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HYDRAULIC FRACKING: AN EMERGING INSURANCE ISSUE By Ingrid Sapona

Hydraulic fracking is becoming a more economically viable process for extracting oil and natural gas, thanks to technological advances in hydraulic drilling techniques. However, there are a number of issues surrounding fracking that insurers should monitor as the activity becomes more prevalent. Some of the issues discussed in the paper include environmental concerns about water management and water contamination, risks due to blowouts, and risks related to equipment and personnel as a result of activities and accidents.

What is Fracking?

Hydraulic fracturing – "fracking" for short – is a process involving injecting fluid under high pressure into wells to fracture shale formations or coal beds to release oil or natural gas. In the oil and gas industry, the development of shale resources is considered "unconventional gas production".[1] This article focuses on extracting natural gas through fracking into shale formations.

Hydrofracking wells can be vertical, horizontal, or at a slant. Typically a horizontal well is drilled and then extended out horizontally or on a slant. The horizontal portion can extend quite far (up to three kilometres has been reported), providing more exposure to a formation than a vertical well.[2] Because multiple horizontal wells are usually drilled from a single vertical well, there can be fewer vertical wells involved in a shale gas operation, which means less surface disruption.[3]

Once the necessary permits for drilling are obtained and the well site is cleaned and graded, the drilling and casing can begin. The drill casing is cemented in stages to maintain integrity and to ensure fluids within the different strata are contained within those strata.[4] Once the casing is completed it is tested at high pressures before fracking fluids are pumped in.[5]

To maximize output, wells are often fracked multiple times.[6] Wells are fracked in stages, with different volumes of fracking fluid injected in a sequence. Typically, each stage of fracking takes a few hours.[7] Once injection of the fracking fluid stops and pressure is reduced, the

[1] See, for example, "The Future of Natural Gas: An Interdisciplinary MIT Study," June 2011, p. 37, http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf.
[2] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, at p. 47, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.
[3] Id.
[4] See, "The Future of Natural Gas: An Interdisciplinary MIT Study," June 2011, p. 37, http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf.See,
[5] Id. at p. 40.
[6] Some wells in Alberta and B.C. have been fracked as many as 20 times. See: "Calgary-based energy companies welcome new fracking standards," Dan Healing, *Calgary Herald*, January 31, 2012, http://www.calgaryherald.com/business/Calgary+based+energy+companies+welcome+fracking+standards/6076346/story.html#ixzz1oGMCOMDk.
[7] "The Future of Natural Gas: An Interdisciplinary MIT Study," June 2011, p. 40, http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf.

fracking fluid (which may also contain minerals and saline from the dissolved formation itself) flows back through the well casing to the wellhead.[8] After that, the well is placed in production.[9]

There are shale gas reserves throughout the world and some estimate that there is enough gas to power the world for 200 years.[10] One source reports that among the largest reserves are: China (1275 trillion cubic feet of shale gas reserves), the U.S. (862 trillion cubic feet), Argentina (774 trillion cubic feet), Mexico (681 trillion cubic feet), South Africa (485 trillion cubic feet), Australia (396 trillion cubic feet), and Canada (388 trillion cubic feet).[11]

Fracking Fluid

The fluid injected (referred to as "fracking fluid" or "slickwater") is a mixture of water and chemicals. The ingredients used in the fracking fluids vary, but they can include things like surfactants (soaps), biocides (to prevent growth of algae), corrosion inhibitors, foaming, and gelling agents.[12] Sand and other solids, including ceramic beads, for example, are often pumped in to keep the fissures propped open to allow the methane gas to escape once the fluid pumping is stopped.[13] Such additives are called "proppants". Drilling companies consider their fracking mixture proprietary and generally do not disclose the exact composition. Some of the chemicals thought to be used in fracking fluid are carcinogens, such as benzene, lead, methanol, boric acid, and various radioactive isotopes.[14]

In the face of growing complaints from different communities and groups in regions where fracking is being done, some jurisdictions are starting to require disclosure of the compounds used in fracking fluids.[15] Indeed, in January 2012 the Canadian Association of Petroleum Producers (CAPP) issued Operating Practices related to hydraulic fracturing and the Association favours disclosure of fracking fluid additives, though disclosure is optional at this time.[16]

The Surge in Fracking

Fracking has been used by oil and gas companies for over 60 years.[17] But, thanks to the high price of crude[18], as well as technological advances in horizontal drilling techniques and fracking technology that have helped make it economically feasible[19], it has taken off in the

