



MANITOBA

Mine Closure Regulation 67/99

GENERAL CLOSURE PLAN

GUIDELINES

These guidelines have been developed and approved by a joint committee of government and mining industry representatives from Manitoba and it shall be reviewed and revised by a similar committee in the event of changes to
The Mines and Minerals Act.

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MANITOBA GENERAL CLOSURE PLAN GUIDELINES

These guidelines are not a substitute for *The Mines and Minerals Act* or the *Mine Closure Regulation* and have no legislative sanction. Their purpose is to emphasize the main requirements of the act and regulations relating to mine closure plans.

HOW TO USE THESE GUIDELINES

These guidelines are not intended to provide detailed instruction on how to develop a rehabilitation plan, but are intended to provide direction on matters that should be considered in planning closure.

In a closure plan, it is sufficient for a proponent to commit to following these guidelines. Any item where departure from the guidelines is anticipated should be explained in detail, particularly with respect to why such departure is necessary. To develop an estimate of closure costs, a proponent must have sufficient detail for each item to provide defensible basis for the costs.

1 DEFINITION OF SATISFACTORY CONDITION

The aim of rehabilitation is to restore the site to a satisfactory condition by:

- a) eliminating unacceptable health hazards and ensuring public safety
- b) limiting the production and circulation of substances that could damage the receiving environment and, in the long-term, eliminate the need for maintenance and monitoring
- c) restoring the site to a condition in which it is visually acceptable to the community
- d) reclaiming for future use the areas where infrastructures are located.

2 REVEGETATION

All areas affected by mining activities (building sites, tailings ponds, sedimentation ponds, waste rock piles, etc.) must be revegetated to control erosion and restore the site's natural condition. However, if all or part of the mining site, particularly former mine rock piles and mine rock piles in use, cannot be revegetated, the proponent must prove that it is nevertheless in "satisfactory condition".

In general, grass and bushes should be planted in areas prone to erosion. Other areas should be fertilized to promote natural encroachment, or may be seeded. The characteristics of this vegetation should resemble that of the natural environment except for the early growth, which may be a protective cover crop of non-seeding annuals.

Before revegetation, the land must be properly prepared. Where applicable, organic soil that had been saved during original site development must be spread.

Vegetation must be self-sufficient six years after planting and require no fertilization or maintenance.

3 CONTAMINATED SOILS

Any contaminated land outside of the boundaries of a designated and properly managed contaminated area for contaminated soils or other solids should be rehabilitated. Contaminated soil should be removed from the said land for placement into a designated and properly managed contaminated area, or otherwise ensure that the contaminated soil will not, in perpetuity, cause harm to public health or the environment. By doing this the affected land is restored to a condition compatible with future use(s) of the surrounding local area. (Refer to *The Contaminated Sites Remediation Act C205*).

4 BUILDINGS AND SURFACE INFRASTRUCTURE

a) Administrative Buildings and Accommodation

Walls must be razed to the ground; foundations should be removed but if they must remain, they must be covered with a sufficiently thick layer of growth media to permit the establishment of self-sufficient vegetation.

In general, waste from dismantling must be removed from the site and stored in an authorized waste disposal site. Innocuous wastes such as concrete may be disposed in an authorized waste disposal site created on the site. The location and contents of such a disposal site must be documented.

b) Shaft, Service Buildings and Processing Plant

The same requirements as those listed above apply. All metallic wastes should be salvaged for reuse or recycle. The proponent must also assess the quality of the subsoil and, if need be, decontaminate it. For shaft capping detail refer to *The Workplace Safety and Health Act W 210*, Manitoba Regulation 228/94, section 19(3).

c) Support Infrastructures

All buried support infrastructures (tanks, pipes, underground services, etc.) should be removed but may, depending on the future use of the mining site (residential, industrial, recreational, tourism, forest operations, etc.) remain. All remaining openings and support infrastructure accesses must be sealed off as per *The Workplace Safety and Health Act W210*, Regulation 228/94, section 19(7) & 20. The proponent must provide a plan showing the location of these support infrastructures.

d) Transportation Infrastructures

The main mining site and secondary access roads must be kept in a sufficient condition to allow access to monitor and to maintain mining structures. Before closing down access roads, the proponent must check to see whether any other authorities wish to maintain and legally accept responsibility for the access roads.

Where roads are no longer necessary (including railways), the site must be restored as follows:

- bridges, culverts and pipes must be removed, natural stream flows must be restored, and stream/river banks and ditches stabilized by planting vegetation. If vegetation cannot be maintained and a substantial threat of erosion exists, granular material or riprap may be used
- road surfaces, shoulders, escarpments, steep slopes, regular and irregular benches, etc. must be rehabilitated to prevent erosion
- in general, road surfaces and shoulders must be scarified, blended into natural contours, and revegetated.

