

Radon: The Kitigan Zibi Experience



BASED ON THE SUMMARY BY CELINE
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RSIC RADON SURVEY REPORTS

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Situated in the south western section of Quebec, approximately 130 km north of Ottawa and covering 18,437 hectares, the Kitigan Zibi Anishinabeg First Nation Territory is the largest Algonquin Nation in Canada, in both area and population with almost 2,600 community members



Kitigan Zibi Anishinabeg Algonquin First Nation



Project Scope

- Phase I: 2009 Radon survey of homes
- Phase II: 2010 Radon survey of public building and radon mitigation of homes
- Phase III: 2011 Post-mitigation survey of homes



Project Background

- In 1993, a routine analysis of groundwater samples conducted by the Medical Services Branch of Health Canada shows that five wells in the community exceeded the Canadian uranium guideline for uranium concentration in drinking water
- In 1994 an extensive chemical analysis on all individual drilled wells is carried out by Health Canada.
- Analysis found exceeding levels of uranium and radium
- 1996 community continues to express concerns over cancer incidences
- 1999 a **no consumption** advisory of the well water is issued by Health Canada



Project Background

- 1990's, Health Canada carried out random radon test sampling of 79 homes
- The results ranged from 19.3 to 414.9 Bq/ m³
- Health and Welfare Canada's guideline, prior to 2008, was set at 800 Becquerels per cubic meter of air, or 800 Bq/m³
- 2008 Health Canada's guideline brought that limit down to 200Bq/m³



Band Council Taking Charge

- The Chief and the Council decide on the course of action, funding not yet secured
- March of 2009- the Band Council contracts the Radiation Safety Institute to undertake a large scale long-term testing of homes
- Communication strategy :
 - information sessions
 - focused communiqués on radon
 - input in weekly flyers, highlighting the and the importance of having homes tested
 - dedicated phone line to answer the community member questions



Project Implementation

Phase I

Radon Survey of 500
homes

- March 2009, the Radiation Safety Institute (RSIC) comes on site to deliver the monitors and train workers in deployment and retrieval
- Challenges of scheduling and organization of testing 500 houses
- All monitors are in place by April 1, 2009.



Project Implementation

Phase I

Radon Survey of 500
homes

Technical Details

- Monitoring device: E-PERM monitors (consisting of an “S” chamber and long-term electret)
- Additional information provided: Instructions and educational fact sheet “Radon in Your Home”
- For quality assurance purposes, the 503 standard tests were supplemented with an additional 5% (or 27) blank monitors and 10% (or 50) duplicate monitors. A total of 580 monitors were deployed.



Project Implementation

Phase I

Radon Survey of 500
homes

Privacy Considerations

- Address codes provided by the Kitigan Zibi community were used to ensure the anonymity of the results and to protect the privacy of individual households.
- The codes were paired with an electret number when preparing the monitors, and the assembled monitor was tagged with that address code.
- The monitors were thus assigned a deployment location.



Project Implementation

Phase I

Radon Survey of 500
homes

Survey Results

- Once the testing was done and reports received. All results were given to the homeowners.
- Reliable readings were obtained for 424 homes in the community:
 - In 244 homes (58%), radon levels were below 200 Bq/m³
 - In 148 homes (35%), radon levels were ranging between 200 and 600 Bq/m³.
 - In 32 homes (8%), radon levels were ranging between 600 and 2000 Bq/m³.



Project Implementation

Phase I

Radon Survey of 500
homes

Survey Results and
Action Levels

Radon Level (Bq/m ³)	Number of Homes	Percent of Homes	Recommend ed Remedial Action Time
above 600	32	7.6	In less than 1 year
between 200 – 600	148	34.9	In less than 2 years
below 200	244	57.6	No action required
(total)	424	100	



Project Implementation

Phase I

Radon Survey of 500
homes

Survey Results
Communication

- Information sessions with a panel of experts from the Radiation Safety Institute, Health Canada and Radiation Protection Bureau
- To make it more effective, the groups were divided the groups according to their results:
- Special attention was given to those who needed remedial actions in less than a year or levels above 600 Bq/m³ and those who needed remedial actions in less than 2 years or levels between 200-600 Bq/m³.



Project Implementation

Phase II

Radon Survey of Public
Building and Radon
Mitigation of Homes

- Workers received training from CMHC for the remedial actions, this included:
 - sealing of the basement cracks
 - installation of Heat Recovery Ventilators (HRVs)
 - installation of Sub –slab depressurization systems
- Aboriginal Affairs and Northern Development Canada, took the responsibility for the funding of the mitigation procedures.
- The mitigation phase commenced in the fall of 2009 and continued throughout 2010.



Project Implementation

Phase II

Radon Survey of Public
Building and Radon
Mitigation of Homes

- In 2010 a radon survey of seven public buildings (75 locations in total) was commissioned.
- The survey was carried out by the Radiation Safety Institute over the period of January 2010 to early April 2010.
- Reliable readings were obtained for all 75 locations in the community:
 - In 58 locations (77.3%), radon levels were *below* 200 Bq/m³.
 - In 16 locations (21.3%), radon levels were ranging between 200 and 600 Bq/m³.
 - In 1 location (1.3%), radon levels were above 600 Bq/m³.

Project Implementation

Phase II

Radon Survey of Public Buildings

Survey Results and Action Levels

Radon Level (Bq/m ³)	Number of Locations	Percent of Locations	Recommended Remedial Action Time
above 600	1	1.3	In less than 1 year
between 200 – 600	16	21.3	In less than 2 years
below 200	58	77.3	No action required
(total)	75	100	



Project Implementation

Phase III

Post-Mitigation Survey
of Homes

Survey Results

- The post-mitigation survey was completed during winter and early spring of 2011.
- The final report was submitted to the community in the summer of 2011.

- **Results**

Of the **357** monitors that were returned, reliable readings were obtained for **311** locations in the community:

- In **252 locations (81%)**, radon levels were *below 200* Bq/m³
- In **53 locations (17%)**, radon levels were ranging between 200 and 600 Bq/m³.
- In **6 locations (2%)**, radon levels were above 600 Bq/m³.

Project Implementation

Phase III

Post-Mitigation Survey of Homes

Survey Results and Action Levels

Radon Level (Bq/m ³)	Number of Locations	Percent of Locations	Recommended Remedial Action Time
above 600	6	2%	In less than 1 year
between 200 – 600	53	17%	In less than 2 years
below 200	252	81%	No action required
(total)	311		



Concluding Words

- The homes that received remedial procedures will be monitored on a regular basis to make sure the systems in place are working properly.
- From a lesson learned, all new construction is prepared in consequence for an easier process in the case of required mitigation, if Radon is found to be present within the home.
- Thanks to the community's leadership proactive approach in addressing the health and safety concerns- the homeowners are more aware of their living environments.



- The Radiation Safety Institute would like to thank the Kitigan Zibi Anishinabeg Community and its representative Celine Brazeau for making this presentation possible and for trusting the Institute to deliver it on the community's behalf.

Thank you for listening!