



## MASTER OF PUBLIC POLICY CAPSTONE PROJECT

Compliance, Not Enforcement:

A Comparative Evaluation of Best Practice Regulation For Hydraulic Fracturing

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# THE SCHOOL OF PUBLIC POLICY

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## **Capstone Executive Summary**

The following study seeks to define and identify regulatory excellence for hydraulic fracturing with a focus on issues of compliance and enforcement. The inspiration for this investigation developed as a result of intense criticism and scrutiny of oil and gas regulators and their enforcement practices, both in Alberta, and throughout North America. These critiques have appeared predominantly in news media, as well as independent studies produced by think tanks and environmental advocacy organizations. The overwhelming consensus is that regulatory compliance, and any subsequent enforcement, is critically low. Regulatory agencies, it is said, are therefore failing in their mandates to adequately protect the environment and the public from hydraulic fracturing's numerous associated environmental and human health risks. I wanted to find out for myself, through a critical, comprehensive evaluation, to what extent these allegations might be true. My findings reveal that while they certainly contain some merit, and do offer some worthwhile contributions on how compliance and enforcement may be improved, the overall analyses are constrained through an inadequate understanding of the intricacies of modern environmental regulation.

I begin my study by outlining the numerous informational gaps and inherent controversies associated with the hydraulic fracturing debate, as well as providing both an environmental and an economic justification for strong regulatory oversight, including enforcement. By incorporating the University of Pennsylvania Law School's recent Best In Class Regulator Initiative, I establish a comprehensive framework for assessing regulatory excellence. This framework includes key areas such as a regulator's level of general expertise and its organizational structure, as well as notions of transparency, approaches to risk management, and the degree to which it promotes flexibility and adaptability to changing circumstances.

Finally, I apply this framework within the context of a comparative evaluation of the regulatory frameworks in four jurisdictions – Alberta, British Columbia, Texas, and Oklahoma. Through this process, I conclude, as above, that although compliance and enforcement rates may need to improve, the existing regulations governing hydraulic fracturing are in general comprehensive and well managed. It must be further understood that effective enforcement is a proactive rather than reactive process. To this extent, I evaluate how other regulatory tools such as education, energy literacy initiatives, and a cooperative, rather than a confrontational approach to compliance will better balance the needs of industry and the public – both in an environmental and economic sense.

## **1.0 - Introduction**

Hydraulic fracturing – the process of injecting pressurized fluids into a well to stimulate the release of trapped hydrocarbons – has been in use by the oil and gas industry since the late 1940s. However, it was the fusion of horizontal drilling technology with traditional fracturing processes in the 1990s that enabled a revolution in the production of oil and gas from previously inaccessible resource plays. This has dramatically improved the supply of oil and gas in many jurisdictions, resulting in substantial economic growth. In the wake of the recent massive decline in world oil prices, the ongoing profitability of hydraulic fracturing operations is no longer assured. Meanwhile, considerable controversy has emerged over fracking’s use, regulation, and enforcement due to a range of significant environmental impacts. These include, but are not limited to, water contamination, water usage, disposal, and recycling, air pollution, greenhouse gas emissions, and induced seismicity. In attempting to balance the economic benefits against the environmental challenges, governments and industry have implemented rigorous regulatory frameworks.

The central focus of this study addresses the question of best practice regulation (including enforcement) that minimizes fracking’s adverse environmental effects, without compromising the economic benefits. A range of other important considerations will help guide this discussion, including whether or not fracking can be properly regulated, the unintentionally divisive role of science in developing adequate regulation, and how the answers to these questions may or may not justify its continuation. These issues will be addressed through a comparative evaluation of the relative strengths and weaknesses of the regulatory frameworks in selected leading jurisdictions in both Canada and the U.S., including Alberta, British Columbia, Texas, and Oklahoma. Methodologies will encompass both qualitative and quantitative



approaches, including in depth regulatory comparisons, as well as statistical data measuring activity rates against enforcement actions, performance vs. outcomes, and the responsiveness of these systems based on changing circumstances. Though works dedicated strictly to questions of compliance and enforcement are limited, particularly in the Canadian context, this is not expected to hinder the overall analysis.

The principal argument presented in this project is that regulation without enforcement is without purpose, imposing significant social and economic costs. Regulation and enforcement must therefore be seen as mutually inclusive. However, proper perspective on how and when to resort to enforcement – as opposed to other compliance strategies – is also key. As my research demonstrates, determining what constitutes an appropriate level of enforcement is about so much more than numbers – it is about regulators adopting a compliance first mindset, ensuring effective regulatory outcomes. Effective regulation and enforcement of hydraulic fracturing preserves the things we all care about – continued economic growth and prosperity, energy security, human health, and environmental sustainability.

### **1.1 - Why Hydraulic Fracturing Needs Strong Regulation & Enforcement**

In this section, I establish the basis for strong regulation coupled with effective monitoring and enforcement. This will be done through an evaluation of current competing approaches to managing instances of environmental externalities, namely property rights regimes versus regulation. Here, I will argue that, in spite of the numerous successes of property rights regimes in the environmental realm, traditional regulation and enforcement better address the issues pertaining to hydraulic fracturing.

The notion of externalities in economics may be simply understood as the unintended consequences that result from the undertaking of various human enterprises and activities. Pollution, and the other environmental impacts often associated with industry, are the most commonly cited examples. Arising from conflicts around the use and enjoyment of both privately and publicly owned property, externalities are further described as instances of market failure. This rationale, in turn, is used to justify government intervention in the market to remedy or minimize the impact of the externality in question. Such interventions generally take the form of regulations and legislation. However, as noted by Jonathan H. Adler, proponents of what is known as free market environmentalism maintain that, rather than market failure, “the problem is a lack of markets and, in particular, a lack of enforceable and exchangeable property rights.”<sup>1</sup> Adler further observes that there is a growing body of evidence to suggest that strong property rights, and their enforcement, particularly in the realm of natural resource management, effectively “alleviates disputes, as well as the problem of overuse... in a manner consistent with individual preferences for a clean and healthy environment.”<sup>2</sup>

Despite the claims of free market environmentalists, Adler contends the evidence of the success of property rights approaches to controlling pollution is far less apparent. The primary reasons for this are the various shortcomings of common law mechanisms such as torts and nuisance in adequately resolving pollution and instances of environmental degradation. Adler notes that courts have largely abandoned granting injunctive relief to private landowners in favour of awarding monetary damages. This, he claims “...has greatly diminished the potential effectiveness of common-law actions. Indeed, allowing a firm to pollute the property of others so

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<sup>1</sup> Jonathan H. Adler. “Is The Common Law A Free Market Solution To Pollution?” Case Research Paper Series in *Legal Studies*, March 2012, 61.

