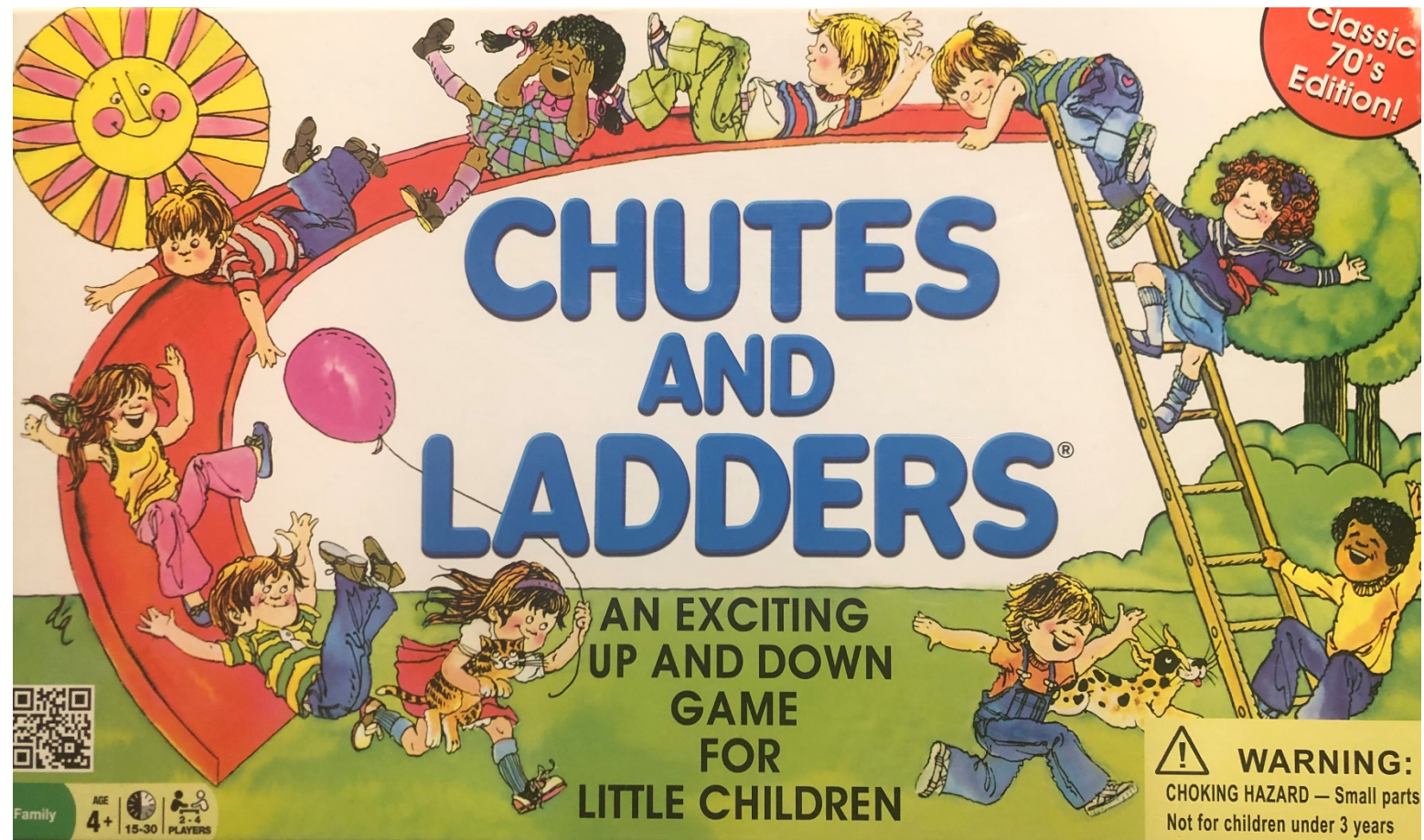
For more information on radon, please contact the Minnesota Department of Health at 651-201-4601 or health.indoorair@state.mn.us or visit their website at mn.gov/radon.

RADON TEST DATA

Attached to this report is a copy of the actual test data either taken from the testing device or provided from the analytical laboratory. This test was done with a <name of testing device> a Minnesota Department of Health approved testing device. The test was performed in accordance with the current ANSI/AARST standards and guidelines accepted for radon testing.

Radon Test Start to Finish

Radon Testing Edition!



5443 Ridgeview Dr NW Rochester, MN 55901



- Interior Inspection Video
- Exterior Inspection Video

Radon Test Start to Finish

- Initial contact and scheduling
 - Gather Info – vacant, new const, # tests, access, pre test notice
- Test Placement
 - Notice of required test conditions / non-interference agreement
 - Multiple foundations
 - Choose proper location
 - Visual Inspection / Video
 - Documentation
 - Air exchangers
 - What to do if proper conditions are not present?
- Test Retrieval
 - Visual Inspection / documentation

Radon Test Start to Finish

- Test Report
 - Why it is important?
 - What is required?
 - What format?
 - Who receives it?
- Submit info to Regulators –
 - What is the information used for?
- Record in QC spreadsheet

- Create repeatable business practices
- Growth emphasizes inefficiencies
- Use internal forms or technology
- Communication and proper notification of required test conditions
- Scheduling is key!

Radon Test Internal Form

CUSTOMER INFO:

Drop off date: _____ Pick up date: _____
Drop off time: _____ Pick up time: _____
Customer name: _____ Same ☐
Address: _____ Job Address: _____
Phone: _____ Year built: _____
Cell: _____
E-mail address: _____
Notified about closed windows 12 hours prior to
test start time: ☐ Yes ☐ No
Who: _____

Real Estate: ☐ Yes ☐ No Closing date: _____ ☐ Meet _____ ☐ Let myself in
Vacant: ☐ Yes ☐ No
☐ Buyer ☐ Seller
Realtor name: _____ Realtor name: _____
Realtor phone: _____ Realtor phone: _____

TEST RESULTS:

Test location: ☐ Basement ☐ Paid _____
☐ Basement Bedroom ☐ Not paid _____
☐ Basement Living Room ☐ Free passive test
☐ _____

Weather conditions: ☐ Seasonal ☐ Cold ☐ Warm ☐ Rainy
☐ Windy ☐ Hot ☐ Normal ☐ Snowy

☐ Radon Test (Continuous Radon Monitor) \$ _____ Tester #: _____
Test start date: _____ Test end date: _____ Test level: _____ pCi/L
Test start time: _____ Test end time: _____

Notes to customer: _____

☐ Windows open at drop off: SKIP 1st 12 HRS ☐ Windows open at pick up: Recommend retest

CREDIT CARD PAYMENT:

Cardholder name: _____ Zip code: _____

☐ American Express ☐ Mastercard
☐ Discover ☐ Visa

Credit card #: _____

Expiration date: ____/____

Security code: ____

E-mail address to send receipt: _____

Limits and Opportunities

- What is the maximum you can earn?
 - How many tests can you do?
 - What is your margin?
- How much more can you earn if you hire an employee?
- Can someone else do a task better than you?
 - Paperwork / scheduling / billing
 - Customer relations
 - Marketing / social media
- Are you cut out to be a boss?

Thank you!

Dan Hylland

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651-201-4921