

APPENDIX N
Summary of Submissions
to the Newfoundland and Labrador
Hydraulic Fracturing Review Panel

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to the Newfoundland and Labrador
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Report Prepared for the Newfoundland and Labrador
Hydraulic Fracturing Review Panel (NLHFRP)

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BACKGROUND

The Newfoundland and Labrador Hydraulic Fracturing Review Panel (NLHFRP) was appointed by the Minister of Natural Resources, Government of Newfoundland and Labrador, in October 2014 to conduct a public review of the socio-economic and environmental implications of hydraulic fracturing in Western Newfoundland. The mandate of the Panel is also to make recommendations on whether or not hydraulic fracturing should be undertaken in Western Newfoundland. The work of the Panel includes gathering information through a variety of sources including written submissions from individuals, community organizations and groups, and industry and industry groups.

At the request of the Panel, Keith Storey Consulting was asked to prepare a summary/synthesis of the written submissions received as an aid to the Panel in its deliberations. The report that follows is an overview of those submissions. The report does not, nor is it intended to, stand in place of those submissions. Rather it attempts to summarize any collective views and the emphases/concerns given to or expressed regarding particular themes. As with any overview, it is a simplification of the views and arguments presented. Detail is necessarily lost, as is the tone or passion expressed in many of the submissions. Likewise it cannot adequately convey the intentions of those who submitted artwork, poetry, music and film in support of their views.

The approach adopted in summarizing the information was to review each submission, code and record the areas of concern/statements of values expressed in a spreadsheet format. While the Panel's Terms of Reference provide a structure for the themes explored in the report, many of those making submissions did not feel bound by those themes or the associated questions posed by the Panel. As such the categorization of content in the submissions was a subjective process.

In addition, where it was provided, information about the source of the submission was recorded, e.g. whether the person submitting the input was located in the immediate area likely to be affected by the proposed activity, elsewhere in the Province, etc.). These summary data form the basis of this report. The results reported are, and are intended to be, of a high level, aggregate nature, and at best indicative of general concerns and views. No attempt is made to judge the accuracy or validity of any of the arguments presented or of the sources cited.

The Panel also commissioned a province-wide telephone survey of a sample of residents to determine their knowledge of and attitudes towards the oil and gas industry in the province, and more specifically their knowledge about the Panel Review process and attitudes towards hydraulic fracturing. The terms of reference for this survey and the results are available at nlhfrp.ca/wp-content/uploads/2015/01/MQO-Fracking-Report.pdf. As part of the terms of reference for this Report the Panel asked if any comparisons might be drawn between the results from the telephone survey and the written submissions. On review it was concluded that findings from these two sets of information were not directly comparable given the differences in the purposes, questions asked and methods of information collection associated with each and so this task was not pursued.

While hydraulic fracturing is the technical term for the process under review, "fracking" is the term used by virtually all of those making submissions and is the term used here.

The report is divided into two sections. The first is a high level summary of the submissions received. The second provides a more detailed summary organized by the themes identified by the Panel as part of the review process, plus other concerns that those making submissions wished to raise. The appendices list the sources of information used by those who chose to include them in their submissions.

SECTION 1: OVERVIEW

1.1 Submissions

The written submissions, which form the database of this report are listed on the Panel's website (nlhfrp.ca/wp-content/uploads/2015/01/NLHFRP-Master-List-July-23-4pm.pdf). Submissions on the site are grouped in three categories, letters from:

- individuals (488 submissions);
- community organizations and groups (38 submissions); and
- industry and industry groups (four submissions)¹

Individual submissions ranged from personal letters to the Panel (82%²) to form letters (18%) but, given their content, it appears that a number of the personal letters were also influenced by form letter models. Many of the form letters were based on a generic model generated by the Council of Canadians,³ while a number of submissions from residents of Lark Harbour and York Harbour, for example, utilized a different, but still common letter format.

Individual submissions ranged from single statements, e.g. "Don't Frack", to detailed discussion of specific themes, e.g. public health implications. Group and organization submissions tended to focus on the specific themes of particular interest to them and were typically more detailed in their comments than many of the individual submissions. Three of the four industry/industry organization submissions were highly detailed and addressed all or most of the issue categories listed in Scope section of the Terms of Reference for the Panel (nlhfrp.ca/terms-of-reference/).

Of those making individual submissions, most (49%) did not indicate where they lived, but 22% indicated that they were "local" (defined here as the Port au Port Peninsula and Bonne Bay), 10% were from elsewhere on the west coast of Newfoundland including the Gros Morne area, 8% were from elsewhere in Newfoundland and Labrador, and 9% from elsewhere in Canada or the United States.

