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## Q&A with fracking review panel member Maurice Dusseault

By: [Justin Brake](#) | November 28, 2014  
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Maurice Dusseault. Illustration by Mike Philpott.

He's got enemies on both sides of the fracking debate, but University of Waterloo engineer Maurice Dusseault doesn't shy away from questions about how fracking relates to climate change, capitalism, and the "revolving door" between the fossil fuel industry and government

The last time he was in Newfoundland Maurice Dusseault got an earful from a perfervid crowd of residents from the Island's west coast, who had packed into a banquet room at Corner Brook's Greenwood Inn to hear him speak about fracking.

That was last January, when Dusseault, a [professor of engineering geology](#) at the University of Waterloo, had been invited by Memorial University's Harris Centre to [offer an engineering perspective](#) on the controversial method of fossil fuel extraction to those curious about or opposed to it.

Nearly three months prior to that the Government of Newfoundland and Labrador announced a moratorium on fracking until it conducted an internal review on the matter. Earlier in 2013 a few junior oil companies had expressed interest in fracking the west coast's shale rock formations to get at previously inaccessible fossil fuels. But given the associated risks and controversy around it, fracking became a major topic of concern for residents of communities like Corner Brook, Stephenville, Kippens, Bay St. George and Flat Bay, among others.

That concern manifested in a grassroots movement to protect the environment and public health on the west coast. Hundreds of people turned out for community events related to fracking awareness, including information sessions with guest speakers and public demonstrations.

Alongside an engineering colleague from Memorial University, in Corner Brook Dusseault calmly explained how the process of fracking actually works, and that it's safer than other extractive industry practices.

"The risks associated with fracking in comparison to other large industrial activities are low," he said. "We have had massive contamination events in other industries. We work all the time to try and reduce these risks."

One after another though, people stood to express their displeasure about how the presentation failed to take into account all the risks associated with the entire fracking process outside the moment the fracking itself occurs, such as containing, transporting and processing the shale oil or gas, and disposing of or storing the large amounts of wastewater and chemicals used in the process, not to mention the fugitive emissions that could be polluting the air. They also criticized the Harris Centre for not inviting anyone to debate the merits and consequences of fracking.

Dusseault kept his composure, frustration evident in his voice only once or twice throughout the almost two-hour event. The crowd asked difficult questions, many of which fell outside the 67 year old's area of expertise, but he answered as best as he could anyway.

As winter passed the discontentment among west coast residents grew enough that the PCs, under interim premier Tom Marshall, announced the government would commission an external, "independent" review of fracking before deciding on whether or not to lift the moratorium.

Last month natural resources minister Derrick Dalley announced the government-appointed review panel, headed by MUN Vice President of Research Ray Gosine, who is joined by four other men, including Dusseault.

Still unsatisfied with the way the matter is being handled, residents of the west coast and elsewhere in the province are criticizing the government's choice of panel members—most or all of whom have ties to the fossil fuel industry, and none of whom are women or from the west coast—and questioning the integrity of the review process, which will conclude next October when the panel submits its final report to the Department of Natural Resources.

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So Dusseault is back, this time to advise the government on fracking.

He is counted among Canada's top petroleum engineers, a distinguished academic, and recently was a member of Nova Scotia's fracking review panel, whose 300+ page report influenced the Liberal government's decision to ban fracking.

Dusseault also holds patents on new technology used in the fracking process, which many say puts him in a direct conflict of interest as a member of the NL fracking review panel if he stands to profit from the industry's expansion into other provinces.

His point is clear though: Dusseault believes fracking can be done safely under the proper conditions, but those conditions are not yet widely seen in Canada. He has been critical of both industry and governments for failing to achieve the highest safety standards possible.

Earlier this year he co-authored a [report](#) that acknowledges natural gas seeping from 500,000 wellbores in Canada pose a "threat to environment and public safety because of potential groundwater quality deterioration, contributions to greenhouse gas emissions and explosion risks if methane gas accumulates in inadequately ventilated areas."

While Dusseault, NL Natural Resources Minister [Derrick Dalley](#) and many others argue fracking for shale oil and gas has its merits, there is a growing worldwide movement against fracking and the expansion of fossil fuel extraction in any form for a variety of reasons, not the least important of which, many say, is the necessity to avoid irreversible climate change.

Concluding his talk in Corner Brook in January, Dusseault told the crowd, "If you as a people, as a community here in the western part of Newfoundland — if you decided this is not what you want, don't do it. If you believe that it can be done safely, then put pressure on your regulatory bodies [and] tell them we need more regulators and more people with feet on the ground to make sure that things are done properly. We need penalties that are appropriate for those people who break the regulations. If you feel that the resource should be developed, then please do it right."

