

2013 Alberta Floods
June 27, 2013

What health and safety hazards could be created by the flooding?

The flooding could create a variety of health and safety hazards. These include physical hazards such as sharp edges from debris, slips and falls on wet surfaces and electrical hazards from damaged electrical equipment. Chemical and biological hazards include contaminants in the flood water from sewage and chemicals such as fuels and oils that may leak from damaged storage containers or tanks. Airborne chemical hazards may be created from diesel exhaust from diesel powered equipment. Any item or material that has come into contact with flood water should be considered contaminated. If wet materials are allowed to sit in warm environments, the organic content can start to decay and give off gases such as methane (flammable) and sulfur compounds such as hydrogen sulfide (toxic). Mould may also start to grow on wet materials within 24 to 48 hours. Workers involved in clean-up or remediation activities may be exposed to additional hazards such as asbestos in building materials, lead (mostly from lead paint), mercury (fluorescent lights), heat stress as well as sprains and strains due to the physical work involved. Long work hours and repetitive work can cause fatigue and compromise a worker's ability to work safely.

Is the building safe to enter?

First and foremost, the employer must ensure that the building is structurally safe before workers enter the structure. This includes the integrity of the building envelope as well as the presence of submerged uncovered openings in floors, manholes and damaged stairways. Areas of standing water may present a drowning hazard. If workers will be conducting demolition or renovation activities, the employer must also ensure that these activities will not compromise the building structural integrity. The employer may need to retain a structural engineer to assess the building if there is any uncertainty about its structural integrity. The employer should also be aware that areas of the building that were not previously considered "restricted spaces" or "confined spaces" may now fall into these categories due to restricted or impeded access from the flood damage.

How do I assess the hazards that may be at my work site after a flood?

In addition to the health and safety hazards that may be normally present at the work site, a flood may introduce new hazards. Workers may be called upon to do clean up or restoration activities or contractors may be needed to assist with remediation. Before workers begin these activities, the employer must conduct a hazard assessment. Once the hazards have been identified, suitable controls must be selected to ensure the protection of workers while they are on the work site. If there is still standing water in the structure, this may need to be pumped out before a hazard assessment can be done. The attached work sheet can be used to assist with this process.

What about electrical safety?

The flood may have caused damage to electrical equipment in the building. The employer must ensure that electrical hazards are controlled before power is turned back on to the building. Where there is standing water that cannot be pumped out prior to beginning work in the building and electrical equipment is required, ground fault circuit interrupters must be used.

What about “imminent danger”?

“Imminent danger” refers to any danger that is not normal for that worker’s occupation. Asking a worker to perform flood cleanup or restoration activities that are not normally part of their job may create an imminent danger situation. An example of this would be asking workers to remove flood damaged building materials that contain asbestos when they have not been provided with training or the correct protective equipment.

Workers must not perform any job or operate any equipment if they believe there is or will be imminent danger. When a worker notifies their employer that he or she refuses to do a job due to a belief that there is imminent danger, the employer is required to look into and eliminate the danger. The worker may be temporarily sent to another job, but at no loss of pay. A worker cannot be disciplined for refusing to do work due to a belief that there is imminent danger. Asking a worker to work in a situation of imminent danger is against the law. Workers have the right to call or write to an Occupational Health and Safety Officer if they believe they have been disciplined or fired because they refused to perform a job due to a belief that there was imminent danger.

Could carbon monoxide be a hazard?

Carbon monoxide is a colourless, odourless gas that is usually formed from the incomplete combustion of fuels such as gasoline or diesel. Carbon monoxide enters the body through the lungs. Since it has no colour or odour and is not irritating, workers may be unaware that they have been exposed. Carbon monoxide affects a person because it reduces the amount of oxygen available to the body. Health effects can include impaired judgment, headaches, nausea, dizziness and fainting. Because it may not be possible to restore power to the building immediately after a flood, it may be necessary to use diesel, gasoline or propane powered equipment during remediation activities. These may include heaters (for drying equipment), fans and electrical generators. Carbon monoxide is generated when fuels are burned and levels can quickly build up in the work area if the exhaust from the equipment is not ventilated outside of the building. When using this equipment indoors, it is important to open the windows and doors and ventilate the exhaust outside to prevent carbon monoxide build-up.

For more information:

Carbon Monoxide at the Work Site

http://humanservices.alberta.ca/documents/WHS-PUB_ch031.pdf

Should I be concerned about biological contaminants?

Flood water often becomes contaminated with a variety of biological contaminants; some transferred from outdoors to indoors (normal biological contaminants in bodies of water), but also from sewage. Sewage can contain viruses, bacteria and other microorganisms such as hepatitis and tetanus. The best way to ensure that workers are protected is to avoid direct contact with items that may be contaminated with sewage and follow good workplace hygiene practices.

For more information:

Workers Exposure to Sewage

<http://humanservices.alberta.ca/documents/GH017.pdf>

Should I be concerned about asbestos?

