When The Unexpected Happens: Flooding Risks in Underground Mining

The recent incident at the Alpha Metallurgical Resources Inc. operated Rolling Thunder Mine in Nicholas County, West Virginia underscores how fast and unpredictable underground water incidents can become. According to official reports, a mining crew struck an unknown water pocket about three-quarters of a mile into the mine. The wall of an older worked-out panel was compromised, and water rushed into the working area. One miner was trapped while others made it out.

While this incident is ongoing in the United States, the lessons apply equally to Canadian operations (and to any underground or surface mine that has potential water/hydrostatic hazards).

Why Monitoring Flood Risks in Mining Matters

Flood-related mining incidents are less common than fires, explosions, or roof collapses, but when they happen, they are major. They involve:

- Unexpected water ingress from old workings, aquifers or surface drainage features.
- Rapid loss of escape routes, power, illumination, and

communication in submerged or semi-submerged workings.
- Entrapment of personnel, delayed rescue, high emotional and regulatory stakes.

In the Rolling Thunder case, the operator had commissioned an engineering report that said the area had “no significant hydrologic concerns”, despite the coal seam running beneath a drainage feature (Twenty Mile Creek) and previous mining workings in the area. This underscores a key point: *risk is never zero*. For site supervisors and OHS managers, it means that even when past reports suggest minimal hydrologic hazards, continuous vigilance is required.

Connecting to Broader OHS Culture

For OHS managers, this incident reminds us of the interplay of:

- Pre-work risk assessment (hydrologic, geological, historical mine-workings).
- Worker training and preparedness (how to respond if flooding occurs; escape route drilling; remote communications).
- Rescue readiness (Are you capable of a rapid flood event response? Are emergency pumps, drones, divers, or remote communication systems pre-arranged?).
- Communication and mental preparedness (flood entrapment is high stress, rapid escalation; workers must know what to do immediately; site leadership must respond rapidly).

The Rolling Thunder Mine case also touches on worker morale and organizational trust: if a workforce perceives that water hazard assessments were superficial (as in this case, where the operator’s engineering study had given a clean bill but a flood still occurred), the trust in the safety programme can erode.

Practical Takeaways for Mining Operations in North America

1. **Historical workings + hydrogeology = red flag**
   Older mine walls/abandoned tunnels often contain water pockets or are adjacent to aquifers or surface streams. The Rolling Thunder flood was triggered by striking a "pocket of water" behind an old wall. OHS managers should insist on input from hydrogeologists, mine-water specialists, and historical records of previous workings.
2. **Pre-excavation monitoring & probe drilling**
   Before advancing into new headings or panels, especially near known drainage or surface water features, perform probe holes, water level measurements and continuous monitoring. Even if prior studies say "no significant hydrologic concern", treat it as conditional, not definitive.
3. **Escape and communication redundancy**
   Once water ingress begins, primary escape routes may be cut off quickly. Ensure: multiple escape routes, refuge stations, reliable communication (wired, wireless, voice, drone/ROV support). In the West Virginia case, underwater drones were mobilized to attempt locating the trapped miner.
4. **Rapid-mobilization response plan**
   A mine flooding response must be rehearsed: pumps, dewatering, remote sensors, coordination with rescue agencies. In the U.S. incident, state agencies, MSHA, emergency management, and the mine operator were all mobilized.
5. **Worker training and mental readiness**
   Workers must know: if water bursts in, don't hesitate. Follow escape drills, reach safe zones, don't attempt to self-rescue beyond training, ensure your buddy is accounted for. For supervisors and HR, prebriefing,

drills and clear communication matter.

6. **Post-incident review and culture reinforcement**
   After incidents or near-misses, review what went right/wrong, update hazard assessments, share lessons across the organisation. A do-nothing mindset is unacceptable.

Checklist for Preventative & Response Measures

Preventative Measures

- Conduct comprehensive hydrogeologic and historical-workings assessment before any new heading or panel advance.
- Probe and monitor water pressures, groundwater inflows, and proximity to surface streams or drainage features.
- Map out and physically inspect old workings, abandoned panels, and check for compromised walls/stopes.
- Drill test holes ahead of mining face in high-risk zones (especially near water features).
- Maintain documented escape-route maps, refuge station locations, and ensure routes are physically clear and usable.
- Ensure continuous communication systems underground (wired, radio, emergency beacons) including battery backups.
- Train workforce on flood scenario: recognition of water ingress, escape procedures, refuge use, buddy checks.
- Have standby dewatering/pumping equipment ready and accessible.
- Conduct periodic drills of flooding scenario, including worker abandonment and rescue coordination.
- Review and update mine emergency plan to specifically include flooding/ingress of water event and entrapment scenarios.

Response Measures (when flooding occurs)

- Immediately initiate mine evacuation or movement to refuge stations if water ingress cannot be contained.
- Account for all workers: roll-call, check last known locations, ensure no one left behind.
- Activate emergency communications: broadcast alert, establish contact with trapped/impacted workers if possible.
- Mobilise dewatering/pumping operations: start as early as possible, monitor water levels, flow rates, ingress points.
- Secure ventilation and power supply; flooding may compromise electrical systems and gas control.
- Maintain access for rescue teams: clear routes, mark hazards, use remote technology (ROVs, underwater drones) if inundated zones.
- Provide regular updates to workers, families (via HR/communications), regulators and rescue agencies.
- After safe retrieval or containment, conduct incident review: root-cause analysis, update training, hazard maps, procedural changes.
- Offer worker support (trauma counselling, debriefs) as flooding incidents can cause significant psychological stress.
- Document everything: water volumes, ingress timing, response actions, lessons learned. Use this to improve your OHS programme.

Final thoughts

For HR directors and OHS managers, the key message is: water hazards in mining are often underestimated because they don’t have the day-to-day visibility of roof falls or gas explosions. But when they manifest, they accelerate quickly, cut off escape routes, and become high-stakes – both for worker safety and for organisational reputation. The recent

West Virginia incident reminds us that even when prior engineering studies give comfort, the unknown can intervene._

By ensuring your mine has robust preventative programmes, clear evacuation and response plans, trained personnel, and an organizational culture that treats the “water ingress” hazard as real, you can significantly reduce the risk of entrapment and escalation.