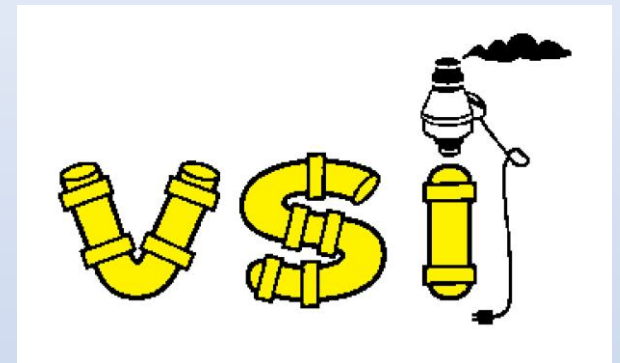


SUMMARY OF SOLUTIONS FOR 175 ACTIVE MITIGATION FAILURES

KEITH VOLSTED, FOUNDER/CEO

VSI RADON REDUCTION CORP.

INGLESIDE, IL USA



REFERENCE MATERIAL

In house documentation from 2017-2022

6 years of data

VSI Radon Reduction Corp.

What qualified as a failure?

Illinois requires an independent post mitigation test. All systems failed to reduce radon levels below 4.0 pCi/L by an independent test during 2017-2022. (4 system were between 3.1-3.9 pCi/L)

DIAGNOSTICS

Usually consisted of

- visual inspection
- grab samples
- communication tests

Data consists of active (fan) mitigation systems only.

174 Single family homes

1 Multifamily home

3 Competitor systems

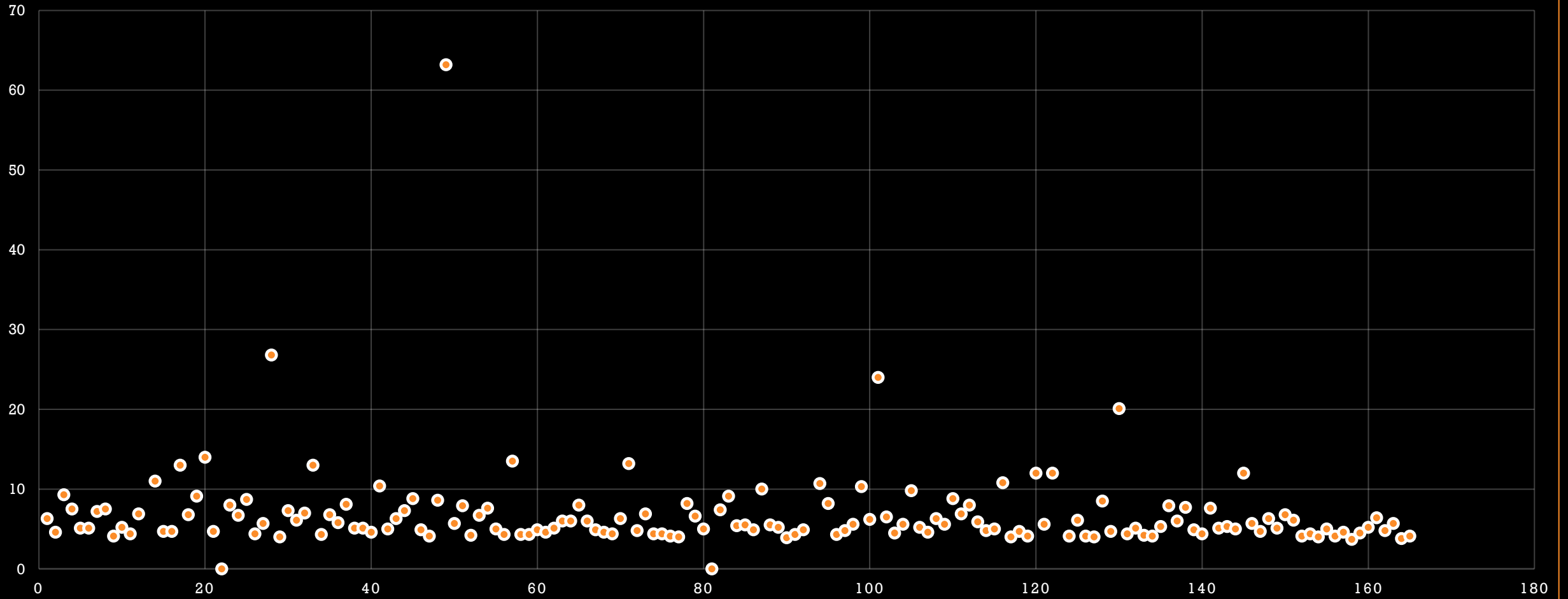
10 Builder pre-installed systems that we activated.