There are a wide variety of building materials in which asbestos was historically used; these materials remain in place in many structures in Alberta. Some examples include stucco, plaster, drywall mud, flooring materials, ceiling tiles and insulation. If a structure was built prior to 1990, there is a potential for asbestos containing materials to be present. It is not possible to confirm if a structure contains asbestos by visual examination; a proper survey must be done and samples of the building materials collected and analyzed for asbestos content. This should be done before renovation or demolition activities begin. If renovations are done in a structure containing asbestos, the asbestos containing materials in the area of the renovation must be enclosed, encapsulated or removed prior to the renovation. If a structure is to be demolished, the asbestos containing materials must be removed prior to demolition. Alberta has developed a best practice document that contains more guidance on how to assess and abate asbestos.

For more information:

Alberta Asbestos Abatement Manual

<http://humanservices.alberta.ca/working-in-alberta/2988.html>

Asbestos Containing Materials in Buildings to be Demolished

http://humanservices.alberta.ca/documents/WHS-PUB_ASB003.pdf

Should I be concerned about mould?

Mould needs three items to grow; air, a food source and a source of moisture. Organic material and wet building materials are ideal substrates upon which mould will grow. Mould growth can start within 24 hours of materials becoming wet. Most healthy people have little or no reaction when exposed to mould. If symptoms do occur they are most likely to be irritation effects to the skin, eyes or respiratory tract. These symptoms are usually temporary and will go away when exposure to mould stops.

For more information:

Do I Have a Workplace Mould Problem?

<http://humanservices.alberta.ca/documents/WHS-PUB-BH018.pdf>

Should I conduct air monitoring for mould?

Air monitoring for mould is generally very difficult to do with any degree of accuracy and the results are hard to interpret. This is because mould is naturally present in our environment and there are no standards (such as occupational exposure limits) for mould exposure. If building materials have been wet for more than 48 hours or visible mould growth is observed, there is no need to conduct air monitoring.

What should I do if I suspect I have mould contamination?

If mould contamination is suspected, there are three steps to follow:

1. Find the source of moisture intrusion and repair it.
2. Dry out and clean wet materials if it is possible to do so (refer to the attached table for guidance).
3. Remove and replace wet/mould contaminated materials that cannot be dried or cleaned.

For more information:

Best Practice: Mould at the Work Site

<http://www.humanservices.alberta.ca/documents/WHS-PUB-BH019.pdf>

How can workers be protected?

Workers should not handle materials or items that have come into contact with flood water except when wearing gloves that are cut and puncture resistant and provide protection from chemical hazards. In addition, appropriate footwear (rubber steel-toed boots), protective eyewear and clothing (disposable coveralls) that are easy to clean or dispose of should be worn. Workers may also need respiratory protective equipment that can protect from exposure to particulate and chemical vapours, depending on the conditions at the work site. If respirators are required, the worker must be fit tested for the equipment and be medically fit to wear it during work. If diesel powered equipment is needed, the exhaust must be ventilated out of the work site to prevent the build-up of contaminants such as carbon monoxide, nitrogen oxides and diesel particulate. Since workers will be doing manual tasks in warm and humid environments while wearing protective equipment, the employer should have procedures in place to address heat stress. The employer should ensure that workers are not impaired by fatigue. Finally, the employer must ensure that workers can decontaminate themselves and their protective equipment, tools and other equipment. Workers must not eat, drink or smoke in the work area; the employer should designate a separate area for these activities once workers have been able to decontaminate.

For more information:

Best Practice: Working Safely in the Heat or Cold

http://humanservices.alberta.ca/documents/WHS-PUB_GS006.pdf

Hidden Danger: Hazardous Materials in Your Building

http://humanservices.alberta.ca/documents/WHS-PUB_ch066.pdf

Respiratory Protective Equipment: An Employer's Guide

http://humanservices.alberta.ca/documents/WHS-PUB_ppe001.pdf

What are the obligations under the Alberta Occupational Health and Safety (OHS) legislation?

The Alberta *OHS Act* applies to most employers and workers in Alberta. The employer has an overall obligation to protect the health and safety of all workers on their work site. In turn, workers must ensure their health and safety and the health and safety of others around them. In addition, the employer must:

- conduct a hazard assessment and ensure that the appropriate controls are available and in place to protect workers who may be working in flood damaged buildings or involved in remediation activities
- develop safe work procedures and provide training to workers on these procedures. Workers must participate in this training
- ensure that all equipment used at the work site is in proper working condition and used in accordance with the manufacturer specifications or specifications certified by a professional engineer

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- assess the potential exposure of workers who may be exposed to harmful substances. If there is an occupational exposure limit listed in the OHS legislation for a substance present at the work site, the employer must ensure that exposure does not exceed the occupational exposure limit
- ensure that the personal protective equipment selected is appropriate for the hazards at the work site and meets the listed standards
- if respiratory protective equipment is required, ensure that it is NIOSH approved, workers are fit tested for the equipment and workers are clean shaven where the equipment seals to the skin of the face if the effectiveness of the equipment depends on a facial seal
- ensure that workers have a way to properly decontaminate themselves, protective clothing, tools and equipment before they leave the work site

Depending on the nature of the work site and the activities to be done, the OHS legislation may have additional specific requirements that must be followed.