[8] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, at p. 66, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.
[9] "The Future of Natural Gas: An Interdisciplinary MIT Study," June 2011, p. 39, http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf.
[10] For example, the former UK chairman of Shell believes this to be the case, see: "Shale gas fracking – the facts and figures," published by *The Guardian*, April 26, 2011, http://www.guardian.co.uk/environment/interactive/2011/apr/26/shale-gas-hydraulic-fracking-graphic.
[11] Id.
[12] See, "Hydraulic Fracturing Frequently Asked Questions," Nova Scotia Environment, published April 2011, http://www.gov.ns.ca/nse/pollutionprevention/docs/Consultation.FAQ.Hydraulic.Fracturing.pdf. The next generation of fracking ingredients could be liquefied propane gas (LPG). See. "Q&A: Inventor of Waterless Fracking on Why His Method Will Be a Game-Changer," *InsideClimate News* (http://insideclimatenews.org).
[13] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, at p. 54, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.
[14] "Fracking, shale gas and health: A case for precaution," by Barb Harris, http://preventcancernow.ca/health-impacts-of-fracking-and-shale-gas-development.
[15] For example, in June 2011 Texas became the first state to require public disclosure of the chemicals used in fracking. see: http://www.canadianenergylaw.com/2011/07/articles/oil-and-gas/texas-becomes-first-state-to-enact-hydrofracking-rules/. Nova Scotia Environment also requires a complete list of any chemicals to be used in fracking before it will issue an Industrial Approval to drill, see: "Hydraulic Fracturing Frequently Asked Questions," Nova Scotia Environment, published April 2011, http://www.gov.ns.ca/nse/pollutionprevention/docs/Consultation.FAQ.Hydraulic.Fracturing.pdf.
[16] See, "CAPP Hydraulic Fracturing Operating Practice: Fracturing Fluid Additive Disclosure," http://www.capp.ca/getdoc.aspx?DocId=199626&DT=NTV.
[17] See, "The Facts About Hydraulic Fracking," Ohio Department of Natural Resources, http://ohiodnr.com/Portals/11/pdf/fracking-fact-sheet.pdf.
[18] See, "Like Fracking? You'll Love Superfracking," by David Wethe, *Bloomberg Businessweek*, January 19, 2012, http://www.businessweek.com/magazine/like-fracking-youll-love-super-fracking-01192012.html.
[19] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf, and "Navigating the Legal Landscape of Shale Gas Exploration and Development in the United States: Identifying and Managing Environmental Risk,, by Andrew N. Davis and Aaron D. Levy, Dewey & LeBeouf, http://www.deweyleboeuf.com/~/media/Files/attorneyarticles/2011/20110718_CorporateLivewire.ashx.

past 10-15 years. Other important factors that have played a role in the rapid growth in U.S. exploration and production are the drive for energy independence and the fact that under the Energy Policy Act of 2005, hydraulic fracking is exempt from requirements of the Safe Drinking Water Act. The exemption means it's up to states to regulate fracking activities. Advocates of further development of fracking have also pointed to the number of jobs created by the boom – an argument that's particularly powerful in this era of high unemployment.[20]

To get a sense of how prolific the shale gas extraction industry has become in the U.S., here are some figures:

- 10 years ago less than 2% of the United States' natural gas was drawn from shale beds but by 2011 the figure was 30%.[21]
- There are over 1 million wells in the U.S. where hydraulic fracturing has been used.[22]
- As a result of fracking activities, natural gas production in the U.S. is at its highest level in over 30 years.[23]
- There are over 8,000 wells in an 80 square kilometre area in Fort Worth, Texas, tapping into the Barnett Shale.[24]

Where Fracking Stands in Canada Today

Canada's shale reserves are located in B.C., Alberta, Quebec, New Brunswick and Nova Scotia.

Here's a brief rundown of where fracking stands in Canada today, including some specific regulatory requirements and studies underway.

Federal Review

In September 2011 the federal Environment Minister asked Environment Canada to conduct a study into the impact of fracking.[25]

British Columbia

Fracking in northern British Columbia is a "billion-dollar industry that's growing rapidly with the full support of Premier Christy Clark".[26] But starting this year, B.C. requires disclosure of the chemicals used in fracking fluids (on a well-by-well basis). Meanwhile, in B.C. the Canadian Centre of Policy Alternatives has called for a slowdown in shale gas development because of the demands on local water and power resources in northeast B.C.[27], and critics have raised concerns over the fact that water is being drained from a northern B.C. Hydro reservoir for fracking.[28]

Alberta

Alberta currently has 170,000 multistage fracking sites throughout the province[29] and the province expects much more of it.[30] In February 2012 the Alberta government announced it would make public information about what chemicals are used in fracking.[31] This information is expected to be up on a web site by the end of 2012.[32]

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[20] See, "Oil, gas industry created 9% of new U.S. jobs in 2011," Reuters, March 7, 2012, http://www.calgaryherald.com/business/industry+created+jobs+2011/6265607/story.html.
[21] "Unearthing Profit," by Al Slavin, *Best's Review*, December 2011, p. 45, http://www.amwins.com/SiteCollectionDocuments/Client%20Advisories/Specialty_Producer_BR_1211.pdf.
[22] See, "The Facts About Hydraulic Fracking," Ohio Department of Natural Resources, http://ohiodnr.com/Portals/11/pdf/fracking-fact-sheet.pdf.
[23] See, "Digging Deep: Fracking Litigation Trends," by John F. Mullen, Kim Hollaender, January 27, 2012, http://www.propertycasualty360.com/2012/01/27/digging-deep-fracking-litigation-trends.
[24] See, http://www.scientificamerican.com/slideshow.cfm?id=shale-gas-and-hydraulic-fracturing.
[25] "Natural gas fracking reviews launched," http://www.cbc.ca/news/business/story/2011/09/23/bc-federal-study-fracking.html.
[26] Id.
[27] "Fracking: How to Win in the Race to Regulate," by William M. Laurin, http://oilgas.net/guest-column/fracking-how-win-race-regulate.
[28] "Natural gas fracking reviews launched," http://www.cbc.ca/news/business/story/2011/09/23/bc-federal-study-fracking.html.
[29] "Alberta aims to get public onside in fracking debate: Province will stress education, transparency, official says," by Trish Audette, *EdmontonJournal.com*, March 5, 2012, http://www.edmontonjournal.com/news/Alberta+aims+public+onside+fracking+debate/6254242/story.html.
[30] "More public disclosure for fracking," by Bill Kaufmann , *Calgary Sun*, February 22, 2012, http://www.calgarysun.com/2012/02/22/more-public-disclosure-for-fracking.
[31] "Alberta aims to get public onside in fracking debate: Province will stress education, transparency, official says," by Trish Audette, *EdmontonJournal.com*, March 5, 2012, http://www.edmontonjournal.com/news/Alberta+aims+public+onside+fracking+debate/6254242/story.html.
[32] Id.

