

Council of Canadian Academies Raises Questions on Environmental Impacts of Fracking – Current Regulations not Based on Strong Science

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The Council of Canadian Academies (CCA) has concluded that development of shale gas reserves is having “profound economic, environmental, and social impacts across much of North America”. CCA further states that targeted science and management strategies are needed to better understand and mitigate those impacts.

While the Canadian regulatory framework governing shale gas development is evolving, CCA says that “many aspects are not based on strong science and remain untested.” In addition, there is no national plan, coordination or federal facilitation of individual provincial efforts to regulate the sector. First Nations’ rights may also be affected in several provinces and need to be considered. CCA concludes that “there can be advantages in the ‘go slow’ approach” currently adopted in several Eastern provinces, and that there are “similar advantages in identifying areas that are too environmentally vulnerable to develop.”

CCA’s 264-page report, [The Environmental Impacts of Shale Gas Extraction in Canada](#), was released May 1, 2014. CCA is an independent, not-for-profit organization that supports science-based assessments of major public policy issues in Canada.

The Primary Concerns of Fracking

In September 2011, former federal Environment Minister Peter Kent asked CCA to assemble a panel of experts to address the following question

What is the state of knowledge of potential environmental impacts from the exploration, extraction and development of Canada’s shale gas resources, and what is the state of knowledge of associated mitigation options?

CCA found that the rapid expansion of shale gas development in Canada over the past decade has occurred “without a corresponding investment in monitoring and research addressing the impacts on the environment, public health, and communities.” The primary concerns are

- ◆ the degradation of the quality of groundwater and surface water, including the safe disposal of large volumes of wastewater
- ◆ the risk of increased greenhouse gas (GHG) emissions, including fugitive methane emissions during and after production, exacerbating anthropogenic climate change
- ◆ disruptive effects on communities and land

- ◆ adverse effects on human health
- ◆ the local release of air contaminants, and
- ◆ the potential for triggering small to moderate-sized earthquakes in seismically active areas.

CCA says that, depending on future natural gas prices and government regulation, further development of Canadian shale gas resources “could potentially span many decades and involve the drilling of tens of thousands of hydraulically fractured horizontal wells.” While shale gas extraction is already well advanced in British Columbia and Alberta, additional reserves exist in Quebec, New Brunswick, Nova Scotia, Ontario, the Yukon and the Northwest Territories.

Long-Term Leakage of Fluids and GHGs a Concern

The assessment of environmental impacts is hampered by a lack of information about many key issues. In particular, the problem of fluids and natural gas escaping from improperly formed, damaged or deteriorated seals on wells. CCA says that if wells can be sealed, “the risk to groundwater is expected to be minimal”. However, much of the data on the behavior and movement of hydraulic fluids has not been obtained, is not publically available or is of “variable quality”.

Several factors make the long-term impacts related to fluid leakage greater for shale gas development than for conventional oil and gas development. These include

- ◆ the larger number of wells needed for shale gas extraction
- ◆ the diverse chemicals used in hydraulic fracturing operations
- ◆ the potential development of shale gas resources in rural and suburban areas that rely on groundwater resources, and
- ◆ (possibly) the repetitive fracturing process itself.

The potential impacts on groundwater, including the upward migration “of natural gas and saline waters via complex underground pathways”, is also not currently monitored in any systematic manner. In addition, CCA says conventional methods of monitoring gas leakage may be inaccurate, and leakage outside the main well casing is rarely measured.

Process Improvements Have Lessened Impacts but More are Needed

CCA says that, over the last 20 years, there have been a number of process improvements to lessen the potential for environmental impacts, including

- ◆ recycling of flowback water
- ◆ placing more wells per pad
- ◆ drilling longer laterals resulting in fewer pads and roads
- ◆ using fewer and more benign chemicals
- ◆ relying more on tanks rather than ponds to store wastewater
- ◆ better pond designs, and
- ◆ in some cases, switching from diesel fuel to natural gas in on-site engines.

However, comprehensive investment in research and monitoring is needed, and “many of the pertinent questions [on impacts and their mitigation] are hard to answer objectively and scientifically.” In addition, greater attention must be paid to the implementation of best current practices and the response to accidental releases that cannot be reduced to zero. Although current

technologies and practices could minimize many, but not all, relevant risks, some of these are untested or are not economically feasible. CCA concludes

Because shale gas development is still at an early stage in Canada, there is opportunity to put in place the management measures required supported by appropriate research to reduce or avoid some of the negative environmental effects of this development.

We will continue to follow developments in the shale gas sector and will provide updates.

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