Earlier this week he responded to questions from *The Independent* by email while traveling in Italy. As an aside, he noted, "At my age, and because the university system has been good to me, and because I have 'tenure', I feel it is a moral responsibility to try and answer questions. I really do try to do my best to be balanced, as well as in my work with governments (Quebec, AB, NL, NB at the present time). I have virtually stopped advising industry at this stage in my life. The accusations you hear of bias are from groups (both proponents and opponents) that are irritated because I refuse to blindly agree with them."

## Q&A with Maurice Dusseault

### On methane emissions and climate change...

**Justin Brake:** Climate change is already triggering more (and more intense) extreme weather events around the globe, which is causing a significant amount of suffering and death in the world right now, mostly in the global south but also even here in North America. The Intergovernmental Panel on Climate Change (IPCC) has shown that climate change and the intensification of these extreme weather events are direct consequences of the amount of greenhouse gases (GHG) we are putting into the atmosphere. So when you say (on pg. 194 of the NS review panel's [final report](#)) that long-term well "leaks appear not to lead to a major public health threat because methane is not a toxic substance," being the most potent greenhouse gas, and since we're talking about developing a fracking industry at a time when the world's leading climate scientists are saying we have to leave what fossil fuels we can in the ground, how do we arrive at the conclusion that long-term leaks after wells are decommissioned are not a major public health threat?

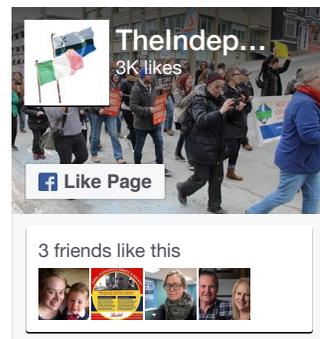
**Maurice Dusseault:** There are many questions in this paragraph because you have chosen to make many statements to contextualize your position, so it is impossible to fully answer in a brief manner. Let me try to clarify a few points. My statement that "...methane is not a toxic substance..." is fully supported in the context of public health definitions of toxicity, which relates individual dosage to individual negative health outcomes. One must not change the meanings of words from what they were clearly intended and conflate the word "toxicity" with other concepts such as weather-induced deaths, automobile accident rates, and so on. No one denies that storms kill people; no one says that storms are toxic.

Methane is a far more powerful GHG in the short-term than carbon dioxide. In the long-term, because it is gradually destroyed in the atmosphere, its relative impact decays; carbon dioxide is said to be more "persistent" in the atmosphere, so it remains there longer. Methane enters the atmosphere from many sources, some of them are from fossil fuels, some of them are from recycling of organic matter. For example, it appears that the "hot spot" in the United States for fossil methane emissions is the Four Corners region of south west USA, where there are massive coal mines. There are natural methane seeps everywhere in the Appalachian valleys of New York down to southern Georgia. This is deep-sourced (thermogenic) methane that has been entering the atmosphere for millennia. It is found throughout the world where there are buried natural gas deposits.

There are many other sources as well. Cattle directly emit about 105 kg of methane a year, perhaps more. All things being equal, a society that consumes a lot of beef therefore causes methane emissions that are proportionately much larger than a society that does not.

Man-induced fossil methane emissions are almost all associated with coal, oil and gas consumption by persons such as you and me. I mentioned the Four Corners case, but methane is emitted by all coal mining activities around the world. Coal remains responsible for about 70 per cent of the total primary energy sources in China. If you look at satellite images of the Bakken and Eagle Ford shale oil development areas in the USA, you will see thousands of gas flares, because there is no currently available commercially viable network to collect the associated gas and use it. Flaring of methane is not 100 per cent effective in turning it into carbon dioxide and water vapour. Small percentages of the flared natural gas (on the order of 1 per cent perhaps) escapes as uncombusted methane. I am certain that this scale of flaring would not be permitted in Canada. Because of different ownership laws and history, the oil and gas practices in Canada are far more and better regulated, flaring is far less common, and there is pressure on provincial governments to regulate the oil and gas producers even more carefully. Canada is not the USA in its approach to oil and gas development.

