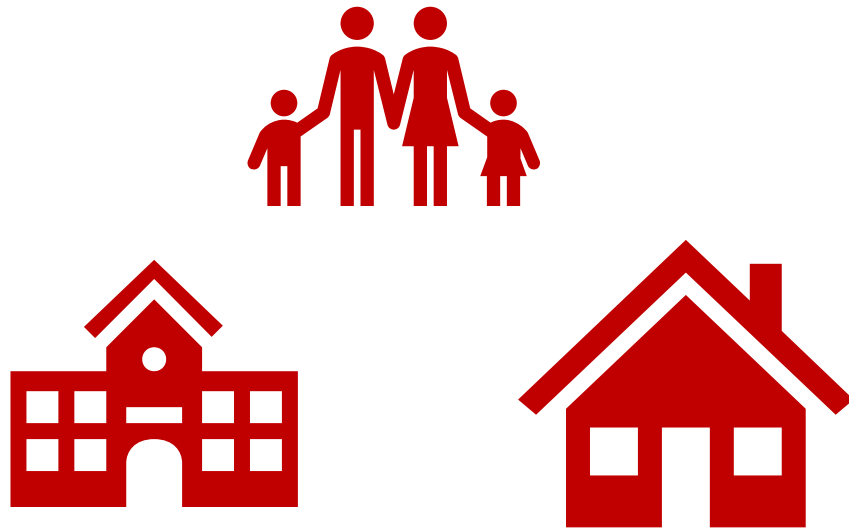


Reducing Radon in Child Care Centers

~Case Studies~

Cody Wright
Synergy Home Inspections
C-NRPP # 201559/201560

Special thanks to Pam Warkentin of
CARST & C-NRPP



Background:



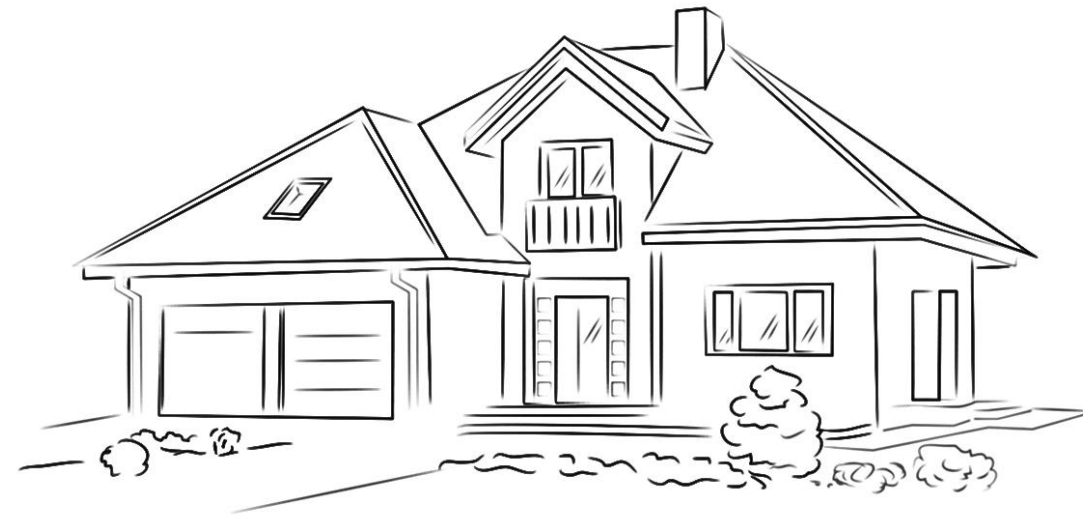
- ▶ Some governing bodies require mandatory radon testing of child care facilities, and if levels are elevated, mitigation is required.
- ▶ Expect requirements to expand throughout the country.

Case Study # 1: Residential Child Care

HOUSE DETAILS:

- ▶ Tested above 1,000 Bq/m³;
- ▶ Residential structure;
- ▶ owned by owner/operator
- ▶ Family lived upstairs with child care center in the basement

- ▶ 2 storey home with basement
- ▶ ~2500 sq ft
- ▶ Built in 2000
- ▶ Vinyl siding, finished basement
- ▶ Fenced backyard
- ▶ Well maintained home



Case Study # 1: Residential Child Care

OCCUPANT DETAILS:

Family:

- ▶ Single mother, 2 teenagers
- ▶ Easy to get along with
- ▶ Didn't want to spend money, but installation was funded (in part) by homeowner's father

- ▶ Licenced child care center with estimated 10 children
- ▶ **Test to mitigation to test completion was over 3 years!**
Original LT test Feb 2014 - Mar 2015. Results acquired in January 2017.
Mitigation in March 2017 and then a LT test.