Of the 40 submissions from community groups and organizations, 10% were local (as defined above), 29% were based elsewhere on the west coast of Newfoundland, 40% were from or had a base elsewhere in the Province, and 25% were based outside of the Province.

Submissions were made by groups/organizations with a wide variety of interests, some of which overlap (e.g. groups with both environmental and health interests). These groups/organizations included those with primarily:

- Environmental interests (seven groups/organizations)
- Church-based membership (5)
- Fracking awareness/opposition interests (4)
- Health-based membership (3)
- Social Justice interests (3)
- Business interests (2)
- Local/Regional Government representatives (2)

¹ Two of the individual submissions indicate that they are made on behalf of community organizations and groups and are included with these in the summary analysis. One individual submission appears to have been included twice. The total submissions summarized were thus from 485 Individuals, 40 Community Organizations/Groups and 4 Industry/Industry Groups.

² Percentage values are rounded to the nearest whole number and totals may not equal 100. Where percentage values are less than 1% or otherwise distort the picture, the number of submissions is given.

³ secure.canadians.org/ea-action/action?ea.client.id=1899&ea.campaign.id=38606

- Tourism sector membership (2)
- Other (12)

Of the four industry/industry group submissions, two were from junior energy exploration companies operating in the Province, one from CAPP, a Canadian organization that acts on behalf of Canadian upstream oil companies, and one from PSAC (Petroleum Services Association of Canada), a trade association representing the upstream service, support and manufacturing sectors in the Canadian petroleum industry.

1.2 Summary of Attitudes and Recommended Actions

Attitudes towards fracking are summarized as follows:

Of the 485 individual submissions received:

- 95% were opposed to fracking;
- 2% were in favour;
- 2% did not state a view; and
- one submission was neutral.

Of the 40 organizations/groups making submissions:

- 87% were opposed to fracking;
- 7% were in favour;
- 2% (1 submission) was neutral; and
- one submission did not offer a view

Of the four industry/industry group submissions:

- four were in favour of fracking

Most submissions to the panel recommended some form of action.

Of those making individual submissions:

- 82% wanted to see an outright ban on fracking;
- 5% wanted a moratorium/continuation of the moratorium on fracking;
- 1% wanted a buffer zone established around Gros Morne National Park;
- 2 submissions wanted any activity to only take place away from residential areas;
- 6% wanted more research/a go-slow on any decision/careful consideration of any action taken;
- 2% recommended proceeding (in most cases recommending that this be done with caution); and
- 5% did not recommend any specific action.

Of the groups/organizations making submissions:

- 57% wanted fracking banned;
- 12% wanted a moratorium on fracking;
- 5% wanted to see more research/a go-slow on any decision/careful consideration of any action taken;
- 7% suggested proceeding with caution (e.g. with appropriate regulatory/monitoring arrangements in place);
- 17% did not offer specific recommendations for action;

Of the industry/industry groups:

- All four indicated that fracking should be allowed to proceed, albeit within an appropriate regulatory framework and in most cases with the explicit understanding that current 'best practice' procedures would be adopted by the operating and service companies.

1.3 Views on the Panel and the Consultation Process

The panel and the consultation process were criticized on several grounds in a number of individual and group/organization submissions:

Panel Bias

- 8% of the individual and 22% of the community group/organization submissions expressed the view that the Panel was biased or in a conflict of interest (several respondents stating that three of the Panel members had previously made statements in favour of fracking and that one member had a patent on a fracking-related process).

Panel Composition

- Many of these submissions also suggested that, for example, the absence of women, West Coast Newfoundland residents, Aboriginal persons and specialists in areas such as Health, meant that the Panel was not representative of all stakeholders or adequately able to assess the full range of concerns expressed.

Public Consultation Sessions

- 9% of the individual and 32% of community group/organization submissions included some reference to Community Engagement. Many suggested that the consultation process was too limited by only having two Public Consultation sessions scheduled, compared, for example with Nova Scotia, for which 11 such sessions were reported.
- Many saw fracking as an issue of Province-wide interest/importance and called for additional sessions in, for example, Bonne Bay, St. John's and Labrador.
- A further limitation of the public engagement process expressed (two submissions) was that there was no opportunity for oral presentations to be made to the Panel.

Terms of Reference

- Many of those commenting on the public engagement process also expressed concern that the Terms of Reference for the Panel were inadequate as a number of important issues were not included in the list published on the website as subject areas for review. These included, health impacts, climate change implications, effects on tourism and the marine ecosystem of the Gulf of St. Lawrence. Many of those who specifically addressed these themes also noted that they had not been explicitly included in the Panel's terms of reference.