<sup>2</sup> Ibid.

long as damages are paid is to award industrial firms a de facto power of eminent domain over affected properties.”<sup>3</sup>

There are other challenges as well. In referencing the work of Schroeder and Brunet, Adler observes:

“Common-law actions are a particularly poor fit for many contemporary pollution problems because the pollution may come from numerous sources, may affect numerous property owners, and may be difficult to detect... It may be difficult or costly to organize a response when numerous rights holders are affected by a single firm’s polluting behavior. If the harm is spread across a wide area and affects many property owners, no individual owner may have suffered harm sufficient to justify bearing the costs of organizing her neighbors.”<sup>4</sup>

The immense scale of hydraulic fracturing operations, along with wide ranging and potentially intense environmental concerns, places it squarely in the category of affecting numerous stakeholders and being difficult to detect. Jessica Ernst’s lawsuit against EnCana, in which she alleged the company’s fracking operations were responsible for the contamination of her water well, is one example. To date, the allegations have not been proven, and the case is now headed to the Supreme Court.<sup>5</sup> To the extent that conclusively identifying the source of contamination has proven elusive, Ernst’s story highlights one of the primary failures of property rights regimes and their enforcement through the common law. By contrast, Adler notes that the use of regulation to preserve the environment has often proven more effective than common law approaches. He writes, “Many officials have supported administrative regulation out of a sincere belief that such measures are necessary for environmental protection, and that common-law rules alone were insufficient to achieve this goal. Moreover, this approach appears to have had

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<sup>3</sup> Ibid., 66

<sup>4</sup> Ibid., 67

<sup>5</sup> Andrew Nikiforuk. “Landmark Fracking Case Gets a Supreme Court Hearing.” *The Tyee*, April 30, 2015. Online: <http://thetyee.ca/News/2015/04/30/Ernst-Heads-to-Supreme-Court/> Accessed September 11, 2015.

positive results. Many measures of environmental quality have improved significantly since the onset of modern environmental regulation.”<sup>6</sup>

## **2.0 Informational Gaps – The Environmental Story**

The Fraser Institute’s Kenneth P. Green recently argued that the environmental risks associated with hydraulic fracturing are both “modest and manageable.”<sup>7</sup> This section investigates the validity of this assertion by outlining the deep divisions that characterize the science on fracking. Here, I maintain that Green’s position is premature. Oddly, he acknowledges the existing informational disparities (i.e., Greenpeace and Council of Canadians against the Canadian Council of Academies (CCA) and others) while incorporating a number of additional studies that support his ultimate conclusion. Instead, I suggest that although the risks are far from being clear, continued hydraulic fracturing activities may be justified on the basis of progress and wealth creation, so long as they are accompanied by a robust regulatory regime. To this end, Green states, “Those who would pursue bans and moratoria are simply deferring risk, while also foregoing experience and knowledge.”<sup>8</sup> Contrary to Green’s contention, it is not necessary, or even possible at this juncture, to suggest the risks are modest, but they may be manageable. The position of my study is that strong, adaptable regulation, supported by ongoing scientific evaluation, innovation, and research, as well as transparent monitoring and enforcement, is sufficient to mitigate even high level risk and/or uncertainty, and is justified on the basis of supporting existing energy infrastructures and the associated economic benefits.

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<sup>6</sup> Ibid., 66

<sup>7</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing”. *The Fraser Institute*, December 2014. Online: <http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/managing-the-risks-of-hydraulic-fracturing.pdf> Accessed September 10, 2015, 5.

<sup>8</sup> Ibid., 30.

As the introduction to this section indicates, one of the foremost challenges in developing an adequate regulatory framework for hydraulic fracturing is the inconclusiveness and uncertainty that characterizes much of the existing science. The informational disparities referenced above, at times appearing to be motivated by political and economic partisanship, serve only to stifle meaningful debate. In other instances, a particular study's findings may be constrained by insufficient analytical tools and methods, or a lack of available baseline data. The following examples demonstrate just how polarized the debates around fracking's environmental impacts have become, as well as the importance of a strong regulatory regime that promotes compliance, and when necessary, enforcement.

To begin, in an independently produced 2014 report, David Wheeler observes, "A number of the potential long-term and cumulative public health impacts of hydraulic fracturing and its associated activities and technologies are simply unknown at the present time... there is currently no evidence of catastrophic threats to public health in the short-to-medium term."<sup>9</sup> This is in stark contrast to the findings of a 2014 New York State Health Department (NYSHD) report that suggests a strong correlation between proximity to well sites and various adverse effects on human health, including respiratory problems, and even congenital birth defects.<sup>10</sup>

Alleged methane contamination of aquifers and water wells as a result of fracking is another contentious and frequently cited concern. Films like *Gasland* or the *Ernst v EnCana* lawsuit in Alberta promote the view that water contamination as a result of fracking activities is a

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<sup>9</sup> David Wheeler et al. (2014). *Report of the Nova Scotia Independent Review Panel on Hydraulic Fracturing*. Online: <http://energy.novascotia.ca/sites/default/files/Report%20of%20the%20Nova%20Scotia%20Independent%20Panel%20on%20Hydraulic%20Fracturing.pdf> Accessed March 14, 2015.

