

Hazard Resilience Strategies

Hazardous Material Spills, Explosions and Leaks

Gas Explosions and Gas Leaks
Mine Explosions
Oil Pipeline Leaks
Other Explosions
Hazardous Material Spill - On Site
Hazardous Material Spill - Air Transport
Hazardous Material Spill - Land Transport
Hazardous Material Spill - Marine Transport
Hazardous Material Spill - Rail Transport

Gas Explosions and Gas Leaks

- Ensure community-based gas explosion and gas leak exercises have taken place with qualified and experienced responders with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure emergency response personnel have been trained to respond to gas explosions and gas leaks and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure gas companies and community officials perform regular safety checks of gas storage structures and distribution systems.
- Ensure gas companies have replaced all gray cast iron pipes.
- Ensure there is a warning system, using various means of communication including social media, in place to notify community residents and businesses of gas explosions and gas leaks and how to prepare for and respond to them.
- Ensure there is a warning system in place to notify emergency response personnel of gas explosions and gas leaks.

- Ensure that when a new project is proposed, the community is fully engaged in the consultation process and has given their free and informed consent prior to siting. The risks associated with the project have been mitigated to the satisfaction of the community.

Mine Explosions

- Ensure abandoned mines have been permanently sealed off.
- Ensure community-based mine explosion exercises have taken place with qualified and experienced responders with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure emergency response personnel have been trained to respond to mine explosions and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure mining officials strictly follow all Occupational Health and Safety regulations.
- Ensure there is a warning system in place to notify community residents and businesses of a mine explosion and how to prepare for and respond to them.
- Ensure there is a warning system in place to notify emergency response personnel of a mine explosion.
- Ensure that when a new project is proposed, the community is fully engaged in the consultation process and has given their free and informed consent prior to siting. The risks associated with the project have been mitigated to the satisfaction of the community.

Oil Pipeline Leaks

- Ensure closed-circuit security cameras are in place to monitor pipelines and personnel regularly review footage and note any and all concerns, whether small or large leaks.
- Ensure community-based oil pipeline leak exercises have taken place with qualified and experienced responders with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure gas companies have plans for the prompt replacement of all gray cast iron pipes.
- Ensure the fire safety team has access to oil absorbents, absorbent pads, mats, pipe flange wraps and other products to minimize the spread and contamination of the soil and waterways.

- Regularly review local regulations and legislation to ensure there are requirements for prompt remediation of all spills and contamination and that they remain valid and consider all pollution sources.
- Ensure the pipeline company monitors and replaces unsafe pipeline sections on a regular basis and ensure they clean up any associated spill or contamination.
- Ensure there is a warning system, using various means of communication including social media, in place to notify community residents and businesses of an oil pipeline leak and how to prepare for and respond to it.
- Ensure there is a warning system in place to notify police, fire and ambulance personnel of an oil pipeline leak.
- Ensure the pipeline company consults with Traditional Knowledge holders and community members about their emergency plans and the reduction of risk to the environment to identify acceptable levels of risk for the community and to share plans for cleanup of leaks and spills.

Other Explosions

- Ensure community-based explosion exercises have taken place with qualified and experienced responders with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure former live-fire military training facilities have been searched for unexploded munitions that can explode if triggered.
- Ensure police or local law enforcement are vigilant in monitoring community for illegal drug manufacturing or fireworks production in private homes or offices and collect evidence to allow for lawful seizure. Ensure there is a warning system in place to notify community residents and businesses of an explosion and how to prepare for and respond to them.
- Ensure there is a warning system in place to notify emergency response personnel of an explosion.
- When a new project is proposed, the community is fully engaged in the consultation process and has given their free and informed consent prior to siting. The risks associated with the project have been mitigated to the satisfaction of the community.

Hazardous Material Spills – On Site/In Situ

- Ensure community officials perform regular safety checks of hazardous material storage structures including chemicals stored under pressure and report findings to provide record of conditions through time.

Hazard Resilience Strategies

- Ensure community-based hazardous material spill on site/in situ exercises have taken place with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure all emergency response personnel have been trained to respond to hazardous material spills and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure fire fighters and residents have ready access to sites where decontamination can be carried out.
- Ensure the company has access to products to minimize the spread and contamination of the soil and waterways.
- Ensure any organization that stores or uses hazardous materials has consulted traditional knowledge holders and community members on how to reduce risk and attain acceptable risk levels as well as to get input for the development of appropriate emergency plans.
- Ensure the company has trained Hazardous Material Response Teams on site.
- Ensure there is a warning system in place, which uses various means of communication including social media, to notify the community of a major hazardous material spill on site/in situ and appropriate responses.
- Ensure there is a warning system in place to notify emergency response personnel of a hazardous material spill on site/in situ.
- Ensure that when a new project is proposed, the community is fully engaged in the consultation process and has given their free and informed consent prior to siting. The risks associated with the project have been mitigated to the satisfaction of the community.

Hazardous Material Spills – Air Transport

- Ensure the community emergency response plans cover response to vehicles (marine, road or rail) carrying dangerous cargo that spill in the community.
- Ensure community-based air transport hazardous material spill exercises have taken place with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure there is a warning system in place, using various means of communication including social media, to notify community residents and businesses of a hazardous material spill via air transport.
- Ensure there is a warning system in place to notify emergency response personnel of a hazardous material spill via air transport.