1.4 Overview of Primary Concerns

Concerns/Issues were recorded for each submission. In some cases those concerns were explored in detail, in other cases simply stated as a concern. Primary areas of concern, other than those associated with the review process and community engagement, as reflected in the frequency with which they were mentioned in the submissions were, in descending order, as follows.

Individual Submission Concerns

>300 references to:

- Groundwater/Surface Water

151-200 references to:

- Environmental impacts generally
- Public Health
- Waste Management – primarily waste water management

101-150 references to:

- Socio-economic Impacts
- Seismicity/Geological Risk
- Air emissions/pollutants
- Management of Additives
- Land – primarily environment/ecology/sustainability issues
- Tourism
- Traffic/Transportation/Accidents

51-100 references to:

- Fisheries
- Regulatory Oversight
- Water Usage
- Sea/Marine Ecosystems
- Fires/Explosions/Flares
- Wildlife/Birds/Plant life
- Climate Change
- Real estate values
- Quality of life for residents
- Lack of baseline data

26-50 references to:

- Social License to operate
- Spills
- Risks/Rewards of fracking
- Noise

11-25 references to:

- Long term community effects
- Wellbore integrity
- Site restoration/rehabilitation
- Long-term environmental effects
- Fossil fuel use
- Lack of trust in companies
- Smell

3-10 references:

- Stress/Mental Health – local residents
- Public Safety/Emergency Planning
- Future risk of lawsuits
- Financial Security/Insurance in the event of spills/restoration needs
- Worker health

Community Group/Organizations Concerns

>20 references:

- Ground/Surface water
- Waste Management – primarily waste water management
- Public Health

16-20 references:

- Environmental impacts generally
- Regulatory oversight

10-15 references:

- Management of Additives
- Tourism
- Air Emissions
- Seismicity/Geological Risks
- Climate Change
- Socio-economic Impacts
- Fisheries
- Spills/Leaks
- Lack of baseline data

Industry and Industry Group Concerns

As noted earlier three of the four industry/industry group submissions directly addressed most or all of the themes listed in the Panel's Terms of Reference. In addition in three of the submissions emphasis was also given to fracking technology and legislation/regulations pertaining to fracking. In two cases concern was expressed over whether what was described as "biased science" utilized by opponents of fracking to make their case would influence the Panel's decision.

1.5 Overview of Considerations in the Decision-Making Process

Many submissions addressed the larger context within which the proposed fracking activities are set and the broader considerations that the authors felt the Panel should take into consideration when making a decision. These included:

Interrelationships Among Elements

While those making submissions that simply advocated banning fracking did not identify specific concerns, others in their submissions made reference to multiple issues/concerns. The majority of individual submissions (41%) made reference to 1-4 different issues/concerns, a further 29% referenced 5-9. In the case of community groups/organizations 30% referred to between 10-14 issues/concerns while 27% noted between 5-9.

In many cases these were simply stated as concerns, e.g. "I am concerned about the impact of fracking activity on tourism." However, many submissions discussed the relationships between and among issues. For example, while oil exploration in the area might bring some economic benefit, there was fear that it could negatively impact other sectors, particularly tourism and the fishery. Others spoke to specific issues of noise, dust, light, traffic and other nuisances and the overall cumulative impact that these and other changes could have on the quality of life for local residents. Similarly any groundwater contamination, air emissions, waste management and disposal issues, spills and other negative environmental outcomes were perceived to have both potential particular and cumulative health consequences. The point made in many submissions was that potential outcomes from allowing fracking were complex and far-reaching and that these interrelationships and cumulative consequences should not be ignored in the decision process in favour of an individual issue-based approach.

Social Licence to Operate

9% of individual and 10% of community group/organizations stated that exploration companies did not have such a licence, i.e. the support of the local communities to carry out fracking in their area.

Other Precedents

6% of individual and 30% of community group/organizations felt that there were sufficient examples of other jurisdictions banning fracking or declaring a moratorium on fracking to justify adopting similar approaches in Newfoundland and Labrador.

Risks and Rewards

6% of individual and 27% of community group/organization submissions expressed the view that the potential risks associated with fracking were not worth the potential rewards. Some submissions explicitly noted that those individuals, groups or communities most likely to benefit from the rewards were not likely to be the same as those likely to bear the costs.

Precautionary Principle

6% of individual and 20% of community group/organizations suggested that there was insufficient data, too many unknowns and/or sufficient 'reasonable doubt' to justify a recommendation to approve fracking, hence the precautionary principle should be invoked and fracking not be allowed.