<sup>10</sup> New York State Health Department. *A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development*. Online: [http://www.health.ny.gov/press/reports/docs/high\\_volume\\_hydraulic\\_fracturing.pdf](http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf) Accessed February 28, 2015.

problem of epic proportions. Conversely, writers such as Ezra Levant cite the Environmental Protection Agency's (EPA) 2012 findings of "no proven cases of fracking related groundwater contamination"<sup>11</sup> to dismiss the validity of groundwater concerns. Levant continues by outlining the studies of various state regulators, as well as a 2011 Ground Water Protection Council (GWPC) report that came to similar conclusions. An earlier 2013 publication by Green echoed these sentiments:

"While some claim that fracking poses a risk to groundwater, or that reinjection of waste water from the process might increase the risk of seismic activity, experience suggests those risks are very low... fracking has limited, but eminently manageable risks."<sup>12</sup>

Finally, the Canadian Council of Academies (CCA) has stated, "The risks due to surface activities will likely be minimal if proper precautionary management practices are followed."<sup>13</sup>

For every study that appears to discredit or diminish the environmental impacts, there are others offering contradictory data and findings. In some cases, these contradictions are often contained within the same studies. For example, in contrast to the CCA's own contention (cited above) that the risks to groundwater are minimal if proper procedures are carried out, the same report states, "The literature on groundwater impacts has grown markedly in the past three years, though the data are generally limited and commonly do not support definitive conclusions."<sup>14</sup>

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<sup>11</sup> Ezra Levant. *Groundswell: The Case For Fracking*. McClelland & Stewart, 2014, 65.

<sup>12</sup> Kenneth P. Green & Mark Milke. "Rescue Canada's Poorest Provincial Economies: Allow Fracking." *Fraser Institute*, October 25, 2013. Online: <https://www.fraserinstitute.org/research-news/news/display.aspx?id=20521> Accessed December 3, 2014.

<sup>13</sup> Canadian Council of Academies [CCA] (2014). *Environmental Impacts of Shale Gas Extraction in Canada: The Expert Panel on Harnessing Science and Technology to Understand the Environmental Impacts of Shale Gas Extraction*. Canadian Council of Academies. Online: [http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/shale%20gas/shalegas\\_fullreporten.pdf](http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/shale%20gas/shalegas_fullreporten.pdf) Accessed September 10, 2015.

<sup>14</sup> *Ibid.*

The obvious question is then how it can reasonably be suggested that groundwater risks are minimal (or severe) in the face of limited and inconclusive data?

One of the more daunting challenges in determining the source of groundwater contamination rests upon the question of whether or not the presence of methane can be blamed on fracking or the result of natural migration. Although there are an insufficient number of baseline studies, there is some evidence that fracking has at least contributed to increased methane concentrations in some jurisdictions. For example, a recent report issued by the Texas Railroad Commission (TRC) admits that the amount of methane gas contaminating local water supplies has risen when compared with detected levels in 2010 and 2011. Despite the close proximity of hydraulic fracking to the water wells in question, the TRC maintained, “The evidence is insufficient to conclude that Barnett Shale production activities have caused or contributed to methane contamination.”<sup>15</sup>

Concerns around air pollution and seismic activity fare no better in terms of inconsistent data and controversy. Separate studies, one conducted by Environmental Defence President Fred Krupp and a 2013 Harvard study<sup>16</sup>, found that methane emissions from US wells were anywhere from 50 per cent to two times higher than estimates conducted by the Environmental Protection Agency (EPA) in 2012.<sup>17</sup> On this front, Green argues that regardless of the overall level of emissions, the key consideration in establishing risk is exposure. He writes, “Emissions that do

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<sup>15</sup> Ramit Plushnick-Masti and Emily Small, “Texas: Can't Tie Water Contamination to Drilling,” *The Big Story*, May 28, 2014. Online: <http://bigstory.ap.org/article/texas-cant-tie-water-contamination-drilling> Accessed September 10, 2015.

<sup>16</sup> Scott M. Miller et al. *Anthropogenic Emissions of Methane in The United States*. Proceedings of The National Academy of Sciences of The United States of America (PNAS). Edited by Mark H. Thieme, University of California, San Diego, La Jolla, CA, and approved October 18, 2013. Online: <http://www.pnas.org/content/110/50/20018.full> Accessed September 13, 2015.

<sup>17</sup> Fred Krupp. “Don’t Just Drill Baby – Drill Carefully,” *HeinOnline*, 93 *Foreign Affairs*, May/June 2014, 18.

not reach a vulnerable population do not turn into exposures, and those non-exposures do not turn into risks. What matters is whether or not hydraulic fracturing processes are producing enough additional emissions to pose additional risk to susceptible populations and ecosystems.”<sup>18</sup> However, there are a number of documented cases where individuals living within close proximity to fracking sites have reported experiencing adverse health consequences. The NYSHD report referenced earlier is but one example. Another involves Cochrane ranchers who claim that since the commencement of fracking operations near their land, they have suffered hair loss, and abnormally high losses of livestock.<sup>19</sup> Furthermore, beyond the potential for emissions to impact human health are concerns around climate change. Krupp observes, “During its first 20 years in the atmosphere, methane is 84 times more potent a greenhouse gas than is carbon dioxide.”<sup>20</sup> While Green does deal with this, noting that there are questions as to “Whether shale gas development will actually reduce GHG emissions and slow climate change”<sup>21</sup>, he further observes, “Experts disagree about these matters.”<sup>22</sup>

Finally, on the apparent correlation between seismic events and hydraulic fracturing, there is stronger consensus. As Green notes, the CCA and the National Research Council of the National Academies both agree that the risk of seismic activity as a result from fracking is generally quite low, although the injection for disposal of wastewater may be more problematic than fracking itself. In such cases, potential problems may be minimized through “careful site

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<sup>18</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing.” *The Fraser Institute*, December 2014, 15.

<sup>19</sup> Andrew Nikiforuk. “Home, Fracked Home: Lost Hair and Dead Cows.” *The Tyee*, October 21, 2013. Online: <http://thetyee.ca/News/2013/10/21/Fracking-at-Home/> Accessed September 10, 2015.

<sup>20</sup> Fred Krupp. “Don’t Just Drill Baby – Drill Carefully.” *HeinOnline*, 93 *Foreign Affairs*, May/June 2014, 17.

<sup>21</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing.” *The Fraser Institute*, December 2014, 17.