Nova Scotia

In June 2011, Nova Scotia announced a joint review by the departments of Energy and Environment to examine the potential impacts of fracking.[33] Exploration has stopped pending further scientific study. On April 16, 2012 the province announced the review report, which was due to be released this spring, will be delayed until mid-2014 and so the province has put a two year hold on fracking activities pending completion of the review.[34]

The review is aimed at identifying potential environmental issues, determining how other jurisdictions are managing fracking, and identifying best practices.[35] The review is focused primarily on water issues, including the effects on groundwater and on the use of, and effects on, surface water.[36] Reviewers will also be examining things like: soil contamination, management (disclosure) of fracturing fluid additives, fracking fluid waste management, and site restoration.[37]

New Brunswick

In New Brunswick shale gas exploration is still in its infancy and will likely not be ready for two to three more years. In June 2011 the New Brunswick government announced it will not put a moratorium on development, though it will require disclosure of fracking chemicals, as well as mandatory water testing and a security bond to compensate landowners if there are accidents.[38]

Quebec

Quebec stopped shale gas exploration in March 2011, pending a full environmental study of the technique of hydraulic fracking. "We are committed to making sure that it is done properly or it won't be done at all," Quebec Environment Minister Pierre Arcand told a news conference.[39] "Quebeckers must understand that we will not accept any compromises especially when it involves health and safety as well as respect for the environment. And we will take whatever time is needed to fulfill these conditions."[40] The study will take two to three years to complete.[41]

Environmental Concerns Raised by Fracking

Impact on Water

There are a number of environmental concerns raised by fracking, but the most significant relate to water resources. The main concerns have to do with:

- water management issues related to both depletion of water resources because of the amount of water used in fracking operations and treatment or disposal of fracking wastewater; and
- contamination of drinking water supplies.

The amount of water used varies depending on the type of well and how many times it is fracked. The U.S. Environmental Protection Agency (EPA) estimates one well in a coal bed can require anywhere from 50,000 gallons to 350,000 gallons while a horizontal well in a shale formation can use between 2 and 5 million gallons of water.[42] Proponents of fracking always note that though the amount of water needed seems high, in the U.S. for example, the water usage in shale fracking operations is less than 1% of the total water usage in the affected areas.[43]

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[33] "Nova Scotia Review of Hydraulic Fracturing in Oil and Gas Operations in Nova Scotia – Final Scope," June 2011, http://www.gov.ns.ca/nse/pollutionprevention/docs/Consultation.Fracturing.Scope.pdf.
[34] See, "Dexter delays decision by 2 years," http://www.cbc.ca/news/canada/nova-scotia/story/2012/04/17/ns-fracking-decision-delay.html.
[35] Id.
[36] Id.
[37] Id.
[38] "Natural gas fracking reviews launched," http://www.cbc.ca/news/business/story/2011/09/23/bc-federal-study-fracking.html.
[39] "Quebec halts shale gas exploration," by Rhéal Séguin *Globe and Mail*, March 8, 2011, http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/quebec-halts-shale-gas-exploration/article1934217/.
[40] Id.
[41] See, "Natural gas fracking reviews launched," http://www.cbc.ca/news/business/story/2011/09/23/bc-federal-study-fracking.html.
[42] See, for example, the U.S. EPA's "Hydraulic Fracturing Research Study," http://www.epa.gov/owindian/tribal/pdf/hydraulic-fracturing-fact-sheet.pdf.
[43] See, "The Future of Natural Gas: An Interdisciplinary MIT Study," June 2011, p. 43. http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf. Indeed, this study points out that the

Contamination of ground water is another concern. Those in favour of fracking maintain that fracking does not pose a threat to drinking water because of the casing and cement installed when the well is drilled and because the well goes thousands of feet below the water table.[44] Proponents believe the fluid cannot rise to the surface and into freshwater aquifers because the bedrock between the fracked shale and the surface is so dense.[45] Though the wells are deep (anywhere from 300 metres to 2.5 kilometres[46] and therefore well below the water table[47]), many communities have raised concerns about contamination of their drinking water sources.

