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ENERGY, MINING AND SUSTAINABILITY IN NW BRITISH COLUMBIA • MARCH 2008



A Fortune at What Cost?

The view from Mt. Klappan in Northwest British Columbia. To create an open-pit coal mine, Fortune Minerals plans to literally remove the top of the mountain.

PHOTO: GREG BROWN, THE PEMBINA INSTITUTE

The Proposed Coal Mine at Mt. Klappan

High mineral prices and investor-friendly policies are driving a rush of new mining development across Northwest British Columbia. With more than half a dozen new projects proposed, remote communities are suddenly facing a barrage of development decisions.

This modern day gold rush could change the character of the region forever, bringing scores of new job seekers, roads and industrial sites. Without careful planning, the region's fortunes could rise and fall alongside mineral prices. Each new project will bring its own balance of benefits and challenges for local communities.

Not All Mines Are Created Equal

The differences between projects may not always be easy to see. The devil, as the saying goes, is in the details. When evaluating a new mine, communities need to pay attention to its design, location and

size; its environmental safeguards; and any arrangements for community engagement, including agreements with First Nations.

This primer considers mine impacts in the context of one proposed project: Fortune Minerals' Mt. Klappan Coal Mine, located in the "sacred headwaters" region of Northwest British Columbia. The project would open pristine wilderness to new activity on a landscape-changing scale and would substantially increase British Columbia's production of coal – one of the most concentrated sources of climate change pollution.

Its benefits would include short-term and long-term jobs which, under the right conditions, could be filled by local residents. However, communities will need more detailed information about the mine – and its alternatives – before they can determine whether the project's benefits outweigh its risks.



This photo shows the parts of Mt. Klappan that will be removed by coal mining, as taken from Fortune Minerals' presentation to the Minerals North Conference, April 18, 2007.



Trucks like these will become common with increased mining.

PHOTO: GREG BROWN, THE PEMBINA INSTITUTE

Coal Mining Concerns

- Fortune Minerals has a 15,000 hectare licence to create an open-pit coal mine at Mt. Klappan that will effectively dismantle the mountain in a few decades.
- The mine's short-term and long-term job opportunities could be filled by local job seekers under the right conditions.
- Coal mining is often associated with acid mine drainage and sulphate and nitrate pollution in local streams, which can have significant impacts on fish.
- Mining-exposed rivers in the Elk Valley region of British Columbia were found to have nitrate levels 650 times higher, sulphate levels 18 times higher, and selenium levels 57 times higher than streams with no mine.
- Additional threats to fish and wildlife at Mt. Klappan include habitat fragmentation as a result of new transportation corridors.

The Hard Truth About Coal Mining

At Mt. Klappan, coal is currently buried underground in layers that are separated by other kinds of rock. Extracting it involves removing the top layers of earth and rock with trucks and shovels, and blasting deeper layers of rock apart with explosives. Typically, this process unearths between 8 and 12 cubic metres of rock for every cubic metre of coal. Around 90% of the total mined material is "waste rock," which is removed and left in enormous piles.

Once extracted, the coal is ground and washed with large amounts of water to "clean" it. This produces additional waste rock as well as polluted water that is stored in tailings ponds. The washed coal is then dried and shipped to market.

Fortune Minerals' current proposal calls for an open-pit mine that would produce from 1.5 to 3 million tonnes of coal every year.



Mining will change the landscape and have harmful effects on fish and wildlife.

PHOTO: DAVID DODGE, THE PEMBINA INSTITUTE

Moving Mountains

By its very nature, open-pit coal mining is a colossal endeavour that leaves a huge footprint on the land. The Mt. Klappan coal licence covers 15,000 hectares¹ – that's an area 30% larger than the city of Vancouver. An open-pit mine of this scale effectively means dismantling Mt. Klappan by digging away millions of tonnes of rock, soil and coal each year. In addition to increasing the mine's footprint, the leftover piles of waste rock also carry the risk of "failure," in which they collapse and flow like a landslide over the landscape – sometimes for distances of up to two kilometres.² More than 50 failures have been recorded at British Columbia coal mines in the last 25 years.