If you look at all sources quantitatively, a very challenging task that scientists around the world are gradually undertaking, you will find that methane seepage from energy wells is a small fraction of the world emissions of methane. It is also likely a small fraction of the methane emissions along the natural gas distribution system from the well head to the consumer. It can be quantified in terms of the number of wells and the rates at which they are seeping methane from depth. Furthermore, it is highly



controllable because these seepage can be reduced in number and quantity by mandated and enforced quality-control and quality-assurance practices. Also, if a case of seepage exceeding a set limit is identified, the owner of the well is made to fix it, as in BC, AB, SK. This is what happens in Canada.

It is far more challenging to address more diffuse methane sources (coal mining, natural seepage). Furthermore, with the imminent advent of new hand-held devices that can detect small amounts of methane, the quantities of fugitive emissions of methane along the distribution system to your house or to the local gas-fired generating plant that makes your electricity can be greatly reduced. This is an important opportunity.

It is important to assess all sources of GHG methane quantitatively and to place our efforts into reducing those sources that can be most easily ameliorated. In my view, this can be done much better than it currently is.

Is natural gas a fossil fuel? Of course, and as such its combustion adds "new CO<sub>2</sub>" to the atmosphere as well as some fugitive methane. Will this contribute to atmospheric GHG's? Of course it will. However, methane can serve as a bridge fuel toward a future characterized by very low fossil fuel use, providing that methane can replace coal and fuel oil (still fairly widely used in rural New Brunswick and Nova Scotia), perhaps significant quantities of diesel fuel and gasoline, and that the quality-control and assurance mentioned above are improved. Then, the OVERALL rate of GHG emissions from our primary energy sources can be reduced. I often say in public presentations that if we as a world society were genuinely interested in reducing GHG, we would be aggressively scrambling to help China, India, Poland, and other countries to get away from coal use.

It is proving difficult to transition from coal fired power to nuclear, wind, sun, and tidal sourced power. These are generational changes, perhaps even longer. There are people who oppose development of any kind, not just oil and gas, and it even makes it challenging to put into place a wind farm (opposition in Goderich, Ont. can be accessed through the news blogs for example). But compare natural gas to coal for an instant. Coal has other severe health penalties and GHG effects. Look up articles on the city pollution in China. Apparently, three to four years' life span PER PERSON is cut off because of the health effects of coal burning in China. Purely on a CO<sub>2</sub> emissions basis, coal produces about twice the CO<sub>2</sub> of natural gas per unit of energy. It is also far less flexible as an energy source because you cannot quickly increase or decrease the power output of a thermal coal plant, as you can in a natural gas turbine (this allows the use of more renewable energy that is intermittent). Small gas turbines can be used in remote communities, eliminating the use of diesel fuel, reducing the amount of wood-burning in First Nations Communities (wood has its issues in terms of health associated with particulates emissions, even though it is not a fossil fuel), as back-up in case of electricity outages (they are widely used already for this), and for use with energy storage systems.

Then, for coal, consider the particulates, the needed train transport, the NO<sub>x</sub> and SO<sub>x</sub> gases from coal combustion, the dust from trains, the coal beneficiation tailings ponds, acid mine drainage, the lives lost in coal mining each year, and so on. Replacing coal with natural gas has already reduced the USA GHG emissions, and if done properly, it appears that it could be a highly useful transition fuel as we move to a non-fossil fuel energy system.

### On well integrity and the risk posed by fugitive emissions...

**Justin Brake:** Following from [the first question], since the widespread or large scale use of fracking is a relatively new practice, and we don't know what the status of fugitive emissions and well leaks will be in 20, 50, 100 and 500 years from now, how is the risk (in the context of climate change, but also considering the potential consequences to each well's immediate surroundings in terms of people and environment) justifiable?

**Maurice Dusseault:** We have an excellent idea what these wells will emit in 20 years, less so in 500 years. Better well completion practices are advocated in my Chapter (of the NS review panel final report), and elsewhere in my writing. More investigation of these questions is necessary. There have been on the order of 4 million wells drilled around the world to date, some of them over 100 years ago (as in the Stoney Creek oilfield in New Brunswick and in the Petrolia area of Southwestern Ontario). Study of these wells shows that some leak quite a lot, but these are easy to identify and can be cured. Almost invariably, an autopsy shows that the well was improperly installed decades ago. Furthermore, study shows that only a few wells in an area are seeping methane. Clearly, it appears that we can do this right (i.e. improve considerably our success rates). Practices and materials are improving, and can be improved more. My simple calculations suggest that this well seepage phenomenon is a solvable issue, and also that it is not a large issue in relation to other sources of greenhouse gases. Furthermore, if natural gas can rapidly reduce the amount of coal and fuel oil consumed, the reduction of overall GHG impacts and the enhanced capabilities of factoring in more renewables are evident.