Hazardous Material Spills – Land Transport

- Ensure centre line guardrails, safer intersections and wider road shoulders are in place in problematic areas; implement plans to create these where they do not exist.
- Ensure roundabouts are in place to improve the flow of traffic; develop public education and safety materials in advance of implementation to ensure community learns to use them appropriately.
- Ensure community-based hazardous material spill involving land transport exercises have taken place with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure all emergency response personnel have been trained to respond to hazardous material spills and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure emergency response personnel and residents have ready access to sites where decontamination can be carried out.
- Ensure transport police or appropriate safety agency conduct regular safety checks on vehicles carrying hazardous materials.
- Ensure police regularly monitor traffic for impaired drivers.
- Ensure speed cameras or warning signs (in multiple languages as necessary) are located in places subject to speeding on transportation routes used by trucks carrying hazardous materials (all vehicles are part of enforcement of speeding).
- Ensure the community has reduced speed limits and/or lower speed zones in areas where hazardous materials are being transported.
- Ensure the community limits travel of trucks carrying hazardous material in core areas.
- Ensure the fire safety team in the community or nearby has access to products to minimize the spread and contamination of the waterways and beaches.
- Ensure the fire safety team in the community or nearby has trained Hazardous Material Teams available for deployment.
- Ensure there is a warning system in place, using various means of communication including social media, to notify community residents and businesses of a hazardous material spill involving land transport and how to conduct themselves in preparation and response.
- Ensure there is a warning system in place to notify emergency response personnel of a hazardous material spill involving land transport.

- Land transport companies consult traditional knowledge holders and other community members for information on acceptable risk levels and reporting needs.

Hazardous Material Spills – Marine Transport

- Ensure community-based hazardous material spills involving marine transport exercises have taken place with qualified and experienced responders (e.g., table-top or full-scale exercises).
- Ensure all emergency response personnel have been trained to respond to hazardous material spills and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure, if applicable, harbour masters are familiar with the harbour and are available to board and navigate ships to avoid accidents (e.g., grounding).
- Ensure marinas have warning systems in place to notify boat operators of potential heavy fog or storms, shallow areas and hazards under the water.
- Ensure Port Authorities perform regular safety checks of storage structures (e.g., gas and oil barges) in marinas and harbours.
- Ensure the fire safety team has ready access to products to minimize the spread and contamination of the waterways and beaches.
- Ensure the fire safety team has trained Hazardous Material Teams available in the community or nearby for deployment.
- Ensure there is a warning system in place, using various means of communication, to notify community residents and businesses of a hazardous material spill involving marine transport and how to conduct themselves in preparation and response.
- Ensure there is a warning system in place to notify emergency response personnel of a hazardous material spill involving marine transport.
- Marine transport companies consult traditional knowledge holders and other community members for information on acceptable risk levels and reporting needs.

Hazardous Material Spills – Rail Transport

- Ensure community-based hazardous material spill involving rail transport exercises have taken place with qualified and experienced responders (e.g., table-top or full-scale exercises).

- Ensure saw bucks are made of contrasting materials and are in place to clearly mark rail crossings along road side for both cars and pedestrians.
- Ensure development regulations in areas susceptible to rail derailments limit land use, or prohibit development.
- Ensure emergency response personnel have been trained to respond to hazardous material spills and have sufficient personal protective equipment (PPE) for all fire fighters and/or have Mutual Aid Agreements in place with neighbouring communities.
- Ensure community officials register with CANUTEC (Transport Canada) to get aggregate annual rail safety information and remain informed of rail company safety practices to advocate for compliance with regulations.
- Ensure rail companies consult traditional knowledge holders and other community members for information on acceptable risk levels and reporting needs. Ensure rail owner maintains railway warning systems and that the signs and signals are visible prior to reaching the crossing.
- Ensure the community is working with *Operation Lifesaver*, a national public education program for railway safety, which works with communities to reduce rail collisions.
- Ensure the fire safety team has access to products (in the community or nearby) to minimize the spread and contamination of the soil and waterways.
- Ensure the fire safety team has trained Hazardous Material Teams available in the community or nearby for deployment.
- Ensure the fire safety team is aware of the quantity and type of hazardous materials travelling by rail in close proximity to the community.
- Ensure there is a warning system in place, using various means of communication including social media, to notify community residents and businesses of a hazardous material spill involving rail transport and how to prepare and respond.
- Ensure there is a warning system in place to notify emergency response personnel of a hazardous material spill involving rail transport.

References

- Melchers, R. E. (2002). Safety and risk in structural engineering. *Prog. Structural Engineering Mater*, 4, 193-202.
- Fingas, M. (Ed.). (2002). *The handbook of hazardous materials spills technology*. New York: McGraw-Hill.
- Transport Canada (2005). *Road safety 2010: Making Canada's roads the safest in the world*. Retrieved from <http://www.tc.gc.ca/media/documents/roadsafety/rsv2005se.pdf>
- Wang, J. (2006). Maritime risk assessment and its current status. *Quality and Reliability Engineering International*, 22, 3-19.