23 system older than 1 year

139 Installations, retested within 3 weeks of installation

Rn lvl

FAILURE RN LEVEL

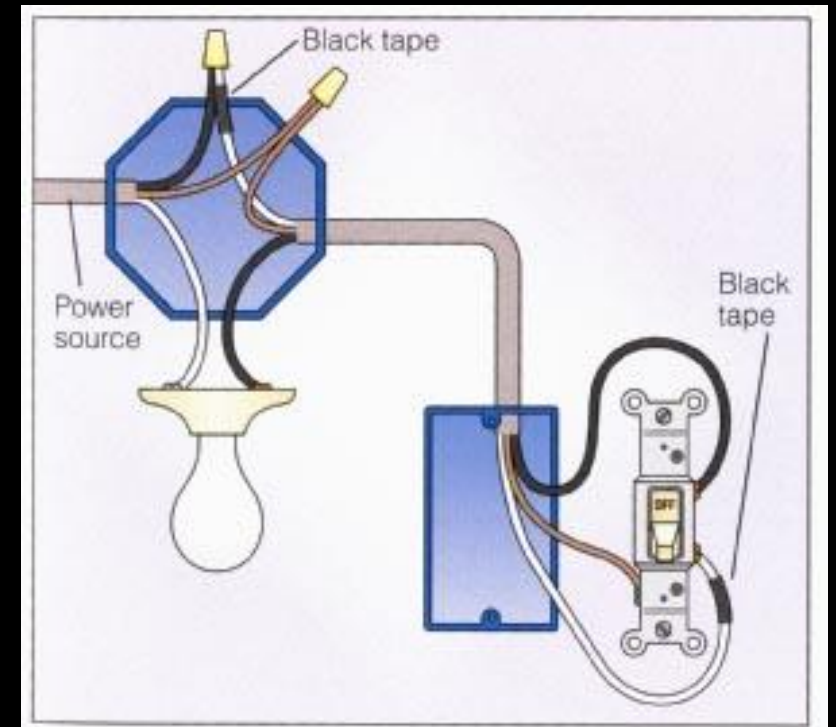


A SPREADSHEET WAS CREATED USING DATA WE TRACKED AND NOTES

- Failure Rn lvl
- Post test
- Passive new construction pipe.
- Fan model
- # suction point
- Original u-tube
- Failure u-tube
- Finale u-tube
- Home sq footage
- # stories
- Age of home
- # foundations/types
- # attached garage(s)
- % finished basement
- # sumps
- Water noted (sump & floor)
- Installation date
- Communication results
- And a few more....

FINDINGS

- 12 systems failed due to fan tied into a switched wire.



10 SYSTEMS – DIAGNOSTICS ONLY

- 1- Failed due to freezing
- 3- Failed due to Weather?
- 3- Needed additional work. Owner never scheduled with us

DIAGNOSTICS ONLY

- 1- Failed due to Wi-Fi booster.
(Interfered with owners Rn monitor)
- 1- Owner disconnected electrical when changing ceiling fan. (Builder pre-installed pipe)

DIAGNOSTICS ONLY

1- FAILED DUE TO A
GRANITE COUNTERTOP.

20.4 PCI/L ON COUNTER.

1.0 PCI/L – 3 FEET AWAY.



ONE-OFF

Proper inspection is important!
HVAC Returns below slab were missed
by initial inspector and installer.