Case Study # 1: Residential Child Care

Mitigating the House:

- ▶ Installed in Furnace room
- ▶ Side wall discharge
- ▶ Challenges: Furnace room in center of finished basement. Rim joist located just above grade height; tricky discharge route.

Before: Over 1000 Bq/m³

After: 16 Bq/m³



Difficult Termination Location



Window

Dryer Vent

Exterior Door

Rim joist at grade height

Walkway to access daycare

Note: Long pipe runs are not recommended in unconditioned spaces, unless required, due to potential for ice build up. Monitor these types of systems for ice build up during winter months, and ideally, insulate the exposed pipe, if the client is in agreement.

Case Study # 2: Residential Child Care

HOUSE DETAILS:

- ▶ Tested above 350 Bq/m³;
- ▶ Residential structure;
- ▶ owned by owner/operator
- ▶ Family lived upstairs with child care center in the basement

- ▶ 2 storey home with basement
- ▶ ~2500 sq ft
- ▶ Built in 1991
- ▶ Vinyl siding, finished basement
- ▶ Fenced backyard
- ▶ Well maintained home



Case Study # 2: Residential Child Care

DETAILS:

Family:

- ▶ Wife, husband, and 2 teenagers
- ▶ Challenging client to keep happy
- ▶ Client did not want to invest the money, but was required to mitigate to continue to operate as a daycare
- ▶ **Client apparently attempted to contact the premiere to complain about having to mitigate (prior to the contractor's involvement)**

Daycare:

- ▶ Licenced child care center with an estimated 10 children
- ▶ **Test to mitigation to test completion was over 3.5 years!**
Original LT test Jan 2014 - Apr 2014. Results acquired in June 2014.
Mitigation in September 2017 and client purchased a digital radon detector



Case Study # 2: Residential Child Care

Mitigating the House:

- ▶ Installed in Furnace room
- ▶ Side wall discharge
- ▶ Challenges: Finished basement. Viable suction points located next to furnace; small area to work. Large amounts of stored items. Cost effective termination point was to be located adjacent to walkway accessing daycare; however, it is a high traffic area. **Client did not want to spend additional money to locate termination point further away.**

Before: Over 350 Bq/m³

After: 28 Bq/m³





Exit point options limited by utility obstructions within the home

Fresh Air Intake

Vent Exhaust

Walkway to access daycare

Difficult Termination Location

Direct Vent Sealed Combustion Gas Furnace Vent

Note: Client did not want to spend additional money to locate termination point further away

Child Care Facilities

Additional Considerations because of Child Care Center:

- ▶ Care center is likely mitigating due to governing body's requirements. Be sensitive of their budget, time frame, emotions, and individual center's needs.
- ▶ Scheduling is a challenge because of center's hours of operation
- ▶ Attempt to locate the termination point away from high traffic areas
 - ▶ Not always possible, practical, or limited by client's budget
- ▶ Time from testing to mitigation can take years
- ▶ Contractor may need to work with the Authority having jurisdiction
- ▶ Parents/guardians of children may have concerns about a mitigation system being installed in the care center
 - ▶ Due to contractor presence during hours of operation
 - ▶ Due to lack of awareness or understanding about radon
 - ▶ Consider including a handout that centers can share with the child's caregivers

Case Study # 3 : Public Building

BUILDING DETAILS:

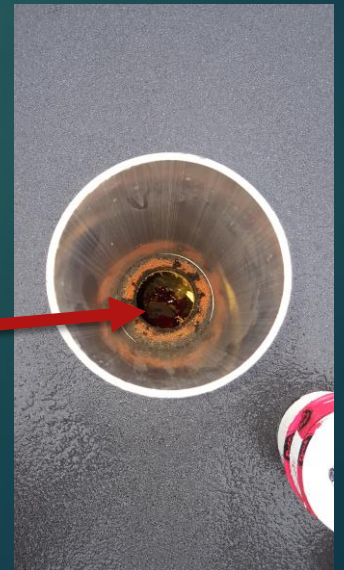
- ▶ Estimated 15-20,000 Sq ft
- ▶ Community Center with offices staffed daily
- ▶ Gymnasium, kitchen, stage, workout area
- ▶ Different programs are run
- ▶ 3 Long Term Tests performed simultaneously between Feb 2017 and May 2017
 - ▶ High of **451 Bq/m³**
 - ▶ Job bidding started Summer 2018
 - ▶ Mitigation conducted Winter 2018



Case Study # 3: Public Building

Challenges:

- ▶ Sub slab air diagnostics performed by another company.
 - ▶ Sub slab air diagnostic results not forwarded to contractor when requested as client was not given a copy.
- ▶ Contractor was instructed where to install suction point and system
 - ▶ S.P. located in a small storage room near the center of the building
 - ▶ Unrealistic to sidewall vent with building configuration
- ▶ Flat roof with torch on roof membrane
 - ▶ required roofing contractor to open membrane and install stack flashing
 - ▶ = extra cost \$\$\$
 - ▶ Do not touch a roof unless it is verified that it is no longer under warranty, otherwise a contractor could be at fault for defects or damages relating to the roof and mitigation install
 - ▶ **Other contractors can create more issues and work for the contractor.**
E.g. A Roofer only used a 2 inch hole saw to drill through the roof deck, but installed a 5 inch stack flashing. The contractor was required to enlarge hole from inside attic. (Caution: Potential for cutting or puncturing roof membrane from below.)

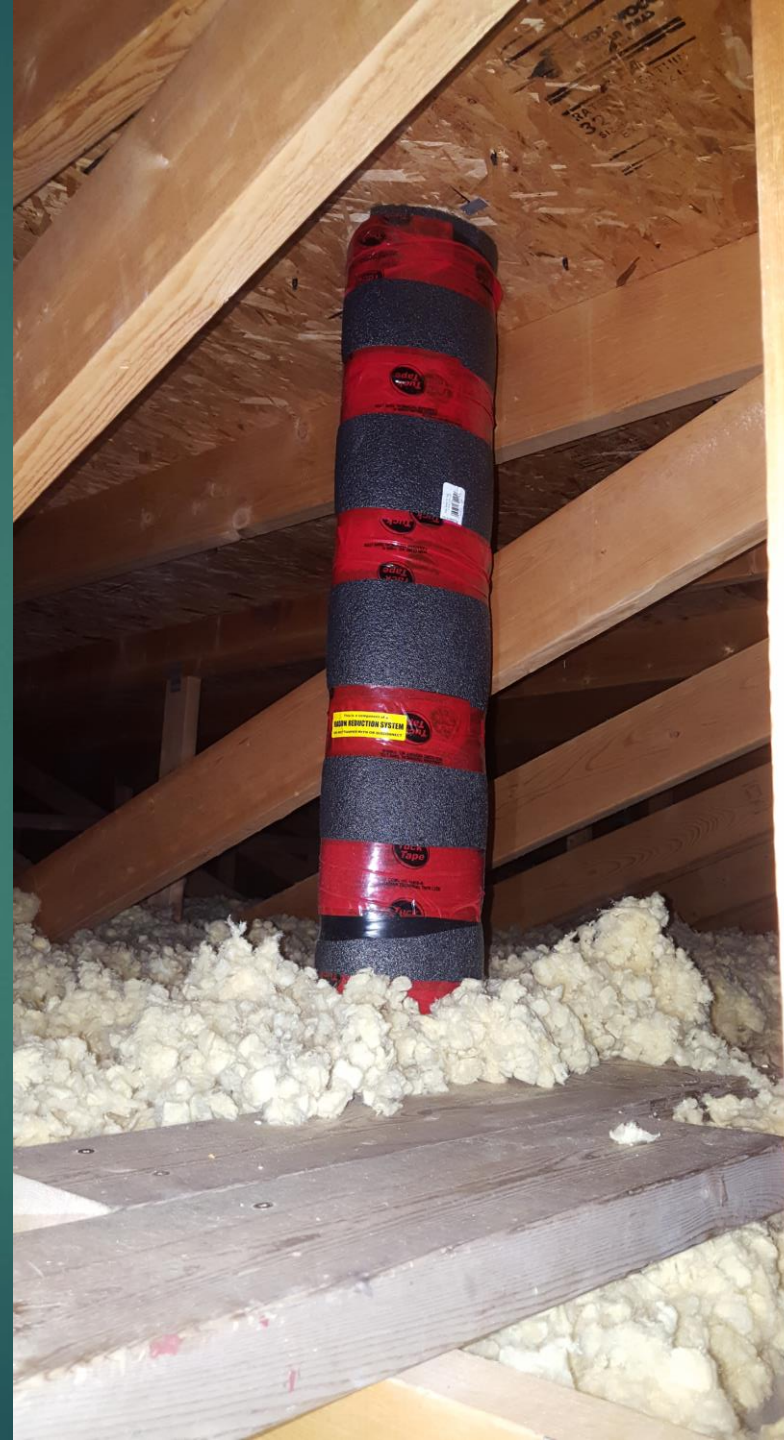




Inside
drop
ceiling



Inside
attic



Before: 451 Bq/m³

After: < 10 Bq/m³



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