Today, Mt. Klappan is a relatively pristine wetland on a remote and beautiful plateau, near the headwaters of three major rivers: the Nass, the Stikine and the Skeena. Mining will change the landscape forever and significantly impact fish and wildlife. The mine would replace natural vegetation; new right-of-ways would interrupt wildlife corridors; and roads and other access infrastructure would lead to erosion and stream silting.

¹ Fortune Minerals press release, October 17, 2005.

² R.F. Dawson, N.R. Morgenstern and A.W. Stokes, "Liquefaction flowslides in Rocky Mountain coal mine waste dumps," *Canadian Geotechnical Journal*, 35: 328-343 (1998).

Worries About Water

Coal mines have polluted groundwater and rivers across North America in many different ways. When rocks are mined and brought to the surface, they often contain sulphide minerals and heavy metals, such as arsenic, selenium, mercury, chromium and lead. When these sulphide minerals are mixed with water (rainfall on newly exposed rock, for example) they form strong acids. The highly acidic runoff that results, known as acid mine drainage, is poisonous to aquatic life and dissolves the toxic heavy metals into ground and surface water.

Details about the rock chemistry at Mt. Klappan are not available to the public. However, pyrite, the most common sulphide mineral associated with acid mine drainage from coal mines, has been found at the site.³

Other chemicals generated in coal mines include nitrates and ammonia (from explosives used to blast rock). Both can lead to algal blooms in rivers, which can in turn upset the balance of invertebrate species, ultimately impacting fish populations.

The effective design of a mine can help reduce negative impacts, for instance by shielding rocks from water and reducing opportunities for acids to form. However, more information about risks will be needed before communities can make informed choices.



More than 60,000 cubic metres of rocks traveled two kilometres in less than one minute when a waste rock pile at a Southeast British Columbia mine collapsed. The pile's original location is shown in the background of this photo. PHOTO: O. HUNGR

Contributing to Climate Change

Coal mining releases nitrogen and sulphur compounds that reduce local air quality and contribute to acid rain.

Coal is also a concentrated source of climate change pollution.

If Mt. Klappan coal is exported to produce steel, as Fortune Minerals proposes, it could eventually add 10.5 million tonnes of greenhouse gases to the atmosphere every year. That's equal to nearly one sixth of British Columbia's total emissions, and it would make the Northwest a major global contributor to climate change.⁴

3 BC Geological Survey, Ministry of Energy Mines and Petroleum Resources, MINFILE Number: 104H 020. Accessed January 14, 2008.

4 Estimated greenhouse gas emissions calculated with Environment Canada emission factors, 2007.

Déjà Vu? Coal Mining and Water in the Elk Valley

The Elk Valley region in Southeast British Columbia, where five coal mines are currently in operation, provides some lessons about water quality problems created by coal mining. A comparison of



A fisher at the confluence of the Tahltan and Stikine rivers. Mt. Klappan is at the headwaters of three major rivers: the Nass, Stikine and Skeena.

PHOTO: GARY FIEGHEHEN

two neighbouring rivers in the region — one with coal mines in its watershed, the other one without — revealed significant differences. The river exposed to coal mining had nitrate levels 650 times higher, sulphate levels 18 times higher, and selenium levels 57 times higher than its sister stream.⁵ Other studies in the Elk Valley have found that selenium concentrations in rivers can increase up to 200 times as a result of mine effluent.⁶ Selenium has been shown to cause developmental deformities in rainbow and brook trout, and to decrease the overall number of invertebrate species.

In addition, numerous waste dump failures have occurred at Elk Valley mines (see photo at left).

5 Mike Richeson, "The Threat of Canada's Mines," *Bigfork Eagle*, August 9, 2007. Accessed February 5, 2008 at <http://bigfork eagle.com/articles/2007/08/09/news/news02.txt>. Comparing Flathead River and Michele Creek, below Coal Mountain mine.

6 Leslie E. MacDonald and Mark M. Stroscher, *Selenium Mobilization from Surface Coal Mining in the Elk River Basin, British Columbia: A Survey of Water, Sediment and Biota* (Cranbrook, BC: Ministry of Environment, 1998).

Shipping 1.5 million tonnes of coal by truck to Stewart every year works out to about one 40-tonne truck travelling the highway every 15 minutes. If production at Fortune Minerals reaches its target three million tonnes per year, that's one truck every seven to eight minutes.