<sup>22</sup> *Ibid.*



selection, monitoring, and management.”<sup>23</sup> Nonetheless, the recent 4.4 magnitude earthquake in Fox Creek, Alberta casts some doubt on these findings. University researchers, and the Alberta Energy Regulator (AER), citing the specific types and patterns of aftershocks, contend that fracking was likely the cause of the earthquake.<sup>24</sup>

The foregoing discussion is not, nor is it intended to be, a comprehensive summary of the risks posed by hydraulic fracturing. The purpose of these examples is not to adjudicate which are valid and which are not. Rather they serve, through their contradictions and uncertainty to provide a basis for strong regulation and enforcement. With time and experience, clearer information, and hence improved regulatory responses, will surely emerge. Some may, and have argued, that this uncertainty requires either banning or suspending all fracking activity until the necessary knowledge becomes available. In Canada and the United States, fracking has been temporarily banned in several jurisdictions, including Quebec, Labrador, Newfoundland, Nova Scotia, New Brunswick, New York, and Vermont, as well as a handful of Colorado municipalities. Activist groups like Food & Water Watch claim fracking to be “so dangerous... it cannot be regulated.”<sup>25</sup> Although I believe such positions to be unnecessarily reactive, the CCA’s stated position pertaining to “proper management practices” does reveal one of the central concerns of this study in the areas of compliance and enforcement. Despite the efforts of regulators, industry, and government, doubts linger in terms of the public’s perception as to the degree to which industry operators comply with established best practices and regulations. Of

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<sup>23</sup> Ibid., 19

<sup>24</sup> CBC News. “Fracking Likely Linked to 4.4 Magnitude Quake in Fox Creek: Alberta’s Energy Regulator Fingers Hydraulic Fracturing As Likely Cause of Earthquake.” *Canadian Broadcasting Corporation*. Online: <http://www.cbc.ca/news/canada/edmonton/fracking-likely-linked-to-4-4-magnitude-quake-in-fox-creek-1.2938900> Accessed September 10, 2015.

<sup>25</sup> Food & Water Watch. *The Urgent Case For A Ban On Fracking*, February 2015. Online: [http://documents.foodandwaterwatch.org/doc/urgent\\_case\\_for\\_ban\\_on\\_fracking.pdf](http://documents.foodandwaterwatch.org/doc/urgent_case_for_ban_on_fracking.pdf) Accessed September 10, 2015, 3.

further concern is how adequately regulators enforce these requirements. A number of independent studies, which will be examined thoroughly in later sections, contend the situation has reached a crisis point. As with the divergences on fracking's risks, politicians and industry tend to paint a much more flattering view. Again, I do not engage in an assessment of the relative validity and credibility of these claims. Rather than being satisfied that the risks are modest and manageable, I propose that there are opportunities to promote increased compliance and enforcement, and best practices must be reviewed on an ongoing basis. Initiatives to increase energy literacy and the public's understanding of how to properly interpret enforcement data are also of significant importance.<sup>26</sup> It is precisely because of the uncertainties surrounding fracking's risks that strong regulation, supported by effective enforcement are required to justify the continued development of unconventional resource plays. Among even the best regulators, there is always room for improvement. The CCA for example, has concluded, "There isn't enough information to declare the process safe...", and that provincial regulatory systems "...are not based on strong science and remain untested."<sup>27</sup>

Section 2.1 examines the current economic outlook for hydraulic fracturing in light of the sudden and steep decline in world oil prices, while also establishing the importance of strong regulation and enforcement in preserving the economic benefits that flow from hydraulic fracturing.

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<sup>26</sup> Low levels of enforcement do not necessarily entail a crisis of enforcement. This notion will be examined in greater detail in future sections.

<sup>27</sup> Council of Canadian Academies. *Technological Prospects for Reducing the Environmental Footprint of Canadian Oil Sands*, May 2015. Online: <http://www.scienceadvice.ca/en/assessments/completed/oil-sands.aspx> Accessed September 10, 2015.

## **2.1 - Fracking Economics – Justifying The Risks**

Another central part of the debate regarding fracking and its regulation are the generally well-established economic benefits it entails. For example, in North Dakota, home to the Bakken shale play, unemployment sits at 2.8 per cent, more than four points below the national average.<sup>28</sup> In terms of production, Edward L. Morse observes that fracking has resulted in a 25 per cent increase in natural gas production since 2010, along with a 60 per cent increase in oil production since 2008.<sup>29</sup>

Domestically, there exists a positive correlation between low unemployment, revenue, and strong support for unconventional oil and gas development. As the graph on the following page demonstrates, in both Alberta and Saskatchewan, resource revenues account for more than 20 per cent of total provincial government revenues in these provinces, while in New Brunswick and Nova Scotia, where fracking practices are presently banned, this number sits at less than 2 per cent.<sup>30</sup>

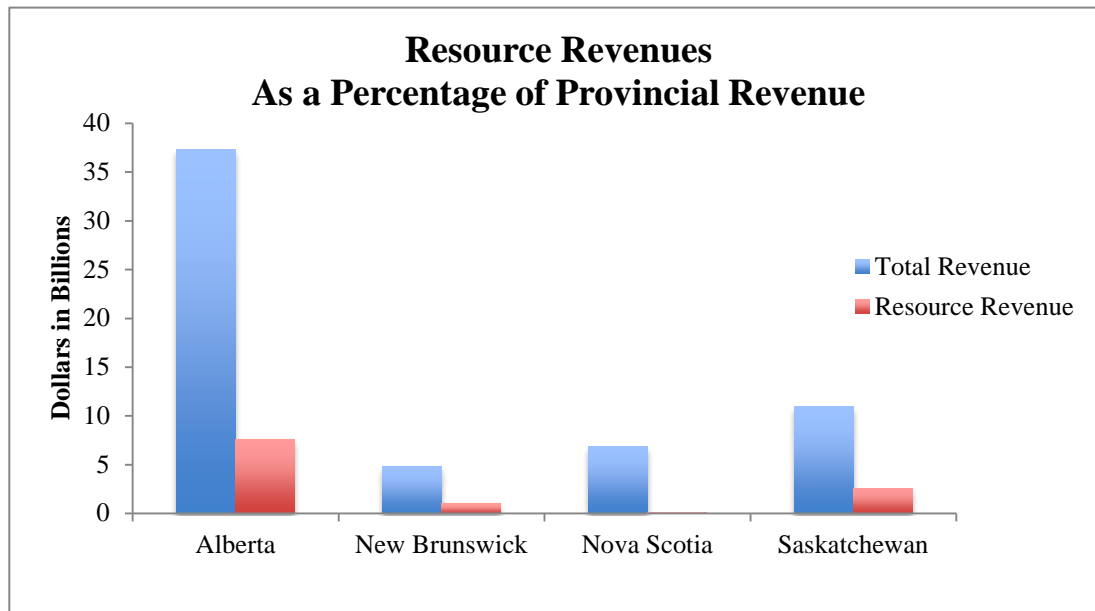
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<sup>28</sup> JC Reindl, “Fracking boom has been a jobs boon for North Dakota,” The Detroit Free Press, October 12, 2014. <http://www.freep.com/story/money/business/michigan/2014/10/12/north-dakota-energy-boom-michigan-jobs/17044837/> Accessed December 3, 2014.