In June 2011 the U.S. EPA announced it would examine claims that water wells in five states have been contaminated because of natural gas drilling.[48] In November 2011 the EPA released its sampling data from monitoring wells drilled deep into an aquifer in Pavillion, Wyoming. The data showed that the wells contain high levels of cancer-causing compounds and at least one chemical commonly used in hydraulic fracturing.[49]

Another sign of growing concern about possible contamination of water supplies as a result of hydraulic fracking activities is the fact that some jurisdictions are enacting legislation – or tightening existing legislation and regulations – specifically to capture such activities. Under a new law in Pennsylvania, for example, anyone applying for a permit to drill unconventional wells must provide notice of the application to all surface owners and public water system owners within 3,000 feet of the proposed bore site.[50] The law also establishes a rebuttable presumption that well operators are responsible for pollution to a water supply if the impacted supply is within 2,500 feet of an unconventional well that was completed, drilled, stimulated, or altered any time within the 12 months before the pollution.[51] Drill operators can be held responsible for reduction in private and public water supplies caused by the drilling activities.[52]

Many believe the primary risk to drinking water comes from handling the wastewater produced by fracking. It's not known exactly how much water is recovered after fracking operations. Indeed, the estimates vary widely: from 15% to 80%.[53] Fracking fluids recovered must either be treated or disposed of.[54] In some cases well operators retain it on-site (in steel tanks or lined pits); some fluids are disposed of by injecting into so-called deep injection wells[55], and in some cases it is sent to public water treatment facilities or is discharged into local rivers. Because municipal water treatment plants typically are not equipped to treat such water (since it is often highly salty and can contain radioactive components), this practice has stirred controversy.

Earthquakes

Though seismologists and academics doubt that fracking can cause earthquakes[56], there certainly is growing concern that disposing of fracking wastewater into deep injection wells might be the cause of a number of small to moderate earthquakes. The mayor of

intensity of water resources used in fracking is low by comparison to other energy sources, such as the amount of water used in irrigation of corn crops grown for ethanol,. at p. 44.

[44] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009 at p. ES-1, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.

[45] See, for example, "The Facts About Hydraulic Fracking", Ohio Department of Natural Resources, http://ohiodnr.com/Portals/11/pdf/fracking-fact-sheet.pdf.

[46] http://www.cbc.ca/news/technology/story/2011/04/27/f-fracking-faq.html.

[47] See, for example, "The Facts About Hydraulic Fracking", Ohio Department of Natural Resources, http://ohiodnr.com/Portals/11/pdf/fracking-fact-sheet.pdf.

[48] "EPA: Natural Gas Drilling May Contaminate Drinking Water," published June 25, 2011, http://www.redorbit.com/news/science/2070062/epa_natural_gas_drilling_may_contaminate_drinking_water/.

[49] "EPA Finds Fracking Chemical in Wyoming Gas Drilling Town's Aquifer," by Abrahm Lustgarten, *ProPublica*, http://insideclimatenews.org/news/20111110/epa-fracking-wyoming-aquifer-drinking-water-natural-gas-wells.

[50] See, "Pennsylvania's Marcellus Shale Bill: Implications for Water Resources in the Commonwealth," Feburary 16, 2012 client alert by Dewey & LeBoeuf, http://www.deweyleboeuf.com/~/media/Files/clientalerts/2012/20120216_WaterImpacts.ashx.

[51] Id.

[52] Id.

[53] See, for example, the U.S. EPA's "Hydraulic Fracturing Research Study," http://www.epa.gov/owindian/tribal/pdf/hydraulic-fracturing-fact-sheet.pdf.

[54] In some cases fracking fluid is being treated and re-used, but this is still a developing technology. See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, a p. 69.

[55] Deep injection wells are wells used exclusively for holding hazardous and nonhazardous waste that are by-products from oil and gas drilling. The oilfield fluids are injected back into depleted oil and gas reservoirs or deep geologic formations. See, http://ohiodnr.com/downloads/northstar/UICReport.pdf.

[56] See, "Like Fracking? You'll Love 'Super Fracking'," by David Wethe, *Bloomberg Businessweek*, January 19, 2012, http://www.businessweek.com/magazine/like-fracking-youll-love-super-fracking-01192012.html.

Youngstown, Ohio sounded the alarm about the unusual seismic activities in his town that he thought might be the result of deep well injection activities occurring in the area. Indeed, his reported purchase of earthquake insurance on his house after a 4.0 magnitude earthquake hit his town on December 31, 2011[57] was met with some amusement. But, after a magnitude 2.7 earthquake hit on December 24, 2011 (the 10th quake to hit in the area since mid-March 2011[58]), Ohio ordered that deep injection of wastewater from natural gas drilling operations be halted in the area, pending review to determine whether there's a correlation between the injection and the quakes. In March 2012, the Ohio Department of Natural Resources released its preliminary report on the seismic events in the Youngstown area and concluded, "A number of coincidental circumstance appear to make a compelling argument for the recent Youngstown-area seismic events to have been induced," and the reported injection operations that began in December 2010 in a wellbore near where the seismic events occurred.[59]

The New York Times reported that similar links between disposal wells and earthquakes have been suspected in Arkansas and Texas.[60] In 2011, after hundreds of quakes were recorded in six months in an area where fracking wastewater was injected into disposal wells, Arkansas' Oil and Gas Commission banned injection into such wells.[61] Interestingly, a sharp decline in the number of earthquakes was reported after two of the four wells stopped operating.[62]

There's also growing concern in Canada about seismic activity. According to geologist John Clague, from Simon Fraser University, several minor tremors in northeastern B.C. have been caused by the re-injection of oil industry wastewater.[63]