Not sure if returns were sealed or
abandoned. Post test 0.1 pCi/L



152

NUMBER OF SYSTEMS WE COULD COMPARE DATA

- That are similar
- Problem was found
- Additional work was performed
- Retested below 4.0 pCi/l

DID TIME OF YEAR EFFECT FAILURES?

- January ----- 11
- February----- 7
- March----- 7
- April----- 11
- May ----- 17
- June----- 15
- July ----- 14
- August----- 20
- September--17
- October----- 16
- November--- 9
- December--- 8

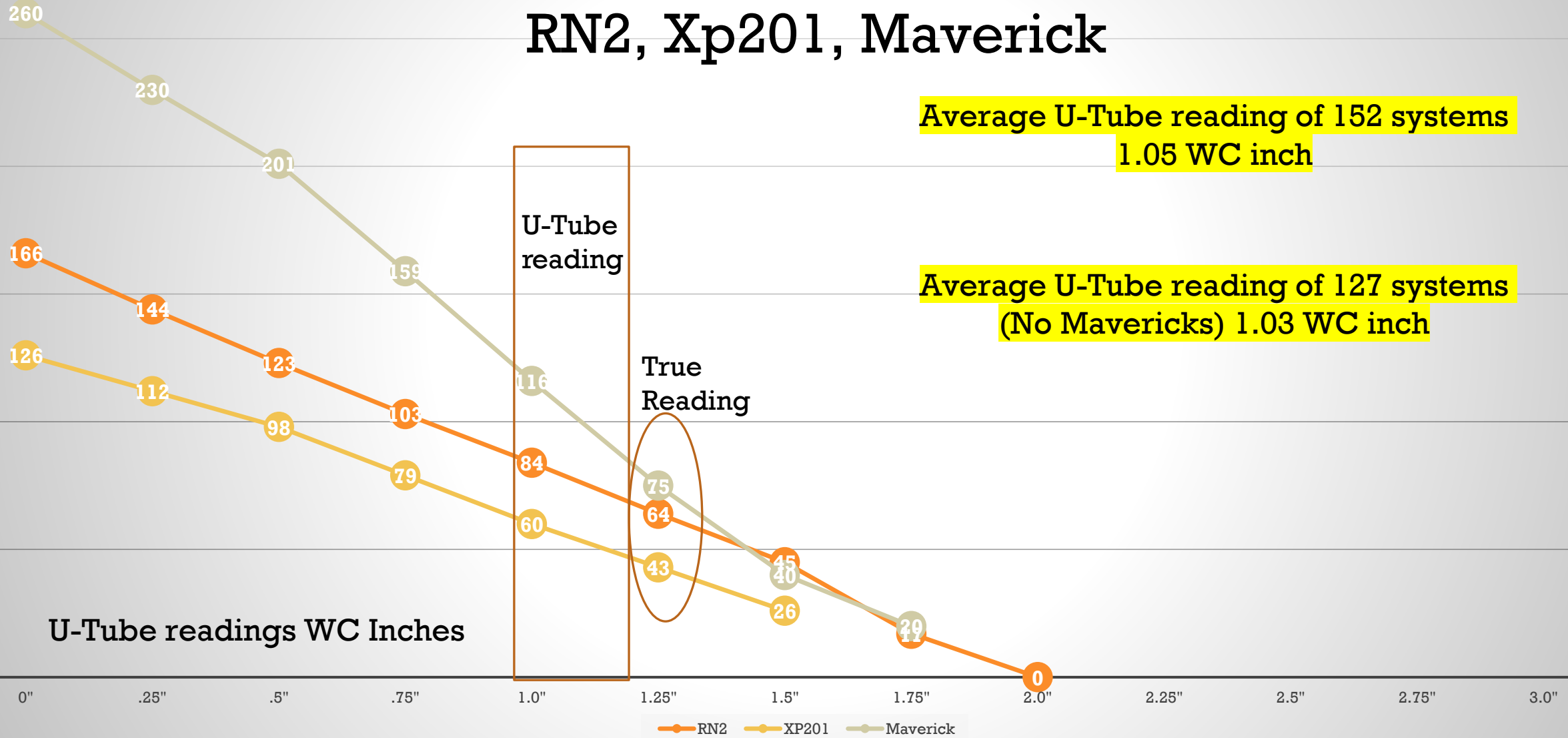


FANS INITIALLY INSTALLED

- 1 - Rn4 (not our install)
- 1 - Rp145 (not our install)
- 8 – Prowlers (higher suction)
- 18 - xp201
- 24 - Mavericks
- 100 - Rn2

