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Living with Zombie Mines

March 6, 2013 by carsoncenter | 3 Comments

Post by John Sandlos and Arn Keeling

Mention the words “zombie mine” and you risk conjuring images of grotesque undead figures lurking in dark abandoned tunnels, more the stuff of movie or video game fantasies than anything to do with mining in the real world. And yet, the idea behind the zombie – that of a malevolent force expressed through the afterlife – is a useful metaphor for thinking about the social and environmental issues surrounding abandoned mines. Our research project, Abandoned Mines in Northern Canada, has suggested to us that mines can have a zombie-like ‘afterlife’ in two ways: through the redevelopment of a formerly abandoned mine to remove remaining ore deposits as prices improve on global markets, or (the focus of this blog contribution) through long-term environmental impacts such as toxic tailings, acid mine drainage, or landscape change.

Mining interests often promote the idea that there is a closed life-cycle to a mine. In keeping with Homer Aschmann’s idea of the natural life cycle of a mine (articulated in a 1970 Economic Geography article), mainstream mining histories often present circular stories: the heroic origins of a

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mine, involving exploration and pre-development of remote mineral sites; a middle stage where the site is developed along with infrastructure such as rail links, highways and electricity; and a final stage where a site is closed down and remediated to something approximating its former state. More recently, a prominent global initiative organized through the Eden Project has produced a book titled *101 Things to do with a Hole in the Ground*, a coffee table style celebration of post-mining landscapes that have been converted to benevolent afterlives ranging from swimming pools to cheese cellars.

But the story of an abandoned mine does not always have a neat and happy ending. Negative impacts may persist for decades, even forever, in the aftermath of a site closure. Historian Patricia Limerick was lead author on a report that has estimated there are close to 500,000 abandoned mines in the western United States, some exhibiting issues with acid mine drainage (the outflow of acidic water from a mine through the oxidization of exposed sulfides) that cannot readily be remediated. In 2010, *The Globe and Mail's* Geoffrey York pointed to a looming catastrophe in Johannesburg, where acidic and toxic-laced mine water is inexorably rising from abandoned underground mines toward the city foundations, a problem for which the relevant authorities have not yet found an adequate solution.

Many similar zombie-like issues persist in Canada's territorial north. In 2002, the federal government's Commissioner of the Environment issued a report estimating thirty priority toxic abandoned mine sites, with the public picking up the tab for a total clean-up bill of \$555 million (an amount that since proved to be a low estimate). The environmental issues at this sites vary, but former mines such as Colomac, Port Radium, Discovery, Mt. Nansen and Faro Mines present long-term liabilities that collectively include acid mine drainage, heavy metal contamination, radioactive waste, and inadequate storage of toxic tailings water. Although mining companies operating in northern Canada must currently post financial security to cover costs of remediation, critics have noted the difficulty of ensuring that money collected, often years in advance of closure, is adequate to cover rising costs or unforeseen financial liabilities at the sites.

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Abandoned headframe, Giant Mine. Photo by John Sandlos and Arn Keeling.

Of all the mines in the Canadian North, the abandoned Giant Mine inarguably presents the most alarming and intractable examples of zombieism in the region. Located adjacent to the territorial capital of Yellowknife, this gold mine operated from 1948-2004, producing just over 7 million ounces of gold worth 2.7 billion Canadian dollars (in 2002 currency) over the 55 year life of the mine. But the mine also produced large amounts of the highly toxic compound, arsenic trioxide, sent up a smoke stack in the form of a fine dust as gold ore was roasted to separate the precious metal from the surrounding rock. The arsenic pollution had a dire and deadly impact on the local indigenous group in the area, the Yellowknives Dene First Nation. Toxic dust settled in snow over the winter (a major source of drinking water), it was released into local lakes, streams, and rivers in large volumes during spring runoff (also a major source of drinking water), and it settled on local sources of food (particularly berries) during gathering seasons. In April 1951, a two year old Dene boy was poisoned to death from drinking contaminated water, and archival records suggest many other Native people were sickened due to arsenic poisoning that spring. In October 1951, the mine installed pollution control equipment that collected the arsenic dust prior to entering the smokestack, technology that did mitigate the air and water pollution problem as efficiency improved over time. But faced with

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the vexing problem of what to do with the large volumes of arsenic it was collecting, the company deposited it in underground chambers within the mine, hoping that permafrost would re-establish itself once the mine was abandoned. Such wishful thinking proved erroneous, however; currently 237,000 tons of arsenic trioxide sits under the ground, a massive amount of toxic material that would certainly cause a health and environmental catastrophe should it ever be released into the local environment.



Abandoned roaster stack, Giant Mine. Photo by John Sandlos and Arn Keeling.

The Canadian government has developed a remediation plan for Giant Mine that involves freezing the arsenic where it sits using passive heat exchange technology known as thermosyphons. There is only one problem, and it's a big one. The site will require ongoing monitoring and maintenance, especially water pumping, forever. It is a thought that boggles the mind, prompting questions of whether there will even be a Canadian government in 100,000 years much less a line in the federal budget for maintaining the site. And what of future generations, who must contend with a toxic legacy and risk that they may no longer understand, or even be aware of? During a recent environmental assessment of the project, Yellowknife citizens and Yellowknives Dene First Nation member raised profound objections to the plan based

primarily on these risks and challenges. For the Yellowknives Dene, in particular, the proposed technical solution to the arsenic issue leaves unaddressed the historical injustices associated with arsenic pollution and the dispossession of Native people from their traditional lands. At Giant Mine, the shadows of the zombie mine grow very long, haunting northern Canadians with an undead mine where the impacts stretch potentially to eternity.



Giant Mine Remediation Project Thermosyphon test plot. Photo by John Sandlos and Arn Keeling.

John Sandlos is a Fellow at the Rachel Carson Center for Environment and Society in Munich, Germany, and an Associate Professor of History at Memorial University of Newfoundland. Arn Keeling is an Associate Professor of Geography at Memorial University. Together they direct the Abandoned Mines in Northern Canada Project, with funding from the Social Sciences and Humanities Research Council of Canada (SSHRC) and ArcticNet.

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seankheraj

March 8, 2013 at 4:34 am

This is a fascinating, troubling, and important research project. Readers should also watch the video Sandlos and Keeling shot on a trip to one of the abandoned mine sites:

<http://m.youtube.com/watch?v=DgY6biryzQc>



SideN

May 22, 2013 at 4:01 pm

Such studies do not help to resolve the problem. It seems that funding was spent on self-education of the researchers. Read about NOAMI and how much effort was spend in this country on to fix major problems.

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