Mining site runways may be left intact (along with all related infrastructures) if they are in good condition and are environmentally benign. Otherwise, all infrastructures (bridges, etc.) must be dismantled, stream flows restored and the runway surface scarified and revegetated.

e) Equipment and Electrical Infrastructures

Equipment and electrical infrastructures (pylons, electrical cables, transformers, etc.) on-site belonging to the proponent must be dismantled. Off-site equipment belonging to the proponent should likewise be dismantled, but may remain in place if there is a future potential use for it. Electrical equipment required to monitor and maintain installations may remain operational. The measures implemented to prevent site contamination must be maintained.

The proponent must provide a quality assessment of the soils and subsoils near electrical stations with facilities containing oil or petroleum products and decontaminate them if need be. Documentation must be provided indicating whether or not the equipment in use contained PCBs and, if it did, soil assessment must include PCB determinations.

f) Surface Equipment and Heavy Machinery

Mining equipment (hoists, pumps, conveyors, etc.), ore processing equipment (grinding mill, flotation cells, cyanidation tanks, thickeners, etc.) and heavy machinery must be decontaminated and (motor vehicles, drills, shovels, etc.) be removed from the site by the proponent.

During rehabilitation, the proponent must pay particular attention to equipment areas, evaluate the quality of the soils and subsoils and, if need be, decontaminate them.

g) Heavy Machinery, Underground Equipment and Heavy Machinery Infrastructures

Mining equipment (conveyors, jackleg drills, etc.) and heavy machinery (trains, motor vehicles, drills, etc.) must be removed from the site after the proponent has checked to determine whether they are contaminated.

If it is technically and economically feasible to do so, underground infrastructures (crushers, rails, metal structures, water and air pipes, etc.) and equipment (fans, pumps, etc.) must be removed from the site.

During rehabilitation, the proponent must pay particular attention to equipment, heavy machinery and underground infrastructure areas to detect any hydrocarbon contamination and, if applicable, take remedial action.

All surface or buried petroleum product tanks and storage vessels must be removed from the site.

5 UNDERGROUND AND OPEN PIT WORK

This section deals with underground mines, open pit excavations, and bulk sampling sites.

a) Bulk Sampling and Stripping Zone

Excavations and stripping zones must be backfilled. However, excavations may not need to be backfilled if the resident geologist confirms in writing, at the proponent's request, that the excavation constitutes an essential attraction of the geological heritage to be conserved and that it does not constitute a danger to public safety. In this case, a fence meeting regulatory standards must be built. In certain cases, an embankment with a ditch in front may be acceptable. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19(4) & 19(5)).

Any wooded surface between the fence or embankment and the excavation should be thinned (cut understory) and cleaned.

Well-visible warning signs must be posted on the fence, on the berm, and on any gate. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19).

b) Excavations (Open-pit Mine)

If it is technically and economically feasible to do so, excavations must be backfilled. Otherwise, all access roads must be condemned and a fence meeting regulatory standards must be built. In certain cases, an embankment with a ditch in front may be acceptable.

The fence or embankment should be at least fifteen metres from the excavation (horizontal distance) or more if geotechnical considerations so warrant. Any wooded surface between the fence or embankment and the excavation should be thinned (cut understory) and cleared.

Well-visible warning signs must be posted on the fence, and on the berm, and on any gate. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19).

NOTE: For cases involving backfilling of an open pit mine, it is recommended that the proponent check with authorities beforehand to determine whether the material to be used (solid waste, waste rock, etc.) is acceptable.

c) Safety of Surface Openings

All surface openings to underground work sites must be backfilled and leveled to blend in with the surrounding topography, or should be concrete-capped. If these options are not technically or economically feasible, a fence meeting regulatory standards must be built. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19).

NOTE: When backfilling surface openings, it is recommended that the proponent check with regulatory authorities beforehand to determine whether the material to be used (solid waste, waste rock, etc.) is acceptable.

d) Stability of Surface Pillars

Any surface pillars must retain long-term structural stability after mining activities cease. They must sustain their own weight and, if applicable, the weight of unconsolidated deposits, watersheds and all other surface loads. Engineering studies of pillar stability must be prepared and submitted to regulatory authorities. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19).

No sudden rupture of the surface subsidence may occur. Otherwise, if a surface subsidence is formed, it must be stopped and filled up before reaching the surface. Stability calculations must be consistent with current standards.

For underground mining sites, for which the long-term stability of the pillars cannot be guaranteed, a fence meeting regulatory standards must be built around the problem area. (Refer to *The Workplace Safety and Health Act* W210, Manitoba Regulation 228/94, section 19).

6 MINE DEWATERING PONDS

Mine dewatering ponds must be restored unless the proponent can prove that they serve a purpose. Pond dikes must be leveled and the site revegetated; natural drainage must be re-established.

Treatment sludge must be stored in the tailings pond; or, in the absence thereof, disposed of in keeping with regulatory requirements.