Initial installation U-Tube readings

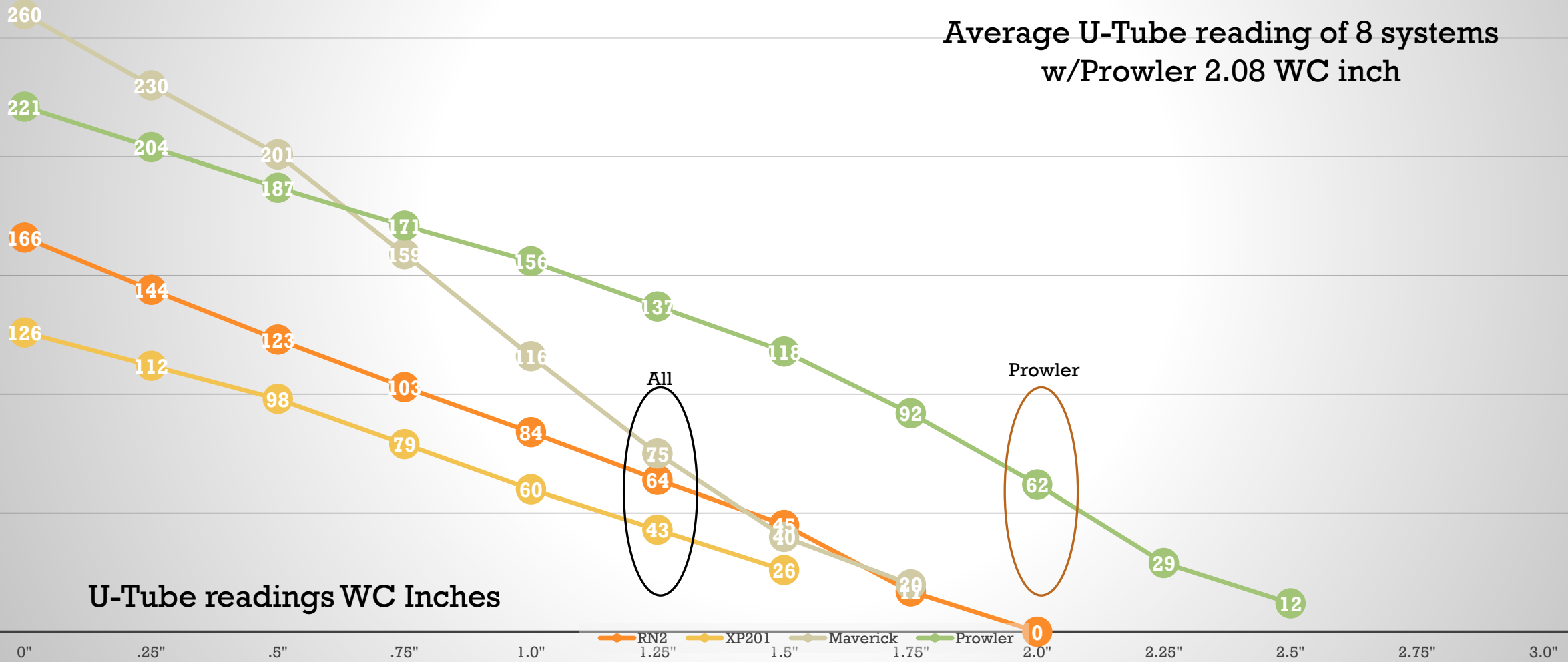
Avg Air flow RN2, Xp201, Maverick



Initial installation U-Tube readings

Prowler

Average U-Tube reading of 8 systems w/Prowler 2.08 WC inch



U-Tube readings WC Inches

