

The New Brunswick Anti-Shale Gas Alliance

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New Brunswick Anti-Shale Gas Alliance
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Newfoundland and Labrador
Hydraulic Fracturing Review Panel
nlhfrp.ca

Dear Dr. Gosine and Panel Members:

The following submission and references are in response to your solicitation for public comments.

I serve as a spokesperson and researcher for the New Brunswick Anti-Shale Gas Alliance (NBASGA), on whose behalf I am submitting these comments. NBASGA is an alliance of 22 community groups from across the province, representing both Francophone and Anglophone communities and both rural and urban populations. We, together with non-profit organizations such as the Conservation Council of New Brunswick and the Council of Canadians, and with both of New Brunswick's indigenous groups (Wolastoq and Mi'kmac), have constituted the core of opposition to unconventional gas and oil development (UNGOD) in this province.

Our opposition is based on our contention that the scientific knowledge in all fields related to UNGOD show that it is too risky to the health of the population and the environment to pursue. This is the first of our two founding principles. The second is that the fundamental and existential threats to both health and environment stemming from climate change preclude the development of any new fossil fuel resources. We, therefore also support action to move to a clean energy economy.

The quality of our research and educational programs has made us a primary resource for the news media on this topic, and I, along with other spokespersons, have been extensively interviewed in print, radio and television, both provincially and nationally. You may see much of what we have done in both research and education by visiting our website at www.noshalegasnb.ca - notably under the headings of Our Resources and Our Voice.

As you may know, the previous government of New Brunswick made UNGOD the platform on which it centered its recent election campaign, which it lost. Nearly two thirds of voters chose parties that called for a moratorium on UNGOD, and the winning Liberal party has instituted a moratorium on hydraulic fracturing.

While we are happy for that moratorium, we believe that UNGOD poses a threat that should not be left to shifting political winds or ill-defined moratorium conditions. Therefore, we have entered a suit against the Province of New Brunswick, calling for a moratorium until such time that the science can show beyond a reasonable doubt that

UNGOD can be done without harm to health, air, water and the climate. We have based our suit on the Charter of Rights guarantee of the protection of the person. This suit is in progress.

With the above introduction, I hope to have established our bona fides as a responsible and qualified commentator to your panel.

The Recent History of Commissions and Panels

It is worth noting that essentially all states, provinces and countries hosting UNGOD are those where the industry became entrenched before there was much public engagement. In places where there have been pre-evaluations demanded by an informed citizenry, the industry has been stopped by moratoria or bans. The salient conclusion to be reached from this fact is that it appears that the more one knows about the industry the less likely it is that one will welcome it.

In Canada, the provinces of Quebec, Nova Scotia and New Brunswick currently have moratoria. Quebec and Nova Scotia have retained and/or strengthened their original positions following the completed reports of commissions much like your panel.

The state of Maryland recently enacted a three-year moratorium based on a report conducted by their highly regarded university public health system [1]. But, perhaps, the most thorough review of UNGOD was undertaken by the state of New York [2]. Last year they declared a moratorium based largely on the concerns surrounding public health. This May, however, they announced the results of a seven year Shale Gas Environmental Impact Statement (SGEIS), upholding that decision with an essentially permanent moratorium.

What all these commissions found is that there are many risks, posing potentially serious consequences that are largely unstudied. The science that has been done and other studies currently running show those risks to be growing in both scope and potential severity, while new threats continue to be uncovered.

This scientific trend calls for increased caution and wariness until much more research can be done, particularly in the area of public health. Comprehensive looks at shale gas such as the one from Maryland and another from the Chief Medical Officer for New Brunswick [3] outline an extensive number of studies that must be conducted and questions answered before proceeding with UNGOD.

As expressed in the NY SGEIS, “These studies and expert comments evidence that significant uncertainty remains regarding the level of risk to public health and the environment that would result from permitting high-volume hydraulic fracturing in New York, and regarding the degree of effectiveness of proposed mitigation measures. **In fact, the uncertainty regarding the potential significant adverse environmental and public health impacts has been growing over time.**” [emphasis mine]

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The commissions and panels cited above made use of all the relevant peer-reviewed and expert testimony. Two public health interest groups compiled their own collections of the scientific evidence to be submitted to the panels.

The first is the [Compendium \[4\]](#) including, peer-reviewed science, expert papers and media reports compiled by the Concerned Health Professionals of NY. The other is the universe of [peer-reviewed studies \[5\]](#) collected by Physicians, Scientists and Engineers for Health Energy. Both collections are periodically updated on the organizations' websites, and the ones online now are current at least through the first of this year.