7 MINE ROCK PILES

Mine rock piles must be stable in the long term to prevent erosion, subsidence or collapse. The generation of acid water and other contaminants must be controlled to meet the federal *Fisheries Act, Metal Mining Liquid Effluent Regulations* (Refer to Regulation Codes and Protocols EPS 1-WP-77-1, published by Water Pollution Control Directorate, April 1977).

a) Mine Rock Generating Acid Mine Drainage

Mine rock pile rehabilitation must provide control of the chemical reactions generating acid water, prevent contaminated water flows, and allow contaminated water to be collected and treated. Systems may be required to collect contaminated waters and divert uncontaminated runoff. These must require minimal maintenance and in all cases, *Fisheries Act, Metal Mining Liquid Effluent Regulations* (Regulation Codes and Protocols EPS 1-WP-77-1, published by Water Pollution Control Directorate, April 1977) must be met.

Use of effluent-treatment facilities does not constitute final rehabilitation, but may be needed as a temporary or even long-term measure to be used while striving to develop technically and economically viable rehabilitation methods.

8 TAILINGS AND SEDIMENTATION PONDS

Tailings and sedimentation pond containment structures should be maintenance-free, must meet engineering criteria for physical stability, and must not deteriorate, erode or collapse under wind/water, frost/thaw, human activity, ice build-up, earthquakes, etc., or due to root damage, beaver dams, animal burrows, etc. (Refer to *The Workplace Safety and Health Act W210*, Manitoba Regulation 228/94, section 19).

Use of effluent-treatment facilities does not constitute final rehabilitation, but may be needed as a temporary or even long-term measure to be used while striving to develop technically and economically viable rehabilitation methods.

9 WATER COLLECTION

Systems must be implemented to collect contaminated waters, including ground water, and divert uncontaminated runoff. These systems must require minimal maintenance.

Using proven techniques where they are available, tailings and sedimentation pond rehabilitation must control the production of contaminants including acid waters, prevent contaminated water flows, and allow contaminated water to be collected and treated. In all cases, mining effluents must meet *Fisheries Act, Metal Mining Liquid Effluent Regulations* (Refer to Regulation Codes and Protocols EPS 1-WP-77-1, published by Water Pollution Control Directorate, April 1977).

To maintain tailings pond overflow drainage, maintenance-free open spillways are recommended. Decant towers, culverts and other similar systems are generally not acceptable. Where they can be justified, special measures must be implemented to ensure their maintenance and safety. (Refer to *The Workplace Safety and Health Act W210*, Manitoba Regulation 228/94, section 21).

Water collection system dams must meet engineering criteria for physical stability (Refer to *A Guide to the Management of Tailings Facilities* by The Mining Association of Canada.)

10 Mining Effluents

Mining effluents must meet the *Fisheries Act, Metal Mining Liquid Effluent Regulations* (Regulation Codes and Protocols EPS 1-WP-77-1, published by Water Pollution Control Directorate, April 1977) at all times.

11 Sanitary Installations

After being emptied decommissioned septic tanks must be removed or completely filled with gravel, sand, earth or inert material. Purification field treatment ponds need not be removed. Wastewater treatment ponds (domestic waste) must be emptied and backfilled or provided drainage so as not to create stagnant water ponds.

Sewage sludge from treatment ponds may be used as fertilizer, but requires approval from the environmental authorities. It may be disposed in a sanitary landfill or other authorized site.

Wastewater treatment equipment (biodisks, etc.) must be removed, kept for reuse, or disposed in keeping with solid waste management requirements.

12 Petroleum Products

The rehabilitation of all petroleum products sites used for storage of fuels and lubricant should be included in the closure plan and the measures taken to rehabilitate these sites shall comply with *Storage and Handling of Petroleum Products and Allied Products Regulation 188/2001*.

All decommissioning of storage facilities and parts thereof including buried or surface tanks that have not been used and pipes must be dismantled and the site decontaminated in accordance with the Manitoba Conservation guidelines for the dismantling and removal of underground and aboveground petroleum storage tank systems in Manitoba, June 1991 (revised Jan. 2000) or as amended.

13 Hazardous Waste

Hazardous waste most commonly associated with mining includes used oil, grease, and solvents, contaminated containers or materials, obsolete products and PCB-contaminated oils and equipment.

All hazardous waste must be removed from the mining site after activities are permanently shut down. Interim on-site storage, in accordance with regulatory requirements, may be authorized if no disposal or treatment technology exists.

Used oil should be sent to a waste transfer center or an authorized recycling/re-use site. Waste transportation to an authorized site requires a transport permit but not a shipping manifest. Other hazardous waste must be properly disposed, preferably by sending to an authorized site for disposal, treatment, recycling or re-use.

PCB contaminated oils, equipment and soils (concentration more than 50 ppm) may be treated to lower PCBs to less than 50 ppm, may be transported to an authorized disposal site, or may be stored in accordance with applicable regulations.