Fossil Fuel Use

3% of individual submissions and 15% of community group/organization submissions explicitly expressed concerns about our current dependence on fossil fuels and the need to reduce such dependence by sourcing other types of renewable energy with fewer negative environmental consequences. Allowing fracking was seen as being inconsistent with this goal.

Biased Science

As noted above, two (50%) of the industry submissions were concerned that public information about fracking and its implications were based on insufficient or incorrect information and that this might influence the Panel's decision.

While not as explicit on the question of the quality or merits of the science used, 3% of the individual and 5% of the group submissions indicated that they did not trust the companies involved in fracking. This lack of trust was based in part on direct experience (including past experience with site restoration), but there were also concerns about overstatements regarding the potential benefits of fracking activity versus understatements about potential costs.

SECTION 2: SUMMARY OF VIEWS/CONCERNS EXPRESSED ON SPECIFIC ISSUES/THEMES

The mandate of the Panel includes gathering public input on a number of specific topic areas regarding fracking in oil and gas operations in Western Newfoundland and to provide specific responses to a set of associated questions. Many of the individual and community group/organization submissions addressed topic areas in a more general fashion and were not structured in a way that addressed the specific questions posed in the Terms of Reference. In addition, since most submissions advocated banning fracking completely or declaring/continuing a moratorium on it, there were few submissions in either of these groups that offered suggestions on best practices, regulations or other actions that might reduce potential risks or negative outcomes.

Views/concerns regarding each of the identified topics are summarized below, together with views and concerns on other topics of concern to those making submissions, but which had not been explicitly included in the scope of the Panel's mandate. Excerpts from the Scope of Work for the Panel used to introduce each topic are italicized.

2.1 Protecting and Monitoring Water Quality

The risk of water contamination, particularly groundwater, is one of the biggest concerns raised by the public with respect to hydraulic fracturing. Two key areas to address are the potential effects of hydraulic fracturing on groundwater and on surface water.

2.1.1 Potential Impacts on Groundwater

The Panel will assess the short and long-term risks to groundwater and water wells. This may include such activities as water acquisition, additives mixing, well injection, flowback/produced water and wastewater management.

2.1.1.1 Groundwater

Groundwater and waterwell (drinking water) issues, were the most frequently mentioned concerns in individual (65%) and community group/organization (70%) submissions to the Panel. A number of submissions discussed the reliance of many people in the area on shallow wells and expressed concern that surface water pollution might also affect drinking water sources.

One industry organization provided information concluding that there was no indication that the McCully gas field in New Brunswick has affected water wells there.

2.1.1.2 Wastewater Management

Waste management and particularly wastewater management was seen as a major concern (referred to in 32% of individual and 52% of community group/organization submissions).

The quantity of wastewater requiring treatment, the technical and regulatory requirements for treatment, transport of wastewater and its final disposal were expressed as concerns. These were mainly because of a lack of information and knowledge about how these matters would be addressed and a lack of confidence in the ability of regulators to design, implement and monitor systems that would adequately address the problem together with a lack of trust in the willingness of operators to implement appropriate measures.

Industry/industry group submissions that addressed these issues felt that there were examples of best practices, appropriate regulatory management arrangements and other actions that could be adopted that would minimize any potential risks.

2.2 Potential Impacts on Surface Water

The Panel will assess the use of surface water for hydraulic fracturing operations. This assessment will include an assessment of the quantity of water required for exploration and operations, and the effect on water sources in the areas where exploration and development activities could take place. The Panel will also assess the sourcing of fresh water alternatives and recycling of water for use in hydraulic fracturing operations. The Panel should also assess the potential impact of surface water use on other users.

2.2.1 Water Usage

The large quantities of water required for fracking was a concern expressed in 17% of the individual and 22% of the community group/organization submissions insofar as it was seen as both a waste of an important resource and would lead to competition for that resource among different users.

Industry/industry group submissions noted that looking for ways to reduce water usage is an ongoing process. This includes use of seawater, which, if possible in this context, could minimize competition for local supplies of fresh water. One submission outlined examples of preferred sources for water and tools for water-use approvals and licences.

2.3 Protecting Communities and the Environment

Environmental protection measures are in place for the province's oil and gas industry. While there is no recommendation at this time to allow hydraulic fracturing operations to occur in the province, it is useful to review, and, where appropriate, recommend improvements to existing environmental and technical standards to ensure our communities and the environment are protected. The Panel will assess the challenges that hydraulic fracturing activities may represent for social and physical environments. This should include assessing opportunities for minimizing/mitigating surface infrastructure development and associated impacts such as footprint, linear disturbances, vehicular traffic, dust, emissions, odours, noise and environmental impacts such as pollution, waste management and geological risks.