All

Prowler

- RN2
- XP201
- Maverick
- Prowler

Missing post measurements

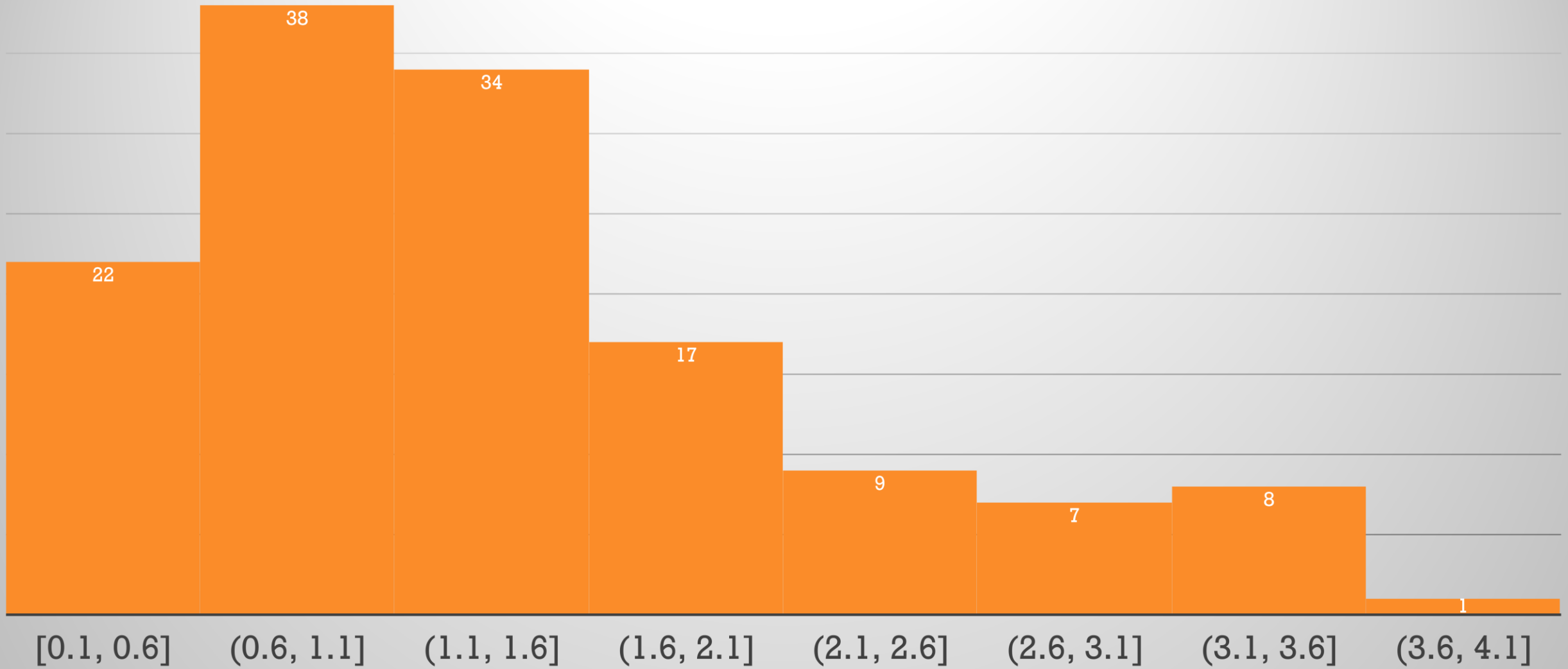
Confirmed post measurement data on 136 of the 152 systems, after repairs.

Homeowners had their own monitor and did not contact us.

