



To The Point

Mine Site Care and Maintenance (C&M)

Companies must properly maintain and secure assets when a mine temporarily closes or halts production, known as Care and Maintenance (C&M). Fluctuating commodity prices, constrained debt and equity markets, and high visibility cost reduction strategies are driving mining companies to place assets into C&M. While the expectation is that these operations will recommence, it is common to see prolonged C&M periods, which can place a strain on the company's financial resources. By implementing and executing an effective C&M plan, a mine site can save considerable costs and downtime associated with future operations restarting.

Buildings and Equipment

It is essential to have key equipment and building systems ready to ensure smooth operations and protect them during extended outages. Regular engagement and proactive measures can help mitigate damage.

- Ensure HVAC and electrical services remain operational and properly serviced, especially in harsh environments.
- Identify unheated areas and take additional protection measures to prevent freezing (e.g., frozen pipe leading to water damage).
- Actuate pumps periodically.
- Rotate motors and gears periodically.
- If equipment is not being exercised, empty hydraulic reservoirs and clean motors.
- De-tension or exercise conveyors periodically.
- Depressurize, clean, and dry pressure vessels. Also, drain and dry auxiliaries like piping, tanks, filters, etc.
- Bring equipment indoors, where possible.
- Maintain roadways and airstrips.

Electrical Systems

Although not all electrical equipment will remain energized during C&M, implementing effective preventative maintenance will help avoid expensive electrical outages during the plant's restart.

- Identify which system(s) will remain operational during the shutdown.
- Inspect, clean, and tighten all connections, and ensure tight seal on all electrical enclosures to prevent moisture intrusion.
- Ensure MCC and other critical electrical rooms remain heated to prevent condensation build-up.
- Exercise any backup generators periodically, including a full annual load test.

- Conduct annual infrared scans on all active electrical systems and dissolved gas analysis (DGA) on transformers.
- Remove combustible storage from electrical rooms.

Fire Protection Systems

All fire protection and suppression equipment should remain active and maintained during C&M. This includes, but is not limited to, fire pumps, sprinkler systems, fixed extinguishing systems, fire detection systems, and fire extinguishers.

- Identify which system(s) will be impaired during prolonged outages, develop a plan to mitigate ignition sources, and update the emergency response plan for these areas.
- Mark and tag these systems as part of the fire protection system impairment program.
- Upkeep housekeeping efforts to reduce overall fire load.
- Maintain and inspect systems.
- Identify who will be conducting maintenance and request copies of the most recent inspections if using contractors.
- Continue implementation of a hot work permit program.

Special Hazards

There should be minimal special hazards during C&M unless maintenance or repair activities are carried out. Identify any special hazards left on-site, such as ignitable liquids, compressed gases, or explosives, which can pose hot work risks. The following brings special attention to reducing these risks:

- Dispose of or remove explosives.
- Inform and train contractors of special hazards, their location, and proper safeguards.

Servicing and maintaining mobile equipment while idle reduces the fire risk and enhances long-term reliability.

- Implement safe work permits, such as hot work, confined space, lock out tag out, etc.
- Ensure all rubber-lined vessels and equipment are clearly labeled.

Mobile Equipment

Servicing and maintaining mobile equipment while idle reduces the fire risk and enhances long-term reliability. Incorporate these best practices to address potential issues.

- Inventory equipment on-site and verify what equipment will remain operational.
- Keep fire protection systems active and properly maintained.
- Store all equipment on the surface and away from active working areas (e.g., pits, benches, faces, etc.) or low-lying areas subject to flooding.
- Drain fuel lines and disconnect batteries.
- Clean equipment to remove any combustible accumulation(s).
- Park equipment with a minimum of 20ft (6m) of separation to reduce the risk of fire spread.

Security

A company can achieve more than just protection against vandalism by implementing robust security measures to secure assets. These measures can also help minimize the risk of attractive nuisance and mitigate associated liabilities.

- Identify areas that are unoccupied and limit site access to authorized personnel.
- Secure and lock all buildings and mobile equipment.
- Secure all mine site access points, such as ramps or underground portals, with physical barriers (e.g., fencing, barricades, etc.), lighting, and signage.
- Conduct and verify routine inspections by company personnel or a security contractor.
- Institute a formal visitor sign-in/out process and hazard awareness training program.

Environmental

Even though operations may have halted, there is still a potential risk of releasing liquids from operations, such as dams, ponds, or tanks, that could cause environmental damage.

- Have the Engineer of Record (EoR) or a similar entity continue with dam safety inspections for tailings storage facilities or slurry impoundments.
- Conduct ongoing visual inspections of upstream and downstream slopes, diversion ditches, spillways, crest, etc., for potential damages (e.g., seepage, erosion, cracks, slumping, etc.) and make repairs as necessary.
- Reduce supernatant pond and ensure adequate freeboard levels—review and update the water balance program as necessary.
- Inspect and verify decant systems and functionality.
- Maintain and inspect all instrumentation (e.g., piezometers) and continue readings.
- Continue implementation of the Operation Maintenance and Surveillance (OMS) program.
- Inspect ponds and liners.
- Continue monitoring water quality.

Mine Workings and Infrastructure

Protecting essential surface and underground workings and infrastructure, such as ventilation systems or highwalls, is vital in successfully restarting mining operations.

- Continue geotechnical monitoring, such as underground roof control, open pit highwall, or bench control programs.
- Continue dewatering and ventilation efforts.
- Conduct regular snow removal as part of the snow-loading program.
- Upkeep with vegetation removal to reduce the impacts of wildfire.
- Continue monitoring instrumentation on waste dumps and heap leach pads.

Learn More & Connect

For more information on protecting your business, contact your local risk engineer, visit the [Chubb Risk Consulting Library](#), or check out www.chubb.com/engineering.

Emergency Response

Because significant changes to the facility will be made, updating emergency response personnel is key. Update the ERP to reflect site changes and modifications and indicate any protection system impairments and location of energized and de-energized equipment. Train all personnel and conduct on-site tours prior to entering C&M.

Restart or Recommissioning

Ongoing efforts during the C&M period will support the effective restart of mining operations. Proper due diligence of equipment and critical systems is necessary before restarting operations.

- Conduct a pre-start-up safety review.
- Identify those decommissioned or de-energized systems and develop a plan to bring them back online.
- Ensure fire protection systems are fully functional.
- Refuel equipment and check other applicable fluid levels (e.g., hydraulic oil, lube oil, etc.).
- Inspect all equipment (mechanical, electrical, etc.) for damage and make repairs as necessary.
- Update and implement ERP prior to conducting hot testing of equipment.

Importance of C&M Plans

Mine site care and maintenance programs effectively protect company assets and ensure smooth operational restarts. Additionally, these programs provide public and company personnel safety, protect the environment, improve community relationships, and fulfill various legal requirements. Even when operations cease, site-specific hazards persist. A mine site can safeguard its property and personnel by maintaining foundational management programs.

Resources

National Fire Protection Association (NFPA), www.nfpa.org/en

- NFPA 25: Standard for Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- NFPA 51B: Standard for Fire Prevention During Welding, Cutting, or Other Hot Work
- NFPA 70B: Standard for Electrical Equipment Maintenance
- NFPA 120: Standard for Fire Prevention and Control in Coal Mines
- NFPA 122 Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities

Canadian Dam Association (CDA), cda.ca/