We in turn submit them to you now as necessary reading for anyone conducting a review. Because of their exhaustive nature, by availing yourself of these resources you will be encompassing most of the science that will be submitted to you by others. And because these sources are comprehensive, we will not be commenting in this document on every facet of UNGOD covered in them, but rather limit our comments to the larger issues.

We will reference new reports that have been recently released and that reinforce the trend of the ever-increasing number of studies that highlight problems. The studies are all referenced within the text and included at the end of this submission with links to find all the documents online.

Organization of Comments:

The categories you listed as subjects for comments often overlap. Wastewater Management is associated with Seismicity, for example, in the case of injection wells. Interestingly, there is no category for Public Health. Yet the Impacts on Groundwater, Surface Water, and Land, Waste Management, Management of Additives, Regulatory Oversight, Air Emissions, Well bore Integrity, Seismicity, and Site Restoration are all constituent parts of the effects of UNGOD on Public Health.

The references supplied at the end of our comments list studies independently, so readers can put them in whatever category they choose. However, when doing a risk analysis, as you are, these topics must be considered in context to make sense. We believe the context important to most citizens is that of threats to their health, so our discussion will center on that context.

Public Health

As much as water contamination has been touted as the public's largest concern, that concern is actually about the health effects of water contamination. People are nervous about threats to their health, as they should be.

The source of these threats of contamination of both water and air stem from the chemicals used in the processes of hydraulic fracturing and other processes involved in UNGOD. From their FracFocus analysis, the US EPA found that there are roughly 650

chemicals used in fracking, although each individual frack uses only a handful, and the mix is different in each frack. [6]

Of these, 650 chemicals, a complete survey shows that there is data on only 362 - meaning that there are nearly 300 about which we know nothing. Of those we do know, large percentages are associated with problems including cancer, birth defects, brain and neurological disorders, respiratory and kidney diseases, and include endocrine disruptors and mutagens, which control our hormone systems and alter our genes respectively. [7]

That is what we know about half of the individual chemicals. What they do in combinations with the 300 chemicals that we know nothing about, and with the naturally occurring chemicals in the ground is completely unstudied. We know absolutely nothing in this regard.

Last year's report by The Council of Canadian Academies mentioned these unknowns prominently. "Information is also required on potentially hazardous chemicals produced down-hole by chemical interactions under high temperature and pressure. This includes information on concentration, mobility, persistence in groundwater and surface water, and bioaccumulation properties, **for each chemical on its own and as a mixture. This represents a major gap in understanding of the potential environmental and human impacts of hydraulic fracturing, and of how to mitigate accidental releases of chemicals or flowback water to the environment.**" [8] (emphasis mine)

Considering that we as a nation require years of extensive testing before certifying a single pharmaceutical chemical for human consumption, it goes against common sense, and any possible ethical standard, that we would expose humans (and animals) to hundreds of unknown substances to be breathed by them 24 hours a day and consumed by them in their food and water. The history of the tragic consequences of allowing substances into our environment before we know their danger was also pointed out in the Council's report.

One of the newer areas of medical research is on endocrine disruptors; substances that in miniscule quantities act on the body's hormone system and cause a vast array of developmental, immune system and reproductive problems. The following is from a recent review of the science in this area. [9]

"We review the scientific literature providing evidence that adult and early life exposure to chemicals associated with UOG (unconventional oil and gas) operations can result in adverse reproductive health and developmental effects in humans. Volatile organic compounds (VOCs) [including benzene, toluene, ethyl benzene, and xylene (BTEX) and formaldehyde] and heavy metals (including arsenic, cadmium and lead) are just a few of the known contributors to reduced air and water quality that pose a threat to human developmental and reproductive health.

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The developing fetus is particularly sensitive to environmental factors, which include air and water pollution. Research shows that there are critical windows of vulnerability during prenatal and early postnatal development, during which chemical exposures can cause potentially permanent damage to the growing embryo and fetus. **Many of the air and water pollutants found near UOG operation sites are recognized as being developmental and reproductive toxicants; therefore there is a compelling need to increase our knowledge of the potential health consequences for adults, infants, and children from these chemicals through rapid and thorough health research investigation.**” (emphasis mine)

A newly released study following this line of research found that diseases caused by BTEX occurred at levels that were orders of magnitude lower than the current ‘safe’ standards set by the EPA, and that levels of these chemicals in the **“air near oil and gas development can be orders of magnitude higher than exposures for which we found health effects.”** [10] (emphasis mine)

There is hardly a better example of how threatening are the risks we have uncovered, and at the same time how many of these heretofore unknown risks exist. This is the case against UNGOD in a nutshell.