You ask how is the risk justifiable? All industrial activities, indeed, all human activities carry risk. Please look at the incidence of water well contamination from agriculture, or stream contamination from forestry or pulp and paper, and so on. Compare it honestly to the incidence of water contamination associated with the 440,000 energy wells in Alberta. We all must evaluate and weigh the risks. Doing nothing (such as continuing to burn coal and fighting against nuclear) carries risks. Clear numbers, good science, transparency, honest comparisons, government willingness to have meaningful dialogues, eliminating of patronizing approaches are all needed to inform this discussion. The questions are easy, the answers complex. Criticizing is easy, finding solutions is challenging. Posting an opinion on a blog takes five minutes, the science takes years.

### On conflict of interest...

**Justin Brake:** There are several people, groups, and even a Member of our House of Assembly, who are questioning the Minister of Natural Resources about the patents you hold on specific technology used in the fracking process. Some are questioning—and others are saying outright—that the possibility you could profit from a fracking industry entering NL puts you in a direct conflict of interest as a member of our review panel. How do you respond to these concerns? And feel free to clarify if there is in fact no way you could profit from the industry entering NL.

**Maurice Dusseault:** I cannot be responsible for what accusations are made by others who have various agendas they are following. My reputation is well known, and my neutrality is only drawn into question by opponents or proponents (often industry) because I do not support their positions. Experts are experts because they have done important things in the area. Some people say that I should not be used as an advisor because I have consulted in the past for companies. Others say that I will profit from possible future patent use. Others say that I do not have a Professional Engineering status in Nova Scotia so I should not comment (I am a professional engineer in AB and also ON, and provinces in Canada recognize other's professional certifications). Others say that only local NS experts

should be used (...but there are none because Nova Scotia does not have a significant history in hydraulic fracturing for gas development).

If you wish to disqualify experts on such factors, society will be left with a residue of persons who present themselves as experts, but have no judgment because the only way to get genuine expertise is to do it in practice and work on the science and engineering. Would you prefer to have a well-paid practicing surgeon operate on you, for financial gain of course, or someone who has no experience? My [CV](#) and background are public knowledge. If you wish to look into my background in detail, you will find that a great deal of my work is on issues such as increasing renewables use through energy storage, on CO2 sequestration, of secure deep waste disposal, and so on.

**Justin Brake:** You mentioned that not only opponents but proponents too have accused you of being biased. Can you give an example of when you were thought to be biased by a proponent, and why they felt you were not being objective?

**Maurice Dusseault:** I have been criticized because I have been studying the issue of wellbore integrity and have continued to point out that there are issues with wellbore integrity and that these should be addressed and mitigated. [The report I co-authored earlier this year] was criticized, as well as the Council of Canadian Academies Shale Gas Environmental report I helped with, at a [proponent blog](#).

Also, without naming me directly, Ezra Levant, and others in meetings have criticized this work, but these cannot be named by me because they are not attributable. I do not seek out comments about me, only when they are sent to me directly by friends and colleagues do they come to my attention.

### On climate change, capitalism and fracking...

**Justin Brake:** The article [“What It Would Really Take to Reverse Climate Change”](#), which you forwarded to me and advised that I read carefully, makes a compelling case for greater investment in innovative research to develop new technologies that would be “truly disruptive to reverse climate change” — so long as doing so would be profitable for all parties involved. The article is based on the assumption that solutions to the climate crisis must be born within the framework of capitalism, the very economic system that, for all the wonderful technological advancements brought about under its purview, is also at the root of the climate crisis (and the economic crisis). What are your thoughts about whether the answer to addressing the climate crisis (a problem created by corollaries of capitalism like neoliberalism and “extractivism”) can only come about from capitalistic solutions?

**Maurice Dusseault:** I really don't have an opinion one way or the other, but I note that many so-called capitalistic success stories started out as state-subsidized research and investment. Are the massive environmental disasters of Russia and China ascribable to capitalism? Was medieval feudalism preferable because it wasn't extractive? I really don't know, but in general, I believe we should always seek to do things better, for the greater good of humanity. Nevertheless, I am a carbon hog, so I live with personal inconsistencies, as do all of us in Canada. We want the best of medical care and travel opportunities, but somehow disconnect that from extractivism.

There is a climate issue, but I am not sure there is anything like an economic crisis, as so many claim. Life is pretty good in the OECD countries, and sometimes the demonstrations seem to me about as rational as arguing over the relative merits of a chocolate cream versus a vanilla crême doughnut: just having a cream doughnut seems pretty good to most of the world outside the OECD.