Radiation

There is also a concern about radiation from fracking activities. The radiation could be a result of radiation used by oil and gas companies as tracers. The other source of radiation is from what is referred to as "naturally occurring radioactive material" (NORM) that is contained in some soils and geologic formations. In some cases NORM is brought to the surface during shale gas drilling and production operations. NORM is thought to remain in the rock pieces of the drill cuttings and is thought to be weak and unable to penetrate dense materials, such as the steel used in pipes and tanks.[64] Some are concerned, however, that over time the radiation will become concentrated in the equipment to the point that using the equipment will become hazardous to workers.[65]

Carbon Emissions

Carbon emissions resulting from fracking operations are another concern. But, like all estimates when it comes to determining the carbon footprint from an activity, experts disagree. Though shale gas emits far less methane than coal, it emits more of the greenhouse gas than conventional gas does.[66]

Leasing of Mineral Rights to Gas Companies

The system of land ownership in Canada and the U.S. is quite different. In the U.S., property owners typically own the land and the mineral rights below the land. In Canada, because of the way the country was settled, on more than 90% of the land the mineral rights are owned

[57] "Ohio Mayor Buys Quake Insurance as He Seeks Answers on Fracking," byMark Niquette, *Bloomberg,* January 4, 2012, http://www.bloomberg.com/news/2012-01-04/ohio-mayor-buys-quake-insurance-as-he-seeks-answers-on-fracking.html.
[58] "Disposal Halted at Well After New Quake in Ohio," by Henry Fountain, *New York Times*, January 1, 2012, http://www.nytimes.com/2012/01/02/science/earth/youngstown-injection-well-stays-shut-after-earthquake.html.
[59] Preliminary Report on the Northstar 1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio Area, Ohio Department of Natural Resources, March 2012, at p. 4, http://ohiodnr.com/downloads/northstar/UICReport.pdf.
[60] Id.
[61] "'Fracking' Disposal Sites Suspended, Likely Linked To Arkansas Earthquakes", by Sarah Eddington, Associated Press, March 4, 2011, http://www.huffingtonpost.com/2011/03/06/fracking-arkansas-earthquakes_n_831633.html.
[62] Id.
[63] "The shaky state of fracking," by Shawn McCarthy, *Globe and Mail*, March 10, 2012, http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/the-shaky-state-of-fracking/article2365229/.
[64] See, "Modern Shale Gas Development in the United States: A Primer," U.S. Department of Energy, April 2009, a p. ES-4 – ES-5, http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.
[65] Id. at p. 71.
[66] See, "Are We Entering a Golden Age of Gas?" a special report of the International Energy Agency, http://www.iea.org/weo/docs/weo2011/WEO2011_GoldenAgeofGasReport.pdf.

by the Crown (in some cases the Federal Crown, in other cases the Provincial Crowns). [67] However, on the remaining 10% or so, "freehold mineral owners", most of whom are descendants of Canada's initial settlers, own the minerals.[68]

On lands where the Crown holds the mineral rights, oil and gas companies enter into a competitive bidding process to obtain a licence or a lease for the right to explore for, and produce, gas.[69] If the Crown does not own the surface rights to the property, the company must also seek permission to access the land through negotiation with the surface rights owner. Grants of access from a surface owner usually take the form of a surface lease. In some provinces, like Alberta, for example, if a surface owner denies access, the company may apply to the province[70] for an order granting them a right of entry.[71]

Where the mineral rights are held by a freehold mineral rights owner, oil and gas companies must negotiate with the owner. Regardless of whether a mineral rights lease is granted by the crown or by a freehold mineral rights owner, the party obtaining the lease pays royalties to the grantor in exchange for the minerals extracted.

Horizontal wellbores increase the possibility that the wellbore might extend over the boundary of the lease owner's (the lessor's) property to a neighboring property. In such cases, particularly where the landowners are freehold mineral owners, there is some concern that the lessee could find itself subject to an action in trespass, conversion, and unjust enrichment. Though the Rule of Capture, which basically says that the first person to capture a resource owns it, might be a defence, if proppants are used to facilitate production, reliance on the Rule of Capture may not be a defence.[72]

Potential Mortgage Jeopardy in the U.S.

In the U.S., homeowners who sign leases with oil and gas companies may unknowingly be in default of their mortgage or they may be at risk of losing their title insurance and homeowners insurance.[73] If a homeowner has a mortgage on the property and he or she signs a gas lease without the consent of the lender, the homeowner is likely in default under the mortgage and the lender can demand repayment of the loan or termination of the lease, which could expose the homeowner to a lawsuit by the lessee.[74] Under both Fannie Mae's and Freddie Mac's standard mortgages, if a borrower signs a gas lease without getting written consent from the lender and from Fannie Mae or Freddie Mac, respectively, they risk foreclosure.[75] And, if a property is subject to a lease, potential purchasers likely will not be able to qualify for a mortgage.[76] Banks are also refusing to grant home equity loans to homeowners whose property is subject to a gas lease.[77]