<sup>29</sup> Edward L. Morse, “Welcome to The Revolution: Why Shale is The Next Shale,” HeinOnline, 93 *Foreign Affairs* May/June 2014. Accessed October 26, 2014, 3.

<sup>30</sup> Kenneth P. Green & Mark Milke, “Rescue Canada’s Poorest Provincial Economies: Allow Fracking,” *Fraser Institute*, October 25, 2013. Accessed December 3, 2014.

Figure 1 – Provincial Resource Revenue Comparison



Source: Green & Milke, 2013<sup>31</sup>

The economic benefits of fracking are apparent in global markets as well. Morse notes that US gas production has already surpassed Russia, and is poised to become “one of the world’s largest gas exporters, fundamentally changing pricing and trade patterns in global energy markets.”<sup>32</sup>

In Canada, Green’s report outlines a recent study by the US Energy Information Administration (EIA) that estimates Canada’s technically recoverable shale gas resources at 573 trillion cubic feet (TCF), as well as 8.8 billion barrels of shale oil. Based on an average mid-range price estimate of \$3.57 for natural gas in North America, Canada’s unconventional gas resources have a global market value ranging from \$2.5- \$4.6 trillion.<sup>33</sup>

<sup>31</sup> Ibid.

<sup>32</sup> Edward L. Morse. “Welcome to The Revolution: Why Shale is The Next Shale,” HeinOnline, 93 *Foreign Affairs* May/June 2014. Accessed October 26, 2014, 3.

<sup>33</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing.” *The Fraser Institute*, December 2014, 1.

Green further notes that the Montney Formation that resides in the Western Canadian Sedimentary Basin is among the world's most lucrative unconventional resource plays. A joint assessment conducted by the National Energy Board (NEB), the British Columbia Oil and Gas Commission (BCOG), the Alberta Energy Regulator (AER), and the British Columbia Ministry of Natural Gas Development maintains that the Montney contains "12,719 billion m<sup>3</sup> (449 TCF) of marketable natural gas, 2,308 million m<sup>3</sup> (14,521 million barrels) of marketable [natural gas liquids (NGLs)], and 179 million m<sup>3</sup> (1,125 million barrels) of marketable oil."<sup>34</sup>

Substantial development opportunities are present in eastern Canada as well. Quebec, for example, according to Natural Resources Canada has shale gas reserves ranging between 18 and 40 trillion cubic feet at an estimated market value of \$70-140 billion based on 2012 natural gas prices.<sup>35</sup>

Despite the strength of these figures, three factors may constrain both the short and long term economic viability of fracking. The first of these is the recent downswing in world oil prices. The second pertains to increasing uncertainty regarding global demand for fossil fuels, as climate change concerns continue the transition to an alternative energy future. The third, and perhaps most important factor in the short to medium term is the notion of social acceptability.

Beginning with the impact of declining world oil prices, many observers have sounded the alarm that the shale revolution may well be over. According to the Financial Post's Geoffrey Morgan, a recent IHS Energy report warns of radical declines in production growth, and substantial challenges for companies to raise sufficient capital to ensure continued drilling in

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<sup>34</sup> Ibid., 7

<sup>35</sup> Ibid., 8

unconventional plays.<sup>36</sup> IHS Energy vice president Jim Burkhard states, “The U.S. growth story has been central to the oil market story. In a few months, that month-to-month growth is going to flatten out.”<sup>37</sup> The report predicts, “Growth will level off at 9.5 million barrels per day in the second quarter of 2015, assuming the benchmark West Texas Intermediate (WTI) prices remain below US\$60.”<sup>38</sup> Further complicating the issue is that even a recovery in world oil prices may not be enough to improve the availability of capital for shale producers. This is because, according to the IHS report, “From 2009 to 2013, U.S. upstream spending exceeded cash flow by an average of US\$54 billion annually — amounting to more than a quarter of a trillion dollars.”<sup>39</sup>

Additional evidence of the current economic malaise is readily apparent. Jim Emberger, spokesperson for the New Brunswick Anti-Shale Gas Alliance claims, “The industry has not profited from the actual sale of gas since 2009.”<sup>40</sup> In backing this statement, Emberger cites the EIA to note, “Industry costs exceed the cash coming in from fracking operations by billions of dollars. Expenses and dividends are met by borrowing and from the sale of company assets, including the flipping of quickly depleted wells to clueless (usually foreign) buyers.”<sup>41</sup> These problems are further exacerbated by the fact that the majority of shale wells are depleted within three years.<sup>42</sup>

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<sup>36</sup> Geoffrey Morgan. “How Falling Oil Prices Will Bring U.S. Shale Output Back to Earth This Year.” *Financial Post*, February 4, 2015. Online: [http://business.financialpost.com/news/energy/how-falling-oil-prices-will-bring-u-s-shale-output-back-to-earth-this-year?\\_lsa=ffb8-ad57](http://business.financialpost.com/news/energy/how-falling-oil-prices-will-bring-u-s-shale-output-back-to-earth-this-year?_lsa=ffb8-ad57) Accessed September 10, 2015.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

<sup>40</sup> Joyce Nelson. “Why Provinces and First Nations Are Wise to Put A Hold on Unconventional Gas.” *Canadian Centre for Policy Alternatives*, November 1, 2014. Online: <https://www.policyalternatives.ca/publications/monitor/why-provinces-and-first-nations-are-wise-put-hold-unconventional-gas> Accessed September 10, 2015.

<sup>41</sup> Ibid.

<sup>42</sup> Ibid.

