Canada’s Mining Heritage – Balancing Heritage Preservation with the Environment, Health and Safety

Charles Dumaresq
www.cobaltmininglegacy.ca
Introduction

- Generally, structures such as mine headframes are removed during mine closure and sites returned to something resembling the pre-mining state.
- At most mine sites in Canada, there is no need to consider the heritage value of mining structures or other features.
- At some sites, heritage considerations can make mine closure more complex.
- In Cobalt, Ontario, abandoned silver mines are subject to a mine closure plan and are also part of a National Historic Site.
- This presents challenges for reclamation and can leave those concerned about reclamation at odds with those concerned about heritage.
- However, the two need not be seen as mutually exclusive.
Mine Closure

- Across Canada jurisdictions have in place mine closure legislation.
- In general, the objectives of mine closure are:
  - to ensure safety by preventing access to mine openings and other infrastructure;
  - to provide for the stable, long-term storage of mine waste;
  - to prevent or minimize environmental impacts; and
  - to rehabilitate disturbed areas for a specified land use.
- In some jurisdictions, the removal of headframes and other structures is required.
North Coldstream Mine - Ontario
Mining Heritage

- Abandoned mine sites are seen by most as eyesores at best, serious hazards at worst.
- Many people traveling outside of Canada’s cities expect to see pristine wilderness, not the sort of post-industrial wasteland all too common around abandoned mines.
- Many do not understand the role that abandoned mining structures play in the collective memory of mining towns.
- For these communities the mining landscape is a powerful component of their identity as mining towns, and structures such as headframes are not seen as eyesores, but as heritage buildings to be preserved.
Headframes in Cobalt
Mining Heritage in Cobalt

• Silver was discovered in Cobalt in 1903 and mining continued until the 1980s. Today, there are no operating mines in the area, though exploration continues.

• Cobalt is regarded as the birthplace of hardrock mining in Canada.

• In 2002, part of the area around Cobalt was declared a National Historic Site, because the area:
  – has a large number of buildings and heritage resources related to the evolution of the hard rock mining; and,
  – reflects an important period of hard rock mining in Canada.
Environmental Legacy in Cobalt

- In Cobalt, waste rock and tailings were disposed of with no regard for the environment.
- Waste rock and tailings are high in arsenic because the ore in Cobalt was associated with arsenide and sulfarsenide minerals.
- Arsenic continues to leach from these wastes and most of the lakes and streams around Cobalt are laden with arsenic.
- Cobalt is one the largest sources in Canada of releases of arsenic to surface water, with releases more than those of all base metal and gold mines operating in Canada, combined.
- There is also concern about soil contamination, particularly around some of the mill foundations that are part of the National Historic Site.
Cobalt in the late 1960s
The Challenges

• The challenges in Cobalt are clear – how to complete remediation while respecting the historical legacy. The challenges are both technical and social.
• The technical challenges relate to the preservation of heritage resources such as headframes and mill foundations, while remediating sites to reduce risks.
• The social challenge can be even greater. In some mining communities efforts to remediate can be greeted with suspicion and seen as a threat to the community.
• In Cobalt, there is no clear path forward.
• Work done to address similar challenges at other mining heritage sites may provide some examples of how to meet these challenges in Cobalt and in other Canadian mining communities struggling to preserve their mining heritage.
Case Study – Cornwall and West Devon, UK

- Cornwall and West Devon, in southwestern England, have been home to mining for at least 3,500 years.
- Cornwall became a centre for technological advances in mining and metallurgy.
- From the early 19th century Cornish mines also produced by-product arsenics.
- In 2006, the mining landscape of Cornwall and West Devon was recognized as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO).
Challenges in Cornwall

- Environmental concerns include arsenic contamination from waste areas and other sources.
- Issues related to soil and water contamination are being addressed by the UK National Environment Agency.
- The mines of Cornwall present some interesting parallels with those in Cobalt, and some of the surviving works constructed to recover arsenic are comparable in age to some of the sites in Cobalt.
- The challenges faced in Cornwall are similar to those faced in Cobalt and other mining heritage sites in Canada.
The Botallack Labyrinth

• Mining at the Botallack site dates back to the early 1700s.
• The Botallack labyrinth operated in the early 20th century.
• Ore was roasted in a furnace and off-gases included arsenic and sulphur dioxide.
• The labyrinth was used to recover arsenic from off-gases, and consisted of a series of flues adjacent to the furnace.
• The off-gases were directed through these flues and within the flues the gases cooled and arsenic condensed on the walls.
• To recover the arsenic the system would be shut down a couple of times a year and workers would scrape the arsenic from the walls of the labyrinth and haul it out.
Botallack Labyrinth - 1906
Addressing the Challenges at Botallack

• Results of soil sampling showed that arsenic concentrations were highest in the labyrinth itself and in soils next to the chimney.

• To remediate the site, arsenic-bearing materials were removed, then the walls of the labyrinth were scraped and finally cleaned with a high pressure washer.

• To prevent exposure to any residual arsenic the floors of the labyrinth were covered with geotextile and a layer of clean material.

• Once the remediation work was complete and the site was safe for both workers and tourists, restoration work was carried out.
Remediation of the Botallack Labyrinth
Restoration of the Botallack Labyrinth
Botallack Labyrinth - Before
Botallack Labyrinth - After
Conclusions

- “Mining towns” are scattered across Canada and in these towns mining heritage structures such as headframes are important to the collective memory and identity of the communities.
- Abandoned mine sites are often host to environmental concerns and remediation is essential, but can be perceived as being at odds with efforts to preserve mining heritage.
- The challenge in such communities is to complete environmental remediation, reducing environmental releases of contaminants, while preserving the sites and making them safe and secure for tourists visiting the sites.
- Work at the World Heritage Sites of Cornwall and West Devon illustrates that this challenge can be met.
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