[67] According to "Fracking: How to Win in the Race to Regulate, by William M. Laurin, the Crown owns nearly 100% of the rights in the tight oil and gas areas of northeast B.C., about 80% in Alberta, 50% in Saskatchewan and about 20% in Manitoba, http://oilgas.net/guest-column/fracking-how-win-race-regulate.
[68] See, Freehold Owners Association, http://www.fhoa.ca/.
[69] "Things to Know About Acquiring Petroleum and Natural Gas Assets in Alberta," by Chrysten Perry, http://www.energybridge.ca/articles-chinese/tags/tag/oil-and-gas-rights.
[70] Id. In Alberta the Alberta Surface Rights Board is the body that such an application would be made.
[71] According to Alberta Agriculture and Rural Development, "The surface owner's Certificate of Title is subject to the mineral owner's right to enter the land in order to work and remove the minerals. This approach to land rights is based on the assumption that obtaining oil, gas and other minerals is in the general public's interest and only when the Crown is the mineral owner." See, http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex1126.
[72] Id. at p. 5.
[73] See: "Homeowners and Gas Drilling Leases: Boom or Bust?", by Elisabeth N. Radow, *New York State Bar Journal*, November/December 2011, at p. 20, http://www.nysba.org/AM/Template.cfm?Section=Home&ContentID=57132&Template=/CM/ContentDisplay.cfm
[74] Id.
[75] "Loss of Property Values, Difficulty Getting Mortgages and Home Insurance," http://www.savecoloradofromfracking.org/harm/propertyvalues.html.
[76] See: "Homeowners and Gas Drilling Leases: Boom or Bust?", by Elisabeth N. Radow, *New York State Bar Journal*, November/December 2011, at p. 21, http://www.nysba.org/AM/Template.cfm?Section=Home&ContentID=57132&Template=/CM/ContentDisplay.cfm.
[77] "Loss of Property Values, Difficulty Getting Mortgages and Home Insurance," http://www.savecoloradofromfracking.org/harm/propertyvalues.html.

Lawsuits Related to Fracking

Lawsuits claiming damages for contamination of land, ground, and surface water because of fracking have been brought by numerous property owners (particularly in Pennsylvania, Texas and Arkansas) who sold mineral rights, and by residents in areas where fracking is being conducted.[78] As well, a number of lawsuits seeing personal injury and property damage resulting from drilling on the Marcellus Shale (in the U.S. northeast) have been filed.[79]

More recently there have also been suits filed alleging air pollution and excess noise with regard to drilling and compression stations.[80] Some property owners who entered into leases have brought fraud actions claiming the oil and gas companies misrepresented or failed to disclose potential property damage that could arise from the fracking activities.[81]

The causes of action have been asserted under common law theories, including strict liability, negligence, private nuisance, and trespass.[82] Plaintiffs have even claimed for medical monitoring.

In addition to individual actions, class action suits have also started being filed. Typically class members are residents of an area adjacent to, or near, a fracking site.[83]

Fracking Activities and Insurance

In this section we'll look at insurance issues related to:

- those engaged in fracking (for example, oil and gas companies and drilling companies); and
- property owners on whose land fracking is taking place, or who live in an area where it is taking place.

Insurance Issues for those engaged in fracking

For companies engaged in fracking, there are insurable risks related specifically to the dangers of carrying out the process, such as worker safety-related issues, and risks related to equipment as a result of activities and accidents. There are also risks related to environmental damage. In North America, clients engaged in fracking usually also have a separate Control of Well policy, according to Pascal Ray, senior vice president of AmWins Brokerage of Texas, who specializes in insurance related to oil and gas.

Risks Due to Blowouts

Blowouts present specific risks for oil and gas companies. According to AmWin's Ray, fracking activities have led to an increase in blowouts.[84] In addition to blowouts caused by casing and cementing failures and surface events, blowouts have been reported at the completion/fracking stage and in situations involving communication between multiple wells.[85] As well, there has been an increase in reported blowouts involving producing wells and plugged and abandoned fracked wells.[86]

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[78] "Digging Deep: Fracking Litigation Trends", by John F. Mullen and Kim Hollaender, February 2012, *Claims Magazine*, http://www.propertycasualty360.com/2012/01/27/digging-deep-fracking-litigation-trends.
[79] Fracking in the Marcellus Shale: Contractual Risk Transfer and Insurance Issues for Property Owners and Municipalities," by Michael Conley and Meghan Finnerty, http://www.offitkurman.com/news-events/article/fracking-in-the-marcellus-shale-contractual-risk-transfer-and-insurance-issues-for-property-owners-and-municipalities/.
[80] "Digging Deep: Fracking Litigation Trends", by John F. Mullen and Kim Hollaender, February 2012, *Claims Magazine*, http://www.propertycasualty360.com/2012/01/27/digging-deep-fracking-litigation-trends.
[81] Id.
[82] Id. It should be noted that similar lawsuits have been brought in Canada. Jessica Ernst, for example, a landowner near Rosebud, Alberta, filed a lawsuit in April 2011 seeking $33 million in damages against EnCana, Alberta Energy Resources Conservation Board (the gas drilling regulator in Alberta), and Alberta Environment and Water, alleging that EnCana's coal-bed drilling operations to extract methane near her property were negligent. See, "'Fracking' starts to bring on legal challenges", http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/fracking-starts-to-bring-on-legal-challenges/article2007417/.
[83] "Digging Deep: Fracking Litigation Trends", by John F. Mullen and Kim Hollaender, February 2012, *Claims Magazine*, http://www.propertycasualty360.com/2012/01/27/digging-deep-fracking-litigation-trends.
[84] "New Technology Creates New Insurance Issues for Oil and Gas Lease Operators," AmWins Client Advisory, http://www.amwins.com/SiteCollectionDocuments/Client%20Advisories/Client_Advisory-fracking-COW-6.11.pdf.
[85] Id.
[86] Id.