2.3.1 Impacts on Land

The panel will assess the potential impacts on land as a result of hydraulic fracturing operations. This should include an assessment of potential risk for soil contamination from site development and from the storage and handling of additives, wastes and petroleum products. The panel will also review impacts to land from site development and transportation of chemicals to and from the site.

"Land"-related issues were included in 23% of individual and 25% of community group/organization submissions. Most of the individual and group submissions addressed land concerns in the broader context of the potential for degradation of landscapes, watersheds and wildlife habitat and the environment generally, rather than the specific context of soil contamination. Even more submissions (39% individual, 45% community group/organizations) expressed concern about the implications for the environment generally.

Specific concerns included the implications for wildlife/wildlife habitat/plants (12% individual, 12% community group/organizations), and of spills or leaks into the environment (8% individual, 27% community groups/organizations). An additional concern expressed in this context was the unknown of how much land would be required for fracking exploration activity.

Other submissions extended the concern about environment to the marine context, raising issues about the marine environment and ecosystems (16% individual and 20% community group/submissions) and by extension the fishery (see Section 2.3.12.1, below).

The industry/industry group submissions on this topic had a different focus, emphasizing a land use planning approach. One submission noted that once activities on the ground are ready to occur, industry best practices call for land-use methods that integrate environmental, low impact techniques, species conservation and biodiversity. In addition it noted that companies are changing from a well-by-well approach to a project- or area-based approach to try to minimize cumulative impacts on the land.

2.3.2 Waste Management

The Panel will assess the potential risks to the environment of current and available waste management technologies for treating fluids used in hydraulic fracturing and the associated outcomes. This assessment will include, but is not limited to, issues such as storage areas, deep well injection, and solid wastes.

32% of individual and 52% of community group/organization submissions mentioned or discussed waste management issues, most of which were concerned with wastewater management and disposal. Three industry/

industry group submissions discussed how waste could be managed.

Industry submissions described the ways in which waste fluids are dealt with and regulatory approaches adopted in both New Brunswick and British Columbia. FracFocus.ca is referenced as a collaboration between provinces, territories, regulators and industry to provide Canadians with information on hydraulic fracturing, the legislation and regulations that are in place to protect the environment, including groundwater, and transparency on the ingredients that make up hydraulic fracturing fluids.

2.3.3 Management of Additives

The Panel will assess the potential risks of additives used in hydraulic fracturing fluids, including the use of additives, potential environmental impacts, and the storage and handling of these additives.

25% of individual, 37% of community group/organization submissions referenced management of additives as a concern. Many expressed concerns that there would not be full disclosure of what additives might be used, in part because of proprietary rights and in part because of a lack of confidence in government or other regulatory authorities to ensure that there was full disclosure.

Three of the industry/industry group submissions stated that the transport, handling, storage and use of additives used for fracking are highly regulated and provided examples from Alberta, British Columbia and Canada. Disclosure of chemical use for each well is indicated as being a requirement in British Columbia, Alberta, the Northwest Territories and New Brunswick. PSAC notes that in addition to federal and provincial regulations PSAC members commit to following its *Hydraulic Fracturing Code of Conduct*.

2.3.4 Wellbore Integrity

The Panel will assess the requisite regulatory requirements and best practices to ensure wells are drilled, completed, stimulated, produced, suspended and abandoned in a manner that assures wellbore integrity, considering the risks imposed by the unique reservoir characteristics of the play and the technologies being employed, such as inter-wellbore communications.

Wellbore integrity was noted in 4% of individual and 12% of community group/organization submissions, the main theme being that a loss of wellbore integrity could negatively affect groundwater and water wells.

One industry association submission commented on the need for good regulatory practice complemented by industry best practice. A number of directives from Alberta's Energy Regulator regarding wellbore integrity are cited in the industry/industry submissions. The CAPP submission also indicates that to the extent that groundwater and water well incidents have occurred, this has almost always been related to well construction issues and a loss of wellbore integrity allowing gas or fluids to migrate from one geological zone to another. In such cases companies are required by regulation to undertake necessary repairs.

2.3.5 Seismicity and Geological Risks

The Panel will assess the potential geological risk associated with hydraulic fracturing operations, including induced seismicity. This may include wellbore placement and drilling design, procedures to monitor for induced seismicity and procedures to mitigate and respond to induced seismicity.

