## A test case for tackling the CO-2 challenge

DAVID EBNER Globe and Mail January 21, 2009

FORT NELSON, B.C. — The steel exhaust tower, two metres wide and 100 metres high, is the tallest structure for hundreds of kilometres. Located just south of Fort Nelson in remote northeastern British Columbia, it towers against the sky, and it spews invisible, atmosphere-cooking carbon dioxide, even as the temperature on the ground on a sunny mid-November morning is minus 20 C. The tower, the release point for carbon dioxide extracted from the natural gas processed at Spectra Energy's massive Fort Nelson plant, is the largest emitter of carbon dioxide in the province at about 1.2 million tonnes a year, a figure projected to double as a predicted natural gas boom north of town in the Horn River Basin takes off.

The natural gas below the surface is mingled with carbon dioxide, about 10 per cent of the mix, which is what the Spectra plant currently strips off and emits.

Successfully dealing with the greenhouse gas is going to be crucial to the development of the region, which is home to one of the largest accumulations of natural gas in North America that is in the very early stages of being unlocked with new technology.

Spectra's Fort Nelson gas plant is the focal point for B.C.'s fight against global warming and the area is at the heart of the province's economic future.

Houston-based Spectra is spending \$12-million – a quarter of the money coming from a provincial government grant – to assess the geology 2,000 metres below the surface and drill two wells in an effort to establish a suitable reservoir to sequester carbon dioxide.

The geology is likely the simplest part of the equation. Spectra and other large industrial emitters no doubt foresee future legislation limiting carbon dioxide emissions – but myriad, crucial details remain unknown, leaving the likes of Spectra operating in a fog of unknowns.

Among the glaring gaps is the lack of a national and continental legislative framework that would put all participants on a level playing field. Then there are the specifics, such as who would be liable if a below-ground reservoir were punctured and gas escaped – in this case, Spectra or the natural gas companies that had their product processed at Spectra's plant?

"The big open question is commercial. Right now, it doesn't pay to do this," said Mark Jenkins, a Spectra engineer working on the reservoir project, during a walk around the site on a cold, clear day.

B.C., as part of the 11-member Western Climate Initiative, in the spring introduced cap-and-trade legislation, which would cap industrial emissions and allow companies to buy and sell credits, whether for reducing emissions or to pay for emissions that have not been cut. Details have not been finalized for the province's goal to slash emissions by a third by 2020 – about 21 million tonnes less than a recent estimate of 62 million tonnes of annual carbon dioxide emissions.

Spectra's aim is to emit less carbon dioxide even as it doubles the amount of natural gas it processes. If the company isn't successful, it will be extremely difficult for B.C. to reach its goal.

In neighbouring Alberta, home of the country's biggest emitters, the province is still committed to \$2-billion of spending on carbon capture and sequestration technology – particularly for the oil sands – even as the province's surplus evaporates with plunging oil and natural gas policies.

Such movement by the provinces is happening because, after years of languishing, legislative action is percolating on a broader scale in North America. With former president George W. Bush exiting office, change could come quickly. President Barack Obama has said the environment is a key priority regardless of the recession. Prime Minister Stephen Harper acknowledged the likelihood of swift action in the U.S. by appointing a top minister, Jim Prentice, to the environment portfolio.

The Spectra project has already hit a setback, a harbinger of the daunting challenge to implement carbon capture and storage on a wide scale. The company had hoped to be able to inject the carbon dioxide into a saline reservoir below the plant, but the geology assessment showed the supposedly impermeable rock around the reservoir probably wouldn't keep the carbon dioxide in place.

Spectra is now looking at a spot about 15 kilometres from the plant, and pushed back the drilling of a first test well planned for last year to March. A second test well is scheduled for late this year or early 2010, with the goal of full-scale injection of carbon dioxide in 2013, about a year later than planned when the project was announced last spring.

The cost of implementing carbon capture and storage will be significant. While Spectra doesn't have a precise budget, project director Al Laundry said it will definitely be in the hundreds of millions of dollars.

If the cost is \$500-million (U.S.), it would amount to 25 cents for every thousand cubic feet of natural gas the plant aims to process over a six-year period. It appears to be a big number but for consumers heating homes, or industries powering factories, the additional cost wouldn't be severe. It amounts to about 5 per cent of the current benchmark price of natural gas - \$5 per thousand cubic feet - and is less than many daily price fluctuations of the commodity.

Spectra's Fort Nelson facility currently produces close to 500 million cubic feet of gas for sale daily, which it plans to double as Horn River production increases.

Already, about 50 million cubic feet of gas from Horn River is being sold. Spectra wants to increase output to about one billion cubic feet a day, reopening a part of the plant that was mothballed several years ago after conventional gas production in northeastern B.C. began to fall off.

Spectra's advantage is that it has a ready point source of carbon dioxide, rather than having to capture emissions from various places, a far more difficult task. The processing plant strips out carbon dioxide from natural gas, and a little bit of hydrogen sulphide. The carbon dioxide is vented and the hydrogen sulphide is converted into sulphur.

The gases would be compressed effectively into a liquid form, moved by pipeline to the injection site and pumped underground into a reservoir that could store between 20 and 50 years worth of emissions.

Power is another challenge. About 50 megawatts of power would be required for carbon capture and sequestration, largely for the compressors. That's 10 times more than what the plant currently uses, which Spectra generates itself, and about the same amount as is used by the town of Fort Nelson, population 5,000. Spectra is looking at using gas-powered turbines for about half its power needs and using waste-heat recovery for the rest.