Another potentially serious blow is the uncertainty pertaining to the long term global demand for fossil fuels, as the calls to transition to cleaner and renewable energy alternatives intensify. In fact, some industry observers have suggested that Canada is poorly positioned to respond to this emerging new world order, and is perpetually stuck in what may quickly be becoming energy industry obsolescence. For example, the International Energy Agency (IEA) recently reported that wind and solar generated electricity has become significantly cheaper over the last five years, stating, “These technologies are no longer cost outliers.”<sup>43</sup>

The third and final consideration pertains to the role of social acceptability and its importance for current and future fracking projects. Yates & Horvath define social acceptability as: “A local community’s acceptance or approval of a company’s project or ongoing presence in an area. It is increasingly recognized by various stakeholders and communities as a prerequisite to development.”<sup>44</sup> This has obvious negative implications and impacts for the economic well-being of the industry and the economy as a whole in the form of cancelled exploration and development projects, lost revenues, and decreased job creation. One prominent Alberta example of the negative impacts associated with a lack of social acceptability resulted in Goldenkey Oil’s

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<sup>43</sup> International Energy Agency (IEA), 2015. *Projected Costs of Generating Electricity*. Online: <https://www.oecd-neo.org/ndd/pubs/2015/7056-proj-costs-electricity-2015-es.pdf> Accessed September 10, 2015, 8.

<sup>44</sup> Brian F. Yates & Celesa L. Horvath. “Social License to Operate: How to Get It, and How to Keep It.” *Pacific Energy Summit*, 2013 Summit Working Papers. Online: [http://www.nbr.org/downloads/pdfs/eta/PES\\_2013\\_summitpaper\\_Yates\\_Horvath.pdf](http://www.nbr.org/downloads/pdfs/eta/PES_2013_summitpaper_Yates_Horvath.pdf) Accessed September 10, 2015.

decision to withdraw their application for three exploratory wells in West Lethbridge due to intense local opposition.<sup>45</sup>

Informational disparities and their mismanagement, as discussed in section 2.0, have been the primary contributor to diminished levels of social acceptability. The average citizen cannot possibly be expected to allot the time or have the means available to them to come to an ‘informed position’, or to determine the accuracy of information. The onus is therefore on industry, government, and regulators, to manage the informational issues in ways that improve public knowledge and increase confidence. Fred Krupp writes:

“The industry cannot spin the facts to gain public acceptance or brush aside the harmful local impacts of drilling. Nor can it ignore the prospect that leaks and other releases of natural gas, which is composed primarily of methane... could accelerate climate change. Despite the economic benefits of shale gas, the environmental risks have dragged public opinion of it to an all-time low.”<sup>46</sup>

It is my contention that strong regulation, in conjunction with a proactive approach to compliance and enforcement are capable of overcoming this opposition. Of course, in many jurisdictions, including the ones to be addressed in this study, comprehensive regulations are already in place. However, as the above quote from Krupp indicates, many question whether the level of transparency and responsiveness, both in terms of the available information, and enforcement, is where it ought and needs to be. Differing perspectives in this will be developed in later sections.

In Canada, the issue of social acceptability as it pertains to aboriginal communities presents a unique set of challenges. As Green’s report identifies, aboriginal groups across the

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<sup>45</sup> No Drilling Lethbridge, 2013. Online: <http://nodrillinglethbridge.ca/news/media-release-goldenkey-oil-withdrawal-drilling-lethbridge> Accessed September 10, 2015.

<sup>46</sup> Fred Krupp. “Don’t Just Drill Baby – Drill Carefully,” *HeinOnline*, 93 *Foreign Affairs*, May/June 2014, 16-17.



country are blocking hydraulic fracturing projects en masse.<sup>47</sup> Although there may well be cultural parameters and components to aboriginal opposition that no amount of regulation will ever overcome, there are once again significant indications that strong regulation may well allow at least some of the proposed projects to proceed. Examples of some of the demands made by aboriginal groups include “...full regional baseline studies... and moratoriums on hydraulic fracturing pending further research and the emplacement of regulatory requirements and safeguards.”<sup>48</sup> These are objectives that are achievable given the political will, and that will certainly assist in improving the social acceptability of unconventional oil and gas development across all demographics, including the aboriginal community.

Despite the looming economic uncertainty, and the challenges pertaining to social acceptability, improved regulation and enforcement must play an integral role for the future.

### **3.0 Regulatory Comparisons by Jurisdiction**

Having established the environmental, social, and economic basis for strong regulation and enforcement of hydraulic fracturing, I now turn to an in depth comparison of the regulatory standards for each of the four jurisdictions that are the focus of this study. This data has been taken from the websites of the regulatory bodies in question, and, where necessary, relevant statutes and legislation. A comprehensive overview of the regulations governing hydraulic fracturing in these jurisdictions is provided in Appendix tables A.1-A.8.

The data indicates, at minimum, that the rules governing hydraulic fracturing activities are extensive at both federal and provincial levels. In virtually all jurisdictions, there is room for

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<sup>47</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing.” The Fraser Institute, December 2014, 4.

<sup>48</sup> Ibid.

improvement in areas such as the recycling of wastewater, and establishing mandatory baseline testing protocols for water wells and aquifers. Such measures would represent a crucial next step in the protection and conservation of water sources that may be impacted by fracking, while also increasing transparency and public confidence. The various self-regulation initiatives (i.e. CAPP) in this area are worth noting, but formalizing them in mandatory regulation is an important step in mitigating fracking's water impacts. In the area of seismic monitoring, British Columbia has emerged as a leader on induced seismicity, while Alberta has the most extensive microseismic monitoring with 40 stations. Both Texas, and Oklahoma in particular, have their own set of extensive regulations to mitigate and minimize fracking related seismic incidences.

In addition, expanding the number of baseline studies for is a key factor in conclusively determining whether or not fracking may be implicated in the contamination of groundwater. To date, any 'widespread' connection between fracking and groundwater contamination has not been conclusively established. Despite this, a new EPA report implicates the technology in cases ranging from Alberta to Pennsylvania.<sup>49</sup> As part of ongoing and expanding efforts to better understand and minimize the potential risks, the AER currently requires baseline water well testing for coalbed methane wells. While the other jurisdictions do not currently have any formal measures in place, steps are being taken. This is another critical area for improvement.

#### **4.0 - The Challenge of Enforcement**

Regulation of the oil and gas industry, and by proxy hydraulic fracturing, is focused on achieving the best possible outcomes, both from an environmental and economic perspective.