Seismicity and geological risk was a matter of concern in 29% of the individual and 30% of the community group/organization submissions. The overall sense was that the geology of this area is distinctive and as a consequence the potential outcomes from the use of fracking here unknown.

One individual submission (nlhfrp.ca/wp-content/uploads/2015/01/Letter-from-E.-Burden.pdf) provides an explanation and commentary on the general state of geological knowledge available for western Newfoundland.

One industry submission discusses the issue of scale in relation to induced seismicity. Micro-seismic events generated are designed not to be felt at the surface, where this has occurred the events have been studied. In Alberta none of the recent seismic events are said to have resulted in injuries or property damage. New regulatory requirements in Alberta and additional monitoring are intended to increase understanding between fracking and seismic activity.

2.3.6 Regulatory Oversight and Responsibility

The Panel will assess the regulatory oversight requirements for hydraulic fracturing operations. This would include regulations regarding how wells are drilled, completed, stimulated, produced, suspended and abandoned in a manner that assures wellbore integrity, considers the risks imposed by the unique reservoir characteristics of the play and the technologies being used (such as inter-wellbore communication). This review will also include the application and approval process, filing requirements and design of hydraulic fracturing operations, including the chemicals used.

Concerns about regulatory oversight and responsibility were expressed in 17% of individual and 40% of community group/organization submissions. Here the concern was rather less about the ability of government to establish rules and regulations than the willingness of government to enforce them, ensure compliance and assign liability. In addition there was concern whether government would be transparent about incidents and outcomes and whether it would be willing to establish independent monitoring of fracking activities and outcomes.

3% of individual and 5% of community group submissions indicated a lack of trust in companies involved in fracking to act in the best interests of the environment and people. Government would thus need to be the watchdog, but past experience was suggested as reason to be concerned about its effectiveness in this regard.

Industry submissions suggest that oil and natural gas exploration and development is one of the most highly regulated industries in Canada. Regulatory systems in Alberta, British Columbia and Saskatchewan are suggested as proven regulatory systems that have and could serve as examples for newer jurisdictions establishing their own onshore oil and natural gas industries. New Brunswick established its Rules for Industry in 2013. Industry operating practices are seen to complement provincial regulations and are suggested for inclusion in those regulations.

2.3.7 Site Restoration

The Panel will assess final site restoration requirements for hydraulic fracturing operations. This may include well decommissioning, removal of infrastructure, soil assessment, soil remediation, long-term monitoring and holding tank decommissioning.

4% of individual and 22% of community group/organization submissions were concerned that if allowed to proceed sites would not be appropriately restored. Many of these statements of concern were from local residents and based on previous experience with the industry in the area. Examples, accompanied by photographs, of abandoned sites that had deteriorated resulting in leaks or spills were offered. As a consequence there was a lack of trust in operating companies and a lack of faith in government and current regulations regarding site restoration (see also Section 6. *Regulatory Oversight and Responsibility*, above).

Industry submissions suggest that wellsites are appropriately managed and all follow the same restoration procedures, rules and regulations. Alberta's legislation is briefly summarized in one submission and in another the BC OGC's *Draft Certificate of Restoration Application Manual* (May 2015) is given as an example of recent standards.

2.3.8 Financial Security and Insurance

Various financial securities and insurances are required throughout the different phases of resource development. The Panel will assess the financial security requirements for hydraulic fracturing operations to ensure that they address the potential risks associated with hydraulic fracturing activities.

Only 1 community group/organization submission addressed this. This organization was in favour of fracking and indicated that should it proceed financial security requirements would need to be established.

The industry group submission from CAPP notes that industry and regulators want to ensure that abandonment and reclamation liabilities are estimated appropriately and that adequate funding is in place to reclaim oil and gas sites at the end of their life. Examples of Liability Management Rating (LMR) programs for British Columbia, Alberta and Saskatchewan are given.

2.3.9 Air Emissions

The Panel will assess the potential risks to air quality from hydraulic fracturing operations. This may include setting emissions limits, monitoring emissions from hydraulic fracturing operations and planning for emission reductions.

28% of individual and 32% of community group/organizations expressed concerns about air emissions in their submissions. These were primarily concerns about the potential impacts on human health (see Section 3.13, below).

In addition 3% of individual at 20% of community group/organization submissions were concerned about emissions and long-term environmental effects, while 12% of individual and 30% of community groups/organizations were concerned about the bigger issue of climate change. Many of this last group expressed concern that climate change was not explicitly included in the Panel's terms of reference.