Person picking up our monitor failed to note the Rn Level.

Not notified of the post test result.

Post Rn level – 136 systems



THE START OF FAILURE REVIEW

2017 FAILURES

- A look at failures that could have been avoided.
- Failures that are out of your control.
- How to avoid losing bonus money.

6 THINGS INSTALLERS MUST DO

1. U-tube shows minimum air flow – usually below Manufacture Min airflow
2. Communication across floor
3. All areas addressed or have communication
4. Suction point is dug out
5. Electrical is good
6. All openings have been sealed properly

FINDINGS

- 64 systems DID NOT have full communication.
 - 5-Needed 2nd systems.
 - 23-Installer at fault. (36%)
- 60 systems HAD communication.
 - 4-Needed 2nd systems.
 - 3-Installer at fault. (5%)

OUT OF 152 FAILURES

- It was found the installer did not follow procedures on 33 systems (21.7%)

On its own, this does not always cause the failure, but does cost extra time, trip and money

STATS – 152 FAILURES

- Avg Square feet of home 3061
- Avg age – built in 1985
- # stories, 52- 1 story, 98-2 story, 1-3 story, 1 split level
- 142 homes had attached garages – NOT counted in foundation totals.
- Avg number of foundations (footprint) – 1.4
- Avg number of suction point (final) 2.3

64- DID NOT HAVE FULL COMMUNICATION (CONFIRMED)

- 5 – Builder preinstalled systems.
- 6 – Removed or restricted airflow to one or more suction points
- 51 – Had sump pits (80%)
- 5 – Water levels contributed to failure.
- 8- Required additional sealing
- Only 1 system had a fan upgraded with no additional suction points.

60- HAD FULL COMMUNICATION

- 3 – Builder preinstalled systems.
- 2 – We Restricted airflow to one or more locations
- 56 – Had sump pits (93%)
- 4 – Water levels contributed to failure.
- 2- Required additional sealing

ADDITIONAL SUCTION POINT ADDED

- 60- With full communication

Floor	Sump	Garage	Slab	Crawl	Window well	Wall
0	10	16	1	0	5	32

- 64- Without communication

Floor	Sump	Garage	Slab	Crawl	Window well	Wall
25	12	11	0	3	0	14

80% of failures were due to a source not from the basement floor.

28 SYSTEMS WITH UNCONFIRMED COMMUNICATION

Additional suction points added.

Floor	Sump	Garage	Slab	Crawl	Window well	Wall
1	2	7	2	2	2	4

- 9 – Older systems that failed
- 2 – Not our original installation
- 4 – Had ductwork below slab
- 1 – Debris in exhaust/additional sealing & suction
- 1- Fan failure

- 10 – Installed higher suction fans & added suction point (Prowler)
- 2 – Installed higher suction fans only.