Positive outcomes require not only properly designed and implemented regulation, but also high

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<sup>49</sup> Andrew Nikiforuk. "US Federal Report Confirms Water Pollution by Fracking." *The Tyee*, June 8, 2015. Online: <http://thetyee.ca/News/2015/06/08/Water-Pollution-Fracking/> Accessed September 10, 2015.

levels of compliance, and when necessary, effective enforcement. In contrast to the various critiques addressed in this study, I maintain the challenge facing regulators is not necessarily low levels of enforcement, but rather implementing a proactive regulatory framework that promotes compliance. Many regulators (including those I assess in this work) have already adopted this mentality. In providing a comparative assessment of the selected jurisdictions based upon comprehensiveness of regulation, as well as effective and sufficient levels of compliance and enforcement, I illustrate to what degree each regulator embodies questions of transparency, accountability, and fairness.

This will be done through an investigation of each of the regulatory frameworks, and how well each permits efficient and effective compliance and enforcement. Data from each regulator will be considered, as will the appropriateness of enforcement measures to achieve the desired outcomes. I will also be looking at a minimum of two independent studies, as well as references to enforcement in news media. It should be noted that the existence of independent studies that focus solely on the enforcement of hydraulic fracturing activities has proven extremely elusive. Therefore, the bulk of information presented reflects current findings regarding the enforcement of the oil and gas industry as a whole. This should not be viewed as particularly problematic. Although hydraulic fracturing does pose a unique set of environmental challenges, there is no reason to assume that the regulatory approaches, in terms of frequency of inspections, audits, or enforcement actions, differ in any significant manner from one sector of the industry to another.

In addition, although the data presented in independent studies and the media may suggest a crisis of regulatory enforcement for the oil and gas industry, and by extension hydraulic fracturing, this is not my contention. By comparison, the regulatory bodies themselves

maintain adequate levels of enforcement coupled with low violation rates. The informational disparities on the issue of enforcement indicate there may well be room for improvement in both the frequency and transparency of enforcement actions. However, as I will argue in later sections, any suggestion that regulators are failing to achieve compliance because enforcement rates are low fails to acknowledge that low enforcement rates may in fact be indicative of a highly successful regulatory regime. This is because effective regulation is comprised of more than just enforcement; it includes education and awareness initiatives, stakeholder engagement, self-disclosure mechanisms, and incentives to achieve compliance. By contrast, high enforcement levels, rather than indicating an active and effective regulator, may in fact reveal low compliance and regulatory gaps. Successful regulatory outcomes must be first measured in terms of compliance, not enforcement. In any case, whether there is a need for increased enforcement, improved stakeholder engagement, or other regulatory mechanisms, implementing such changes will ensure fracking's risks are being given more than regulatory lip service, and enhance public perception. I turn now to an overview of how regulatory excellence may be defined and achieved.

### **5.0 - Defining & Assessing Regulatory Excellence**

The purpose of this section is twofold. First, it addresses the central question of how to define and assess regulatory excellence. Second, it provides a basis upon which an evaluation of the four jurisdictions examined in this study may proceed. In a series of discussion papers presented by the University of Pennsylvania Law School's 'Best In Class Regulator Initiative'<sup>50</sup>, a comprehensive set of best in class regulatory attributes and assessment criteria are presented.

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<sup>50</sup> University of Pennsylvania Law School. *Best-In-Class Regulator Initiative: Penn Program On Regulation*. March, 2015. Online: <https://www.law.upenn.edu/institutes/ppr/bestinclassregulator/the-initiative.php> Accessed September 12, 2015.

The following sections will attempt to summarize the program’s primary findings and conclusions.

I begin with an overview of Cary Coglianese’s “Defining and Assessing Regulatory Excellence.” Coglianese first identifies three attributes of excellence, including characteristics, actions, and outcomes. Characteristics, he says, may include adjectives such as “...knowledgeable, well-funded, adequately staffed, credible, honest, and legitimate.”<sup>51</sup> Actions, which may also be thought of as a particular regulator’s set of best practices, include risk management, adaptable regulation, and a cooperative, rather than a confrontational, “...punitive approach to enforcement.”<sup>52</sup> Coglianese further observes actions may also have their own set of adjectives including “vigilant, serious, reasonable, and transparent.”<sup>53</sup> Finally he contends, it is the culmination, indeed the outcomes that flow from characteristics and actions that become the primary metric by which regulatory excellence can be assessed. These outcomes may then be divided into their own subcategories:

- Effectiveness (impact in terms of solving the problem or achieve an ultimate outcome of concern);
- Cost-effectiveness (achieving a specific level of the desired outcome at a low cost);
- Efficiency (balancing the desired outcome – i.e., problem reduction – with other outcomes or concerns, such as costs, so as to achieve an “optimal” level of problem reduction); or
- Equity (a fair distribution of the costs and benefits of regulatory action)
- Public trust and legitimacy (stakeholder engagement)<sup>54</sup>

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<sup>51</sup> Cary Coglianese. *Defining & Assessing Regulatory Excellence*. Discussion Paper for the Penn Program on Regulation’s International Expert Dialogue on “Defining and Measuring Regulatory Excellence”, March 19-20, 2015. University of Pennsylvania Law School. Online: <https://www.law.upenn.edu/live/files/4366-coglianese-discussion-draft1-march-2015pdf> Accessed September 10, 2015.

<sup>52</sup> Ibid.

<sup>53</sup> Ibid.

<sup>54</sup> Ibid.

The above criteria, Coglianese maintains, are still not sufficient on their own in assessing regulatory excellence. Regulators must be evaluated in terms of how well they fulfill these conditions. This can be done, he suggests through measurement, aggregation, and attribution.<sup>55</sup> First, the ability to tangibly measure, or rate, the relative successes and failures of a regulator's various activities is a critical step in the evaluation process. Specific measurement targets and tools may include metrics (performance indicators, ratios), data sources (reporting systems, surveys), triangulation (multiple data sources and metrics), timing (when and how measurement occurs), and personnel (who conducts measurement processes).<sup>56</sup> Aggregation considers a number of factors, and involves prioritizing which characteristics and activities ought to receive the most energy and attention. This process involves weighting, identifying both the proficient and deficient areas of the organization, and then combining these factors to construct a clear assessment.<sup>57</sup> Finally is the notion of attribution, which Coglianese describes as "The extent to which excellence depends on connecting measures of different attributes to the choices made by the regulator... There can be both causal attribution as well as attribution of responsibility."<sup>58</sup> Causal attribution is simply the idea that outcomes, whether positive or negative, may be directly attributed to the policies of the regulator. Conversely, attribution of responsibility involves external factors and circumstances that have an adverse impact on the regulator's activities. One example, noted by Coglianese involves "...a regulator that is "doing everything right" but suffers from low public confidence in its honesty because it is operating within a governmental system that generally has high levels of corruption."<sup>59</sup>

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<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

<sup>59</sup> Ibid.