The PSAC submission provided links to air quality/emission regulations and guidelines. The CAPP submissions also drew attention to the life-cycle approach which involves quantifying emissions from the fuel at every stage during its life cycle including: production, manufacture, distribution, use and disposal, as well as all of the intervening transportation steps needed or caused by the fuel's existence. A 2012 Natural Resources Canada-commissioned study is referenced which states that, "life-cycle emissions of natural gas produced from shale are only slightly higher than those of natural gas produced from more conventional sources."

2.3.10 Public Safety and Emergency Planning

The Panel will assess potential risks to public safety from hydraulic fracturing operations and associated emergency response planning needs.

Concerns about public safety and emergency planning in general were expressed in 7 individual and 2 community group/organization submissions, but many had specific concerns relating to transportation and storage of fracking-related materials and products.

22% of individual and 25% of community group/organization submissions included concerns about traffic volume and traffic type (large, heavy vehicles, vehicles transporting dangerous goods/hazardous materials).

More specifically, 17% of individual and 20% of community group/organization submissions expressed concerns over fire and explosions associated with the storage and transport of volatile materials, while 8% of individual and 27% of community group organization submissions included concerns about spills and leaks that could be harmful to the environment and people.

Three individual submissions also expressed concerns about fracking and worker health and safety.

Of the industry/industry group submissions CAPP provided information on process safety regulations and best practices in Canada and elsewhere and described emergency preparedness and response requirements in New Brunswick and Alberta. PSAC described its Community Partners Program which provides guiding principles regarding dust, noise, communications, driving safety, traffic etc., recommended courses and training programs for workers regarding spills of fracking-related materials during transportation and outlined its principles for health and safety training for service sector workers.

2.3.11 Community Engagement

The Panel will assess how to inform and involve the local communities and other stakeholders throughout the full life cycle of a project, from early exploration through to abandonment, to determine which issues are of particular concern and how they might be addressed.

Individual and community group/organization submissions that raised the question of community engagement focused on engagement during the review phase, not on the full life cycle should fracking be allowed.

Two of the four industry/industry group submissions provided examples of community engagement practices currently employed by Canadian operators and service companies.

2.3.12 Socio-Economic Impacts

Technology such as hydraulic fracturing has made it possible for many communities to benefit from economic gains due to the production of oil and gas, including employment opportunities, supply and service contracts and local infrastructure development. In addition to recognizing the economic benefits for local communities, care must be taken to minimize disruption during operations and consider social and environmental responsibilities to individuals and communities.

2.3.12.1 Economic Benefits

The question of whether fracking would bring socio-economic benefits to the immediate or greater area, or the province as a whole was raised in 30% of the individual and 27% of the community group/organization submissions. Three of the four industry/industry group submissions also commented directly on this.

Of those supporting fracking (11 individuals, three community groups/organizations and four industry/industry groups), all advance the view that the activity will benefit the economies of the local area, region and/or the Province. The focus of the submissions varied, but employment, business and government revenue benefits were the main themes.

Of those opposing fracking there was frequently a recognition of the need for further economic stimulus to the region, but there were questions as to whether the benefits from fracking would be as great as the proponents of the proposed activity claimed, whether jobs and business would in fact go to local/regional workers and companies, whether any revenues accruing to government would be reinvested in the area where fracking would take place, and whether there would be any significant long term benefits given the boom-bust cycle in the industry.

As indicated in the lists of sources cited by those making submissions (see Appendices) there are many sources that support both the case that fracking can bring economic benefits and the case that costs to the local area in particular outweigh any benefits received.

Those opposed to fracking also question what impact it might have on other existing industry sectors in the region. The potential for negative impacts on tourism was a key concern expressed in 21% of individual and 35% of

community group/organization submissions. The potential threat to the UNESCO World Heritage Site designation for Gros Morne Park was mentioned by some (eight individual and five community group organizations) and the potential loss of tourists and tourist revenues to an area that has invested a lot of human and financial capital over a long period, by many more. Fracking was seen as a potentially short-term activity (exploration might not be followed by development, development might only be short-term), but one that could significantly damage both the immediate and long-term prospects for tourism.

The fishery in the Port au Port Bay and Bay St. George and the Gulf of St. Lawrence more generally, has a long history. Fishers and others (18% individual and 27% community group/organizations) expressed concern that fracking through spills, leaks, waste disposal and other activities could negatively impact the marine ecosystem and the commercial fisheries in the area. A number of abandoned drilling sites on Shoal Point are now reported to be in coastal waters as a result of coastal erosion, and tidal surges and extreme weather conditions associated with climate change were believed to make the area more vulnerable to pollution from past and any future onshore fracking activity.

