Conducting Mold Assessments at a Remote Location following Extensive Flooding of an Entire Community

PO124 From Meth Labs to Lead: Policies and Practices in Community Environmental Health
AIHce, Philadelphia, PA
6 June 2007

Presented By:
Andreas Wagner, M.Eng., CIH, ROH
Principal
The Kashechewan Community

**Location**

- Located in the district of Kenora, Ontario, 81° W longitude and 52 °N latitude, 10 km upstream from James Bay on the Albany River in Northern Ontario, Canada
- Isolated community with nearest urban centre Timmins approximately 460 km South
- Flat topography, susceptible to flooding
- Constructed a dyke system around the community in 1997
- Only accessible by air year round
- 50th Anniversary
The Kashechewan Community

Services

- Depends on government services and support and each year received between 18 to 22 million dollars
- Healthcare services are incomplete, inconsistent and inadequate
- Significant problem with domestic violence, vandalism, reckless driving and there is no community patrol or auxiliary police present
- Due to lack of employment, limited economic opportunities, and regular evacuations, the quality and availability of education services has been declining in Kashechewan
- Inappropriately designed housing for the family sizes and traditional living arrangements
2006 Flood

**Background**

- Entire community flooded in May of 2006
- Everyone was evacuated – airlifted to nearby communities
- Water did not recede for 2-3 weeks
- Homes with basements had standing water in them up to several feet deep
- Several homes also became flooded with sewage
- Extensive mold contamination
2006 Flood

Background

• Initial response completed by contractor retained by insurance company included:
  • Removing flood water from homes with basements
  • Removing and disposing of all water damaged building materials (carpets, drywall, insulation, etc.)
  • Mold remediation
  • Disinfection surfaces
  • Drying remaining building materials

• The contractor also applied a disinfectant in crawlspaces homes without basements

• Shortly after re-building commenced, the community returned prematurely and raised concerns regarding “mold contamination” in the homes with basements
In July of 2006, Golder was retained by the insurance company to assess the 39 homes for evidence of mold contamination and to provide recommendations for remediation.

Initial challenges included:

- Remote location
- No cell phone coverage
- Limited accommodations & services
- Lack of understanding by the community of our role/objective
- Need for immediate testing results
- Pre-existing conditions
On-site Lab

- Retained an independent PAACB* certified analyst to analyse samples on site
- Samples collected included:
  - 70 tape-lift samples
  - 20 bulk samples
  - 80 spore-trap air samples
  - 40 swab samples (sewage bacteria)
- The majority of samples were collected and analyzed during the first four days
- Swab samples were sent to laboratory for analysis within 48 hours

* PAACB – PanAmerican Aerobiology Certification Board
• In the absence of any regulatory “clearance” criteria for mold remediation, following post-remediation evaluation criteria was used:

1. **Visual** - Surfaces had to be visually clean and not have any obvious evidence of mold growth

2. **Tape Sampling** - no evidence of mold growth using a relative numerical rating system for indication of *in situ* fungal growth based on microscopic observations

3. **Air Sampling** - less or similar concentrations of total mold spores and similar type of mold spores, compared to outside control samples

4. **Swab Sampling** - no evidence of fecal or sewage related bacteria
### 2006 Flood

<table>
<thead>
<tr>
<th>Pre-Existing Conditions</th>
<th>Evidence of on-going, chronic, and pre-existing water accumulation or infiltration problems, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Foundation cracks</td>
</tr>
<tr>
<td></td>
<td>• Leaking seals on toilets</td>
</tr>
<tr>
<td></td>
<td>• Condensation at windows and rotted wood frames</td>
</tr>
<tr>
<td></td>
<td>• Missing insulation on water pipes</td>
</tr>
<tr>
<td></td>
<td>• Water leakage through perimeter foundation wall, especially in the corners</td>
</tr>
<tr>
<td></td>
<td>• Lack of ventilation</td>
</tr>
<tr>
<td></td>
<td>• Overflowing/leaking connections at washing machines</td>
</tr>
<tr>
<td></td>
<td>• Relative high water table and water drainage problems</td>
</tr>
<tr>
<td></td>
<td>• Evidence of water damage and mold contamination on building materials on the main floor in several of the homes</td>
</tr>
</tbody>
</table>
## Remediation Challenges

- It took ~ 5 months to complete the remediation and rebuild
- Total cost ~ 3 million dollars
- Major challenges included:
  - Remote location – labor & supplies
  - Limited accommodations & services
  - Pre-existing conditions & on-going water infiltration problems
  - Issues related to working with community & INAC* contractor
  - Temporary housing for residences
  - Access issues due to early returns of residents
  - Disposal of contaminated materials
  - Time - avoid winter weather conditions

* INAC – Indian and Northern Affairs Canada
Conclusions

- Visible mold growth was identified on building materials in most of the basements.
- Pre-existing conditions and on-going water infiltration problems affected remediation.
- On-site laboratory analysis was instrumental in getting homes “cleared for re-construction” in less than 2 weeks.
- Opportunity for knowledge transfer and skill development for members of the community.
- Communication was key!
Recommendations

• Design of the homes for the environment and location (i.e., basements) is questionable
  • Proper waterproofing
  • Proper perimeter drainage
  • Ventilation

• Education program
  • Life style issues
  • Proper maintenance
  • Mold prevention

• Relocation of the community (estimated cost of ~ 500 million dollars)
Thank You!

Questions?

Andreas Wagner, CIH, ROH
Principal

2390 Argentia Road
Mississauga, Ontario, L5N 5Z7
P: (905) 567-4444 x:1310
F: (905) 567-6561
E: awagner@golder.com