Wall suction



8 Failures with prowlers

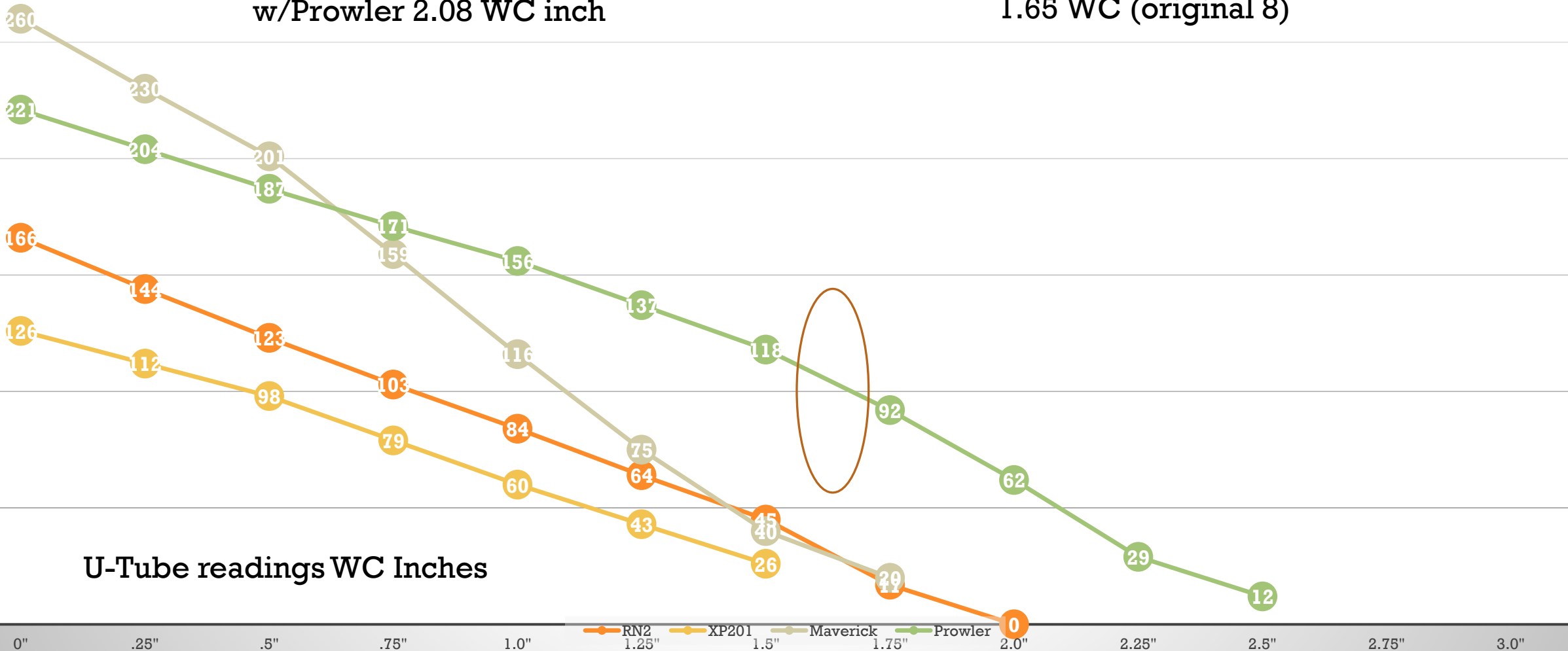
U-Tube		RN Lvl		Corrections
Original	Final	Failed	Final	
1.1	0.6	7.7	1.6	Had comm across floor. 2 nd system in window well. 90% Fin Bas
1.5	0.2	6.8	0.4	(Older system-2008) Added suction to floor. Sealed ducts below floor. Replaced sump pump.
2.4	2.4	3.8	1.6	Had suction points in floor and garage. Wet sand. Water failure likely. Added passive vent pipe to sump pit on opposite side of basement.
2.2	1.7	5.1	1.9	Added suction to wall.
2.2	1.7	5.1	1.3	Had Comm across floor. Added suction to wall.
2.3	1.6	13.2	0.9	Had Comm across floor. Added suction to wall.
2.5	2.5	5.6	<4.0	Removed additional Mat from suction point.
2.5	2.5	4.1	0.8	Added suction point to floor.

Prowler – max 2.5 WCI

Average U-Tube reading of 8 systems

Initial installation
w/Prowler 2.08 WC inch

Post repairs
1.65 WC (original 8)



U-Tube readings WC Inches

● RN2
 ● XP201
 ● Maverick
 ● Prowler

HIGHER SUCTION FANS

- 8 initial systems with Prowlers. 1-Needed 2nd system.
3-Installer at fault. (37.5%)
- 15 systems. Fan upgraded to Prowler. 2-Needed 2nd system.
3-Installer at fault. (20%)

SHORT CIRCUIT OF AIRFLOW EXAMPLE (1 HOME) X2

- Full basement – 80% finished + attached garage.
- Failed at 5.6 pCi/l. Added suction to garage floor, failed 9.2 pCi/l
- Added 2nd system with suction on floor.
- Removed garage floor suction point.
- Post test 2.2 pCi/l

THE END