Agriculture also is important to the local economy and notes about the incompatibility of fracking and agriculture are noted by two (one in considerable detail) individual and two community submissions.

While revenues from fracking activity might accrue to government there was concern that fracking would be a cost to local communities. Some submissions discussed the lack of infrastructure and services available to the industry in the area, which might impact a variety of factors from waste management handling to transportation to emergency preparedness. Others commented on the demands and associated costs that exploration activity would place on existing infrastructure, particularly roads, and ultimately on the budgets of local and provincial governments. In addition a number of local residents (11% of individual submissions) were concerned about the potential for negative impacts on real estate values if fracking were allowed to proceed.

At the provincial level six individual and one community group/organization submission expressed concern about the risk of investor-state lawsuits under trade agreements such as NAFTA and CETA and the potential costs to the Province should fracking be allowed to go ahead,

2.3.12.2 Social Impacts

Those opposed to fracking expressed a variety of concerns over social impacts. 5% of individual and 20% of community group/organization submissions expressed a variety of concerns about the long-term community and cultural implications if fracking were allowed to proceed.

The most significant of these concerns were potential impacts on the quality of life of local residents (11% of individual submissions). Traffic issues (volume/risk of accidents/dangerous goods) were of concern in 22% of individual and 25% of community group/organization submissions). Noise (6%; 20%), smell (2%; 2%), lights (one submission; 7%), visual blight (three submissions; 5%), presence of transitory workers and the potential for social disruption, and overall stress (2%; 2%) were all seen as potential negative outcomes on the quality of life. In more general terms many of those making submissions felt that those in the local area would bear the costs of development, while the benefits would go elsewhere.

One industry submission from Shoal Point Energy offered a proposal to financially compensate landowners and communities around Port au Port Bay for increased traffic and noise disturbance if the proposed project is allowed to proceed.

2.3.13 Public Health

34% of individual and 50% of community group/organization submissions raised concerns about the relationships between fracking activity and health. As noted earlier, many were critical of the Panel's Terms of Reference for not explicitly including this as theme for review and were likewise critical that no one with specific expertise in the potential health implications had been appointed to the Panel.

In general terms those making submissions were concerned about the implications of exposure to individual elements (air emissions, water pollution, etc.), the cumulative implications of exposure to multiple pollutants (in the air and water and soil, etc.), and the long-term consequences of each of these.

The implications for the health of the fetus, newborns and children in particular was the focus for one individual submission (nlhfrp.ca/wp-content/uploads/2015/01/Letters-from-I.-Simpson3.pdf) and included discussion of potential associated acute and chronic illnesses.

Several submissions (e.g. nlhfrp.ca/wp-content/uploads/2015/01/Letter-from-P.-W.-Allderdice.pdf, which includes annotated references), pointed to the lack of information on this topic including, lack of baseline studies, health impact assessment studies, information to assess toxicity risks and lack of participation of public health agencies in regulatory regimes of jurisdictions where fracking is currently permitted.

A related topic raised in three individual and two community group/organization submissions was that of worker health.

For the industry, CAPP referenced the 2014 study, *Detailed Human Health Risk Assessment of Oil and Gas Activities in Northeastern British Columbia*, which finds that "while there is some possibility for elevated COPC (chemicals of potential concern) concentrations to occur at some locations, the probability that adverse health impacts would occur in association with these exposures is considered to be low."

APPENDICES – SOURCES CITED

The Terms of Reference for this report included a request to indicate, where possible, the sources of information on which those making submissions had drawn.

Most of those making submissions did not indicate the sources of information upon which their submissions were based. In the case of individual submissions 85% of the 485 gave no indication of the sources they had used and 9% provided a single source.

Of those making submissions from community groups/organizations 45% of the 40 submissions provided no information on the sources/reference materials consulted, 27% provided from 1-4 sources and 15% provided 10 or more referenced sources.

Of the industry and industry group submissions three of the four submissions were each supported by lengthy lists of sources.

The sources cited by individuals, community groups and organizations and industry/industry groups are listed separately. The sources are categorized by the issues/themes discussed in Section 2, together with additional categories for citations that did not fit these themes or were not theme specific.

This compilation of sources cited has a number of limitations and qualifications. For example, time constraints did not allow all citations to be converted to a single, standard bibliographic format, or for bibliographic details to be verified. Neither could all websites provided be checked for accessibility/availability. Some websites include additional sources not cited here. For these and other reasons the list of sources cited may be neither complete nor are individual sources guaranteed to be accessible. The listings do, however, serve to illustrate the large volume and wide variety of information sources available on this subject.

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