

**Comments On
Discussion Paper: Petroleum Operations, Costs and Opportunities in Nova Scotia**

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Thank you for the opportunity to comment on this Chapter of the Wheeler Report but I did expect more from Mr. Gardner.

This paper claims to be about costs and benefits ? But it focuses entirely on industry. Yet we know the negative impacts of gas discovery and recovery will be significant and long term for this province. The titles of the other chapters tell me that the information I/we need (the cost to the province versus the benefit to the province of a shale gas industry) will not be given to us at this time. Will it ever be submitted to us? Nova Scotians need more respect than this.

As well, the next chapter on how much resource there is indicates so much uncertainty. Perhaps there is nothing there at all in gas resources. But industry will come in, trample our world, making their shareholders happy in the short term and then tell us that the reason they left so quickly was that there was little here to begin with.

It is difficult to figure out just how many local jobs there will be from the information presented. And who will be able to keep a tally on the number of jobs? The only spot in the Chapter where things sound firm enough are the local contractors who would be used during the abandonment phase. So when local company 'x' is called back in 2 years after abandonment, to do something that was probably impossible to do in the first place, it is they who will be on the hook for the poor quality of work that was done by industry outsiders that were initially brought in. Nova Scotians will be left to turn on themselves. How clever.

My position is that if industry and the government that gives the go-ahead for fracking in the province want to attain credibility then it is industry who needs to fund monitoring programs upfront and for a significant time into the future.

Could the royalties that the province receives be used to monitor the environmental impacts? Or is the rumour true that industry is given a 2 year holiday from having to pay royalties? Within a few short kilometres of my house is a well that has been abandoned for several years with little or no clean up (a black tarp has blown off the make-shift tanker car that holds some sort of waste water, evidence is left of a drainage ditch leading to a small stream, etc) When the DOE are called about the site apparently the response is "yes, we are aware of it". What is being done about it, and why is the public not being informed of its location and condition?

Will there be a chance for people who live in the area to know where wells are going to be drilled? And not just the locations of the well pads that could have as many as eight laterals running off of them, that is, where the horizontal drill lines are being directed. It is these lengths that will be fracked many times. If we can have access to the location of the well pads, could we get detailed GIS mapping of known fault line information and aquifer data compiled on them for the site as well? Then monitoring stations could be located appropriately and also placed on the maps? The DOE and the Department of Mineral Resources have this information and the capability to do this.

Will my complaints, should they occur, of obvious water compromises be taken seriously? Who will pay for replacing my water? My property has recently had a state of the art septic system installed on a less than one acre property lot. It cost me roughly \$18,000 with the engineer's assessment. I was forced to fill in my old dug rocked well due to proximity to the new system. Two points here - look at the costly hoops I had to jump through to secure environmental integrity for me and my neighbours, and, two, if my drilled well collapses now (as at least 2 neighbours have probably due to the seismic testing in the area - and industry and government would probably deny this I expect) I will not have room on my property to drill or dig another well. I would have to rip out the

state of the art septic system, install large septic tanks, then dig or drill another well. Who will pay for this and will it even be allowed? These are the things people think of in rural communities after they read about fracking in rural areas. The oil and gas industry has deep pockets and they will (and they do, we hear about this in the media) force people like me with complaints to prove it in court. Very few people here in rural Hants County have this kind of money.

The Executive Summary of the Environmental Impacts of Shale Gas Extraction in Canada which has been published by the Expert Panel on Harnessing Science and Technology to Understand the Environmental Impacts of Shale Gas Extraction set out by the Council of Canadian Academies includes a section titled Environment. The first subsection underneath it is titled *Water*. ***Please read*** what I have excerpted from it and which I present here in quotes.

"WATER

Accidental surface releases of fracturing chemicals and wastewater, and changes in hydrology and water infiltration caused by new infrastructure, may affect shallow groundwater and surface water resources. A risk to potable groundwater exists from the upward migration of natural gas and saline waters from leaky well casings, and possibly also natural fractures in the rock, old abandoned wells, and permeable faults. These pathways may allow for migration of gases and possibly saline fluids over long time scales, with potentially substantial cumulative impact on aquifer water quality. The risks due to surface activities will likely be minimal if proper precautionary management practices are followed.