When we began our research 4 years ago, water contamination was everyone’s prime worry, and the evidence of this problem continues to grow. [11] As the Maryland study concluded, “After carefully reviewing the limited evidence from UNGDP impacted areas and current scientific understanding from non-UNGDP related fields, we conclude that there is a **Moderately High Likelihood** that UNGDP’s impact on water quality, soil quality and naturally occurring radioactive materials will have a negative impact on public health...” [1] (emphasis in original)

But that concern has now yielded to problems stemming from air borne contaminants, and the fact that studies find that our current standards and air quality measurement processes may be inadequate for the new circumstances of the shale industry. [12]

The Maryland study also concluded, “Based on our evaluations of the limited but emerging epidemiological evidence from UNGDP impacted areas and air quality measurements as well as epidemiological evidence from other fields, we conclude that there is a **High Likelihood** UNGDP related changes in air quality will have a negative impact on public health...” [1] (emphasis in original)

And new evidence on old problems continues to accumulate, as in a new study from Pennsylvania showing increased levels of radon in buildings near shale gas development. [13]

Wastewater and Health:

Wastewater disposal is a problem that has yet to be solved. There are no good solutions, only those that may be less bad than others. Two new studies raise health and environmental issues from wastewater that is spilled into ground water or even treated and discharged into waterways. [14] [15]

One concludes that, "Bromide, iodide, and ammonium in surface waters can impact stream ecosystems and promote the formation of toxic brominated-, iodinated-, and nitrogen disinfection byproducts during chlorination at downstream drinking water treatment plants. **Our findings indicate that discharge and accidental spills of OGW (oil and gas wastewater) to waterways pose risks to both human health and the environment.**" (emphasis mine)

And even where regulations require wastewater to be 'contained in pipelines,' its safe disposal cannot be guaranteed, as evidenced by this example of a three million gallon pipeline spill. [16]

Such spills can have dire environmental consequences on forests [17] and waterways [18], affecting ecosystems, economies and land use, as well as posing human health threats. In fact, failure to manage wastewater is a widespread and enduring aspect of UNGOD, as seen in recent studies. [19] [20] [21]

Of course, the most widely used method of wastewater disposal has been the use of injection wells. However, this practice, long associated with earthquakes in Texas, Oklahoma and Arkansas has now been linked to earthquakes in British Columbia [22] and Kansas [23]. Earthquakes caused by fracking itself, known to occur in British Columbia and Great Britain have now occurred in Ohio [24] and Alberta [25] [26], with some experts saying they are more likely in Canada [27].

Regulatory Regimes:

One of the findings of the Council of Canadian Academies was that there has been so little research done on the shale gas process, and that government and industry has done so little monitoring of the industry, that there is no basis for saying that anyone's regulations are supported by science. The reports from Maryland, New York and others point this out as well.

"Best practices" are simply industry-defined, and appear to be tied more to cost-effectiveness rather than as a guarantee of health and safety. And, as continues to be true, industry simply ignores them with regularity and considers fines as the cost of doing business.

Conclusions:

We have kept our comments to just the universal major issues such as public health and climate change. Yet Newfoundland and Labrador also face threats specific to its circumstances, including threats to its road infrastructure, tourism and fisheries from UNGOD. We assume that those problems have local constituencies to voice those very real concerns, which have been incredibly costly in dollars and quality of life in other jurisdictions. Studies to support this statement can be found in the Compendium [4] and other places.

There is a growing body of evidence supporting the known risks associated with UNGOD. Known problems – from wastewater disposal to leaking well casings – are not being solved. New problems – from endocrine disruptors to large unexpected methane emissions – are continually being encountered. The science necessary to judge the implications and levels of danger to the public has not been done.

Together these three factors create the textbook case for the use of the Precautionary Principle. There is more than enough reason to halt UNGOD until much more is known about its consequences.

Climate Change Demands a Separate Response

We have not addressed climate change directly, although it is included in some of the evidence submitted in collections such as Compendium. Your list of categories did not include it, except perhaps, as under air emissions. In fact, it encompasses the entire question of UNGOD.

The evidence supporting climate change and its ties to fossil fuels is beyond question. If one accepts the imminent threat of climate change, and that to avoid its cataclysmic consequences we cannot exploit any new sources of fossil fuels, then the case against UNGOD is an open and shut one.

We hope you will examine the evidence supplied by us in this submission and in the work of the other panels that have investigated this issue. We have no doubt that you will reach the same conclusions that the other panels have.

We appreciate your giving us the opportunity to make this submission and we remain available to answer any questions about it, or to assist you in any way we can. Good luck with your task.

Sincerely,

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