The potential for blowouts arising at multiple wellheads as a result of communication during fracturing is a growing concern for the insurance industry, says Ray. Indeed, the B.C. Oil & Gas Commission issued a Safety Advisory in May 2010 as a result of a so-called "large kick" that took place on a well being horizontally drilled for unconventional gas in B.C.[87] A kick is "an unintended entry of water, gas, oil, or other formation fluid into [a] wellbore that is under control and can be circulated out."[88] If the fluid is not controlled, however, a blowout may occur.[89] As of May 2010 the B.C. Oil & Gas Commission knew of 18 fracture communication incidents in B.C. and one in Alberta.[90]

If there is communication between wells, you have the potential for a single well blowout damaging multiple nearby wells. As Ray explains, "If an insured's well causes a blowout in multiple wells, from the insurer's perspective, this would be viewed as one occurrence, which means it would be subject to one limit in a Control of Well policy." Because the key components of Control of Well coverage include well control costs, costs related to a relief well (if required), costs related to seepage and pollution, evacuation costs, and restoration and re-drill costs[91], blowouts at multiple wells as a result of communication could leave the oil and gas operator underinsured, according to Ray.

Because of these risks related to natural gas production through fracking, some oil and gas companies are increasing their Control of Well coverage limits. Chesapeake Energy Corporation, one of the largest U.S. companies, reportedly increased its policy by 50% (to U.S. $75 million)[92] but even after doing so, it stated that there is no guarantee that it is enough to cover all losses and exposures.[93] AmWin's Ray says that while most of his US clients carry Control of Well policies of between U.S. $5 – $10 million, he believes that limits of up to (more like) U.S. $100 million are probably appropriate. Interestingly, Ray says Canadian clients generally buy more Control of Well insurance limits than U.S. companies.

Risks to Equipment On-Site

When the well is drilled, the rig is moved from the well site and the fracking equipment is brought in to complete the well. The equipment required to carry out fracking is quite extensive and expensive, according to Ray. "While the drill rig equipment might only cost (U.S.) $5 – $10 million, fracking equipment can cost from (U.S.) $35 – $40 million," says Ray. As a result, insurers are putting together more capacity for the care, custody, and control issues under their Control of Well policies, or have developed new stand-alone insurance products for this exposure, according to Ray.

In the U.S. at least one insurer has broadened its coverage of equipment used in the drilling and fracking process because it requires more equipment on site than traditional drilling. As well, it has increased it limits from U.S. $5 million to $30 million, given the additional equipment and the fact that well operators have been asking for higher limits and broader coverage.[94]

There has also been an increase in surface and water table pollution events from fracking activities.[95] Environmental insurance policies that are written to protect various parties, including developers, subcontractors, and investors, can help manage risks from fracking activities. Because of the unique aspects of each operation, environmental insurance policies should be tailored to the specific transaction and risks. Among the potential exposures that might be included in an environmental policy are[96]:

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[87] "Safety Advisory 2010-03," issued May 20, 2010 by the B.C. Oil & Gas Commission, http://www.bcogc.ca/document.aspx?documentID=808&type=.pdf.
[88] Id.
[89] Id.
[90] Id.
[91] Id.
[92] See, "Unearthing Profit", by Al Slavin, Best's Review, December 2011, p. 45, http://www.amwins.com/SiteCollectionDocuments/Client%20Advisories/Specialty_Producer_BR_1211.pdf.
[93] Chesapeake Energy Corporation said this in a filing (its 10-K for fiscal year ended December 31, 2008) with the U.S. Securities and Exchange Commission, http://www.sec.gov/Archives/edgar/data/895126/000119312509042739/d10k.htm#toc87281_2.
[94] "As Fracking Grows, Travellers Boosts Coverage for the Controversial Technique," by Mathhew Sturdevant, The Hartford Currant.com, January 20, 2012, http://articles.courant.com/2012-01-20/business/hc-travelers-gas-coverage-20120117_1_fracking-drilling-natural-gas.
[95] "New Technology Creates New Insurance Issues for Oil and Gas Lease Operators," AmWins Client Advisory, http://www.amwins.com/SiteCollectionDocuments/Client%20Advisories/Client_Advisory-fracking-COW-6.11.pdf.
[96] "Negotiation the Legal Landscape of Shale Gas Exploration and Development in the United States: Identifying and Managing Environmental Risks," by Andrew N. Davis and Aaron D. Levy, article featured on *CorporateLiveWire.com,* July 15, 2011.

- property damage and bodily injury,
- natural resource damages,
- liability associated with transportation and disposal of hazardous wastes or substances,
- project delays and business interruptions,
- loss of collateral value,
- contract liability, and
- costs for legal defence.