**Justin Brake:** In his article ([“The Economic, Social, and Environmental Issues of Hydraulic Fracturing”](#)) submitted to the Nova Scotia review panel Michael Bradfield draws on Industrial Organization Theory to explain why fracking “is a concern because it does not meet many of the necessary conditions of the idealized perfectly competitive market,” and it generates externalities that, when present, impose on society “additional costs which must be recognized and factored into the price for an activity to truly maximize the benefits for society.” This is another pitfall to fracking being practiced under the terms of private market capitalism, Bradfield says. Fugitive emissions are one example of an externality imposed on society, since a well could leak 50 or 100 years from now, potentially long after the company responsible for drilling the well ceases to exist, or at a time when a government no longer has the will or means to monitor old wells.

**Maurice Dusseault:** Yes, and so it is with externalities associated with hydro dams and hydro reservoirs, harbours built decades ago, poor agricultural practices, deforestation in Europe, levees along the Mississippi that are causing New Orleans to sink deeper and deeper below sea level (another disaster waiting), old foundry sites (most of them are contaminated with heavy metals), 4-lane highways, cities, and so on. They all have externalities. I do not agree with [Bradfield] in terms of many of his developmental economic views, and they are certainly not mainstream economics. As to externalities, if one could predict all externalities and demand that the developer pay for all of them in advance, would anything be done? Also, what is the true economic impact of a leaking well (say a cubic meter of methane per day)? Or one head of cattle? If we take the view that governments will lose the will to help us or that anarchy and chaos lie ahead, there is not much reason to do anything but consume, is there?

### On the integrity of the regulation process and the “revolving door” between industry and government...

**Justin Brake:** You told Andrew Nikiforuk in [an interview earlier this year](#) regarding your co-authored paper “Towards a Road Map for Mitigating the Rates and Occurrences of Long-Term Wellbore Leakage” that we “don't know what percentage [of methane] is going into the atmosphere or into the ground. There is no incentive to collect the numbers because industry views it as a bad news problem.” You've called on industry to adopt safer practices, and on governments to implement more stringent regulations around fracking and employ greater diligence in monitoring fracked wells.

However, as Bradfield points out in the aforementioned article, “it is common practice for government to hire those best informed to design the regulations – insiders from the industry. But once they have helped design the regulations these people often leave government – for jobs back in the industry. The deregulation of the financial sector and the crisis of 2008 are a clear example of this. Moreover, many government regulators eventually retire and also join the industry. This revolving door between regulated industries and the agencies which police them clearly raises concern about how stringent the regulations are and how vigorously they are enforced. This concern is heightened when the public sees malleable politicians who adhere to the free market mythology and instruct enforcement agencies accordingly. Moreover, regulators trying to enforce the rules often rely on the regulated firms for information. It is instructive that the current debate about transporting gas and oil has led to disclosures that pipeline and rail companies have not fulfilled their obligations to report leaks or accidents.”

So my final question is, when you advocate for “good regulatory guidelines and enforcement practices,” as you wrote in your submission to the NS final report, “to ensure that the site is geologically

understood, that wells are properly installed with good quality assurance, that well decommissioning is done according to best practice guidelines, and that the groundwater is monitored” — what degree of confidence do you have that industry and government will adopt all the best guidelines and practices given, as Bradfield highlighted, the problem of the “revolving door between regulated industries and the agencies which police them”?

**Maurice Dusseault:** This is a widely recognized issue. It arises in meat-packing industries, in construction industries, etc. It will never entirely disappear. As a civil society, we must have checks and balances to guard against the worst aspects of human venality and moral frailty. That is a necessary part of “civilization”. I have a good degree of confidence that a reasonable job is being done in Alberta, for example, but there are some areas where they could do better, and should be encouraged. That is why society gives me tenure in academia: I can do the science and criticize industry, government, NGOs, even the Church or David Suzuki, with a reasonable level of confidence that I will have both a job and a decent life in the morning. Furthermore, pressure groups who criticize industry, governments, activists, passivists, and so on, have great value in our society to help guarantee that we don’t make huge mistakes. That is part of the dynamic balance.

So here is a question for you. I believe that people in China deserve clean air and a reasonable electrical supply as well. Generation of power from natural gas is the quickest way to achieve a huge environmental benefit in China. So, shouldn’t socially conscious people be promoting hydraulic fracturing (which is far far less impactful than coal use) and natural gas development to achieve this? If not, what is your proposal to help them?

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