For more information:

OHS Contact Centre: 1-866-415-8690

OHS Act, Regulation and Code

<http://humanservices.alberta.ca/working-in-alberta/307.html>

OHS Code Explanation Guide

<http://humanservices.alberta.ca/working-in-alberta/3969.html>

Alberta Health Flood Resources <http://www.albertahealthservices.ca/8644.asp>

Employer's Guide: Occupational Health and Safety

http://humanservices.alberta.ca/documents/WHS-PUB_LI009.pdf

Tips on Selecting an Occupational Health and Safety Consultant

<http://humanservices.alberta.ca/documents/gs009-Tips-On-Selecting-OHS-Consultant.pdf>

Workplace First Aiders and Legal Requirements

http://humanservices.alberta.ca/documents/WHS-PUB_FA011.pdf

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Hazard Assessment Worksheet for Flood Events

Location:

Date:

Hazards assessed by:

Is the building structurally safe to enter? Yes/No/Unsure

If no: No worker enters building until the hazard has been controlled

If unsure: Retain a structural engineer to assess structure

Is there standing water in the building? Yes/No

If yes: Pump out water before conducting hazard assessment, if it possible to do so.

If no: Proceed to hazard assessment

Is there an emergency response plan to address rescue of workers or to deal with incidents? Yes/No

Type of Hazard	Present (Y/N)	Control
Sewage contamination		
Mould		
Damaged chemical containers (If yes, list potential contents)		
Damaged storage tanks (If yes, list potential contents)		
Chemical odours		
Asbestos in building materials		
Lead paint		
Mercury in light fixtures, switches, gauges		
Diesel exhaust		
Other chemical hazards(list)		
Electrical hazards		
Slips, trips and falls		
Falls from heights		
Fire and explosion (e.g. damaged natural gas lines, leaks from fuel tanks)		
Heat stress		
Confined or restricted spaces		
Ladders		
Falling hazards (e.g. openings in floors, damaged stairs)		
Lifting of heavy items		
Working alone		
Insufficient lighting		
Sharp edges		
Other physical hazards(list)		

Guidelines for Response to Clean Water Damage within 24-48 Hours to Prevent Mould Growth

These guidelines are for damage caused by clean water. If the water source is contaminated with sewage or chemical or biological pollutants, then additional personal protective equipment and procedures will be required and the services of an experienced professional should be consulted.

Water-Damaged Material	Actions to be Taken
Books and papers	Discard non-valuable items. Photocopy valuable/important items and discard originals. Freeze (in frost-free freezer or meat locker) or freeze-dry.
Carpet, backing, and subfloor – dry within 24 to 48 hours	Remove water with water extraction vacuum. Reduce ambient humidity levels with dehumidifier. Accelerate drying process with fans.
Ceiling tiles	Discard and replace.
Cellulose insulation	Discard and replace.
Concrete or cinder block	Remove water with water extraction vacuum.
Wallboard (gypsum board)	Best approach is to remove and discard. May be dried in place if there is no obvious swelling and the seams are intact. Ventilate the wall cavity, if possible.
Upholstered furniture	Remove water with water extraction vacuum. Accelerate drying process with dehumidifiers, fans, and/or heaters. It may be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration/water damage professional who specializes in furniture
Fibreglass insulation	Discard and replace.
Hard surface, porous flooring (Linoleum, Ceramic tile, Vinyl)	Vacuum or damp wipe with water and mild detergent and allow drying; scrub if necessary. Check to make sure under flooring is dry; dry under flooring if necessary
Non-porous, hard surfaces (Plastics, Metals)	Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.
Window drapes	Follow laundering or cleaning instructions recommended by the manufacturer.
Wood surfaces	Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. (Use caution when applying heat to hardwood floors.) Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. Wet paneling should be pried away from wall for drying.
All Surfaces	Accelerate the drying process with dehumidifiers, fans, and/or heaters.

This table is adapted from information in the Alberta Infrastructure and Transportation document Mould in Indoor Environment Risk Assessment and Management Program Handbook (June 2006) and the USEPA document Mould Remediation in Schools and Commercial Buildings (2001).

Occupational Health and Safety FAQs

Contact us

Province-Wide Contact Centre

Edmonton	780-415-8690
Other locations	1-866-415-8690 (Toll Free)

Deaf or hearing impaired

Edmonton	780-427-9999
Other locations	1-800-232-7215 (Toll Free)

Web Site

Work Safe Alberta	www.worksafe.alberta.ca
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Getting copies of *OHS Act*, Regulation & Code

Queen's Printer	www.qp.alberta.ca
Occupational Health and Safety	http://humanservices.alberta.ca/ohs-legislation
Edmonton	780-427-4952

Call any Government of Alberta office toll-free

Dial 310-0000, then the area code and telephone number you want to reach

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