PHOTO: GREG BROWN,
THE PEMBINA INSTITUTE



The Role of Cultural Values in Mine Decisions

In 2007, a Joint Review Panel recommended that a Northern British Columbia mine, Kemess North, should not be built. The mine would have used Amazay Lake – considered sacred by the Tse Keh Nay First Nation – as a tailings pond for storing mine waste. This social and cultural cost was judged to be against the public interest. In March 2008, the federal government agreed to respect the panel's ruling.

Coal would be transported to west coast ports through one of three proposed corridors: Corridor A to Stewart via the Bell II River and Highway 37/37A; Corridor B to Prince Rupert via the Skeena River; and Corridor C to Prince Rupert via the existing rail grade to Prince George. Truck, train, and slurry pipeline options have been proposed.

Want More Information?

For reports, primers, maps and slideshows on energy, mining and sustainable development in Northwest British Columbia, visit our website:

www.afterthegoldrush.ca

For more information on the boom and bust cycle of mineral development, see our *Boom to Bust* primer:

www.afterthegoldrush.ca

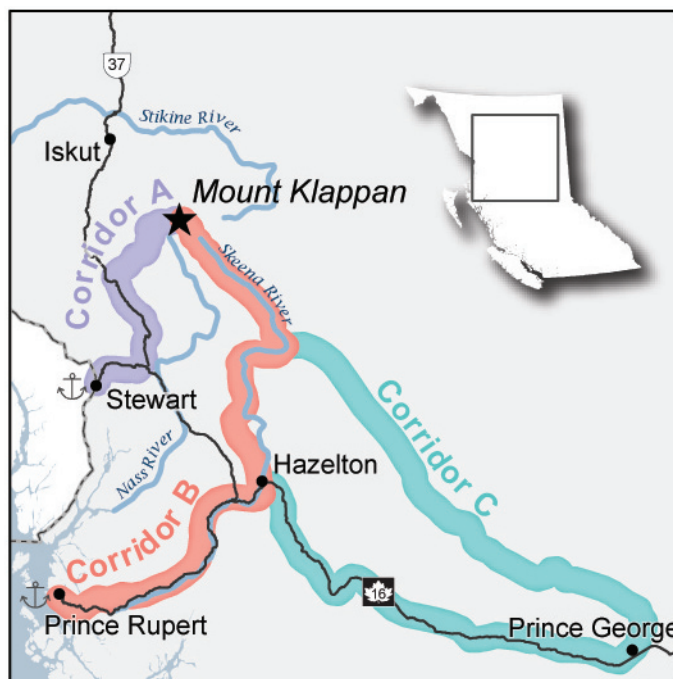
This primer was prepared by Alison Cretney, Jaisel Vadgama and Greg Brown of The Pembina Institute:

www.pembina.org



Pursuing a Pipe Dream

Transporting coal from Mt. Klappan's isolated location creates additional challenges. Most options involve developing right-of-ways, adding stream crossings, and increasing activity on roads or railways. These "upgrades" can fragment habitats, acting as barriers to wildlife movement, and can literally pave the way for further development in the region.⁷

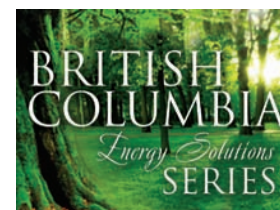


Recently, Fortune Minerals has proposed building a pipeline to haul a coal-water mixture, or "slurry," to port. While this transport option may be more feasible economically, it raises its own set of concerns. For instance, when coal and water are eventually separated, the leftover "black water" (like water used to wash coal) can contain toxic

substances including coal particles and leached metals, and requires special treatment. If pipes break or malfunction, slurry could be released into the environment.⁸

Mt. Klappan at a Crossroads

An open-pit mine, together with new or upgraded transportation links, would be a significant change in an area that has historically seen very little industrial development. Communities need to carefully consider potential impacts and benefits from this proposal – and compare them to other economic development opportunities, from sustainable energy to ecotourism. Today's decisions will have direct and indirect effects that could last for generations.



⁷ In its initial studies of the rail option, Fortune Minerals assumes that another company will share rail upgrade costs fifty-fifty, but no obvious candidates have emerged so far.

⁸ Argonne National Laboratory, *Environmental Consequences of, and Control Processes for, Energy Technologies*, Revised Edition. (William Andrew Inc., 1990), 17.