Ponds of stagnant polluted water pose a threat in Alberta

Dr. Hans Peterson

An article in the Economist magazine (June 2003) stated: "There's oil in them tar sands!" The article made a comparison of global oil reserves and recognized the potential for the tar sands of Northern Alberta to be the second largest oil reserves on earth. But, squeezing oil from a rock (bitumen) isn't that easy and only around 16% of the mined material is bitumen with the rest being clay, sand and other things that are not useful.

This bitumen also needs to be brought out of the ground, which is done by steam injection or other hot water extraction techniques. The key use of water to extract oil from the tar sands did not go unnoticed by the Economist, which acknowledged:

"Another technical snag looks likely to be the environmental impact of producing oil from tar sands. For a start, the process uses enormous amounts of water. The Shell folk insist that they recycle much of it, but even they accept that water scarcity will become an issue if many tar sands operations take off in the future. Indeed, local people are grumbling already".

What is happening with the "enormous amounts of water" used in the extraction process? This water is pumped into huge ponds (more like lakes) for storage. Even after 10 years or more of storage there are still large quantities of contaminants dissolved in the water. So much so that, so far, no one has figured out a way to treat this water so that it can be discharged safely from the ponds.

The approach to this growing pollution problem has been to just build bigger and bigger ponds and pray that someone, some day, is going to come up with a solution to clean up the waste. Sure, a lot of people are doing little things, but one would think that any expansion of the tar sands would be allowed only after a solution of dealing with the contaminated water has been found? Not so.

What if we approached our sewage problems like that? Build bigger and bigger ponds around cities and soon we would all have waterfront properties. Is it surprising that nothing of real substance has been done on this topic?

Compared with the U.S. Environmental Protection Agency, Environment Canada has played an ineffective role in protecting the environment. Maybe the people in Environment Canada believe that we are so few people in Canada, with such a vast land and water base, that how could we possibly pollute it? This view could be rapidly changed if some officials were to visit exposed and contaminated Aboriginal communities across the country. I spend around 50% of my time working in Aboriginal communities and I have yet to bump into a federal government scientist in any of these locations.

The contaminated tar sands water is also now starting to generate additional environmental concerns. With bacteria eating up some of the contaminants, oxygen disappears and bacteria known as methanogens have started to produce methane gas at alarming rates from the bottom of the ponds. Alberta needs to start to account for these greenhouse gases. If the wastewater had been properly treated rather than just stored, the environmental impact of the tar sands development would have been considerably less than what it is now. The size of the waste ponds and the generation of methane from those ponds would have been much decreased.

Disasters can be viewed as accidents waiting to happen. The CN derailment near Lake Wabamun Alberta is a good example of what can happen when train tracks are placed too close to a water source, especially when toxic materials are being transported past the water source on a regular basis.

Wabamum residents were warned to not use lake water to spray gardens, or take showers in. Residents who were tempted to save wildlife contaminated from the spill were also warned against handling the polluted animals.

CBC news reported that "Ron Goodman, an expert hired by Alberta Environment to advise the railway, said it could take between two and five years to return the lake to its original state."

So, what happens in the tar sands of Northern Alberta if a berm breaks due to engineering problems and toxins end up in downstream water bodies, or if there is a natural calamity similar to New Orleans? What would remote communities do when faced with contaminated water?

Some engineers have already thought of this and have installed drinking water treatment membranes and this could be a solution, if the right membrane is installed. But, it should be made clear that the contaminants of concern from the tar sands cannot be removed by ultrafiltration membranes and much finer membranes such as, nanofiltration or reverse osmosis, must be used.

Unfortunately, there are no nano- or reverse osmosis surface water treatment plants in the tar sands area leaving communities at risk should a natural disaster, or an unforeseen accident occur. Δ

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