Insurance issues for landowners where fracking is taking place

When there are adverse environmental impacts to property on which fracking operations are taking place pursuant to a lease, lessors (property owners) usually turn to the lease's indemnity provisions, believing that the oil and gas company (the lessee) will be on the hook. However, lessors can be in for a rude awakening if the drilling operations were carried out by a limited liability company (LLC) or partnership (LLP) and the company (or partnership) has been dissolved or is not solvent.[97] As one commentator noted, "an indemnification provision is only as good as the party agreeing to provide the indemnification."[98]

If a lessee is insolvent and a government agency undertakes the cleanup of an environmental problem, the lessor could be sued by the government agency on the basis that they contributed to the alleged harm by allowing the drilling.[99] If this happens, the lessor can turn to their homeowners policy's personal liability coverage to provide a defence. While there likely will be policy limits on the amount an insurance company might have to pay as a result of any judgment or settlement, most homeowners' policies do not have a limitation on the amount that may be spent in an effort to defend the insureds.

The applicability of liability coverage in a homeowners policy for environmental harm caused by fracking is evaluated in much the same way that coverage would be evaluated under a CGL policy. The insurer would want to determine whether:

- the claim or suit seeks recovery of damages,
- the damages are because of bodily injury or property damage within the meaning of the policy,
- the injury or damages were caused by an "occurrence", and
- any policy exclusions apply.

One of the more common homeowners policy exclusions that might apply is for business pursuits. Evidence that a homeowner was paid, or expects future payment, based on the terms of the lease may preclude application of the personal liability coverage.[100] As well, some homeowners policies include a specific pollution exclusion.

At a minimum, to more fully protect themselves, property owners who enter into a contract to allow fracking on their property should require that they be named as an additional insured on all insurance policies of the lessee. As well, they should specify that they must be named as additional insureds on the insurance policies of any contractor that works on the property (because oil and gas companies sometimes outsource drilling to third parties).[101] It is also prudent to specify in the lease the scope of the coverage for the additional insured.[102]

The property owner should also look into the scope of coverage of the oil and gas company and any subcontractors to determine whether their commercial and general liability policy contains pollution exclusions or limitations. (And, of course, they should not rely on a Certificate of Insurance as evidence of the policy – they should inspect the actual contract, since Certificates may not be binding on the

[97] "'Under Cover': Do homeowners policies protect against liability from fracking operations?", by Thomas H. Clarke Jr. and Dean A. Pappas, *Best's Review*, February 2012, at p. 2, http://www.rmkb.com/tasks/sites/rmkb/assets/image/2-2012%20-%20Best%27s%20Review.pdf.
[98] See: "'Fracking' starts to bring on legal challenges", http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/fracking-starts-to-bring-on-legal-challenges/article2007417/, and: http://digitaljournal.com/article/317334.
[99] Id.
[100] Id.
[101] Id.
[102] Id.

insurance company.[103]) If the policy contains exclusions or limitations, the property owner should require that the lessee carry specialty insurance.[104]

The property owner should also determine whether the oil and gas company's (or its subcontractors') policies are written on a claims made or occurrence basis. Because environmental damage may not manifest itself for many years, claims made policies may not provide coverage.[105]

Other than the mayor of Youngstown's decision to purchase earthquake insurance on his home as a result of concerns about seismic activity from deep injection wells in his area, there is little evidence of other property owners following suit. There are likely many reasons others in areas where fracking is widespread have not taken out earthquake insurance, including the mistaken belief that damages suffered as a result of an earthquake are covered under one's homeowners policy. Under most ordinary homeowners policies earthquake damage is not covered.[106] Indeed, most homeowners policies exclude losses resulting from water or any substance below the surface, regardless of the source, as well as losses resulting from movement of the earth of any kind, such as sinkholes.[107]

Fracking Lawsuits and Insurance Coverage Issues

Because lawsuits related to fracking activities are still in the early stages, it's impossible to tell who will win and on what terms. To succeed, plaintiffs will have to prove a link between the injury they allege and fracking operations.

As one insurance commentary notes, in light of the expected onslaught of lawsuits related to fracking, general commercial and liability insurers could face coverage issues.[108] Defence and indemnification provisions under a CGL policy could be triggered in fracking lawsuits where the claim is for bodily injury, or property damage. However, if the suit is for breach of contract, indemnity provisions under a CGL policy would not be triggered.[109]

Standard pollution exclusions in CGL policies are also likely to be in issue in the event an insured oil and gas company is sued. Applicability of the exclusion will depend on whether elements of fracking fluids are deemed pollutants for purposes of the exclusion and whether inclusion of these materials make the fracking fluid itself a pollutant.[110]

To the extent lawsuits related to fracking are based on allegations of injuries related to continuous exposure to hazardous substances, arguments used in response to determining CGL coverage in asbestos cases may come into play. [111]

Conclusion

The growing world appetite for fossil fuels, the technological changes that have made fracking into shale economically feasible, and the vast shale deposits in North America make it likely that hydrofracking activities will continue to flourish in Canada and the U.S. As with any growth industry, insurers will have to keep up with technology and carefully assess the risks involved so they can design products and coverage that meets the market's demand for insurance, while assessing their own appetite for underwriting these risks.

-END-

[103] Id.
[104] Id.
[105] Id.
[106] http://www.ibc.ca/en/Home_Insurance/Home_Insurance_Explained/Extra_Protection.asp.
[107] "Digging Deep: Fracking Litigation Trends", by John F. Mullen, Kim Hollaender, January 27, 2012, http://www.propertycasualty360.com/2012/01/27/digging-deep-fracking-litigation-trends.
[108] Id.
[109] Id.
[110] Id.
[111] Id.