However, not enough is known about the fate of the chemicals in the flowback water to understand potential impacts to human health, the environment, or to develop appropriate remediation. Monitoring, assessment, and mitigation of impacts from upward migration are more difficult than for surface activities.

The greatest threat to groundwater is gas leakage from wells for which even existing best practices cannot assure long-term prevention. The degree to which natural assimilation capacity can limit the impacts of well leakage is site specific due to variability in the magnitude of natural gas fluxes (or loadings) and aquifer hydro-geochemical compositions. These potential impacts are not being systematically monitored, predications remain unreliable, and approaches for effective and consistent monitoring need to be developed.

On average, about one-quarter to half of the water used in a single hydraulic fracturing treatment returns up the well to the surface after stimulation. This return flow, or flowback, is a potentially hazardous waste because it typically contains hydrocarbons including variable amounts of benzene and other aromatics, fracturing chemicals, and potentially hazardous constituents leached from the shale (e.g., salts, metals, metalloids, and natural radioactive constituents). Although flowback water is now commonly re-used in later fracturing treatments, a fraction eventually remains that poses technical challenges for treatment where deep wastewater injection for disposal may not be feasible (e.g., eastern Canada)."

And there are following this other sub-sections on Greenhouse Gas Emissions, Land and Air Contaminants, among others.

Under the section titled PUBLIC ACCEPTANCE we find "Public acceptance of large-scale shale gas development will not be gained through industry claims of technological prowess or through government assurances that environmental effects are acceptable. It will be gained by transparent and credible monitoring of the environmental impacts." **I feel that this is the best advice that government and industry can heed and I hope they take this to heart for our benefit but for their benefit as well.**

Questions:

Let's consider the roads that will be necessary to continue with the exploration/seismic. Who will pay for these roads? I see on pg 13 of the Chapter that industry expects that

they and the province may develop a compensatory framework under which industry would pay their share. With the state that the province is in and the rumoured 2 year royalty holiday given to industry I do not think the province can be this generous. I am 58 years old and the road in front of my home (hwy 215) has been paved once. Prior to that, it was a dirt road. For the majority of my life it has been very poorly patched. A paving estimate for a simple, short driveway up to our community health clinic was recently given of \$50,000. If industry destroys the roads then they should be the ones paying. Nova Scotians should not have to put up with having our air, water and soil destroyed on top of having our infrastructure damaged and be expected to pay for any portion of its recovery/reclamation. We currently pay some of the highest taxes in the country, we cannot be burdened with more.

And remember! We need to know what the provincial royalties will be and when they will begin to accrue? Don't keep this a secret from us.

This Chapter on the economics does not help me to feel hopeful about a future of shale gas industry in the province and in my area. When I look at the titles of the other Chapters I do not see where my concerns will be examined. When property values (representing much of my life's savings could be cleared to zero with contaminated water I am not comforted by anything that I read in this Chapter.

When will the reclamation be considered complete, and what about fluid migration over time? How will it be monitored?

Rural areas will see very negative impacts. For example, our tiny community gas station will not be able to fill the thousands of trucks with gasoline. Where will they get filled up? When a large truck drives by my house now I automatically look. What is it and where could it be going? Our serenity will be destroyed. There are not enough places for workers (from other provinces and the US) to sleep. So where will the "work camps" be located? What about the increased crime levels that will be associated with this? Can all the truck loads of chemicals be transported with no incidents? Where else will these and

other such issues be addressed before this project gets the go-ahead? It seems this paper has been written but the decision has already been made and the public is not seen as being important enough to receive information on this. But my community will be negatively impacted forever. The noise, the air pollution, the traffic, the potential destruction of my well water and therefore my family's health and my property value will affect me greatly and forever.

Why are the effects on our agriculture and tourism industries? These are not addressed in this Chapter. Why not?

What about addressing the cost of climate change that our continued use of fossil fuels will mean?

And is the last paragraph in the Chapter meant to quell my fears? It talks of incremental industry action. But what control will we really have once industry gets going. So far it seems that the DOE has no ability or desire to engage citizens much at all. DOE representatives appear in front of an audience with a furrowed brow and sincere looks and call the industry representatives who are in attendance by their first names. I have a great distrust of both government and industry on this topic of shale gas development and this Chapter of the Wheeler Report only makes it worse.