In attempting to critically evaluate the regulators discussed in this study, this is the general framework that will be applied. Of course, other questions come to bear as well. These include questions of what specific context for grading should be used, and what external factors may influence a regulator's overall performance. For the purposes of this study, I have chosen to conduct my evaluations under the premise that each of the chosen jurisdictions faces a similar set of challenges and pressures pertaining to hydraulic fracturing. Further, I will attempt, whenever possible and relevant, to factor in "...differences in resource levels, overall governmental capacity, industry characteristics, and demographic, political, geologic, or other environmental conditions."<sup>60</sup> As Coglianese has observed, this approach means, "Issues of attribution of responsibility and causation... become especially important."<sup>61</sup>

### **5.1 - Regulatory Approaches**

Another key consideration of my assessments involves an understanding of contrasting regulatory philosophies with respect to evaluating risk, compliance and enforcement strategies, and stakeholder engagement. Neil Gunningham outlines five such approaches, discussing the relative pros and cons of each. The overview provided in this section is intended to facilitate assessments that demonstrate an understanding of the relevant conditions in each jurisdiction, and how they may have influenced the development of the respective regulatory frameworks. Gunningham has identified six regulatory strategies for consideration. They are advice and persuasion, rules and deterrence, risk-based regulation, meta-regulation, responsive regulation, smart regulation, and criteria strategies. For simplicity, below I have provided Gunningham's list and their corresponding definitions precisely as they appear in his discussion paper:

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<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

Table 5.1 - Gunningham's Regulatory Strategies<sup>62</sup>

**Advice and Persuasion:** Emphasizes cooperation rather than confrontation, and conciliation rather than coercion. The aim is to prevent harm - achieved by bargaining, persuasion and negotiation rather than sanctioning. Recourse to the legal process here is rare, the assumption being that the majority of regulatees are willing to comply voluntarily.

**Rules and Deterrence:** Emphasizes a coercive, formal and adversarial style of enforcement and the sanctioning of rule-breaking behaviour. It assumes that regulatees are rational actors capable of responding to incentives, and that if offenders are detected with sufficient frequency and punished with sufficient severity, then they, and others will be deterred from future violations.

**Risk-Based Regulation:** Argues that the kind of intervention in the event of non-compliance should depend upon an evaluation of degree of risk to the environment posed by the infraction and calculations regarding the impact that the noncompliance will have on the regulatory body's ability to achieve its objectives.

**Meta-Regulation:** Involves placing responsibility on the regulated organizations themselves (usually large organizations) to submit their plans to the regulator for approval, with the regulator's role being to 'risk-manage' the risk management of those individual organizations. The goal is to induce companies themselves to acquire the specialized skills and knowledge to self-regulate, subject to external scrutiny. Accordingly the regulator's main intervention role is to oversee and audit the plans put in place by the regulated organization. Where it finds inadequacies it may invoke a responsive approach as described above.

**Responsive Regulation:** Suggests that best outcomes will be achieved if inspectors adapt (are responsive) to the actions of regulatees. Regulators should explore a range of approaches to encourage capacity building but be prepared to escalate up a pyramid of sanctions where these are unsuccessful. But escalation occurs only reluctantly and only where dialogue fails, and regulators de-escalate when met with a positive response. Indeed, it is preferable to escalate up a pyramid of supports, praising and rewarding good behaviour and only resorting to the pyramid of sanctions where such behaviour is not forthcoming. Implicit in Responsive Regulation is a dynamic model in which the strengths of different forms of regulation compensate for each other's weaknesses.

**Smart Regulation:** Expands on some of the insights of Responsive Regulation (in its original form) and the enforcement pyramid, by suggesting how markets, civil society and other institutions can sometimes act as surrogate regulators and accomplish public policy goals more effectively, with greater social acceptance and at less cost to the state. It also argues that complementary mixes of enforcement strategies and tools will be more effective than 'stand alone' strategies.

**Criteria Strategies:** Provide inspectors and other decision-makers with a list of criteria that they should consider in arriving at a decision in any given case. There is no prescriptive formula and which mechanism(s) will be used in any particular case will depend on the circumstances.<sup>63</sup>

Source: Gunningham

I have also provided a table on the following page that references the potential shortcomings of each approach under different contexts.

<sup>62</sup> Neil Gunningham. *Compliance and Enforcement of Environmental Regulation: What Makes an Excellent Regulator?* Discussion Paper for the Penn Program on Regulation's International Expert Dialogue on "Defining and Measuring Regulatory Excellence", March 19-20, 2015. University of Pennsylvania Law School. Online: <https://www.law.upenn.edu/live/files/4383-gunninghamdiscussion-draftmarch-2015pdfpdf> Accessed September 10, 2015.

<sup>63</sup> Ibid.



**Table 5.2 – Regulatory Strategies & Associated Challenges**

| <b>Regulatory Approach</b> | <b>Context</b>  | <b>Potential Challenges</b>   |
|----------------------------|---|---|
| Risk Regulation            | Regulator has little or no knowledge regarding target population and potential risks                                    | Little use as an intervention or resource allocation strategy                                       |
| Response Regulation        | Regulator has little or no knowledge regarding target population and potential risks                                    | More effective when repeat visits, rather a single visit are possible                               |
| Meta Regulation            | Absence of government legislation, guidelines, and standards  | Potential for self interested industry to undermine the public interest                             |
| Advice & Persuasion        | Absence of government legislation, guidelines, and standards  | Potential for self interested industry to undermine the public interest                             |
| Rules & Deterrence         | Complex environmental challenges  | Highly inefficient in dealing with complex problems, i.e. diffuse source pollution from agriculture |
| Smart Regulation           | Absence of a collaborative regulatory approach that involves government regulatory agencies, standards, and legislation | Public interest challenges and concerns   |

*Source: Gunningham*

As Gunningham notes, it is virtually impossible to establish which regulatory approach will achieve the best results given ever changing and diverse contexts. Despite this, he contends, “The accumulating body of research suggests that regulation-induced fear of legal punishment, social license pressures, and the normative commitments of a great many regulated enterprise managers, acting together, are sufficiently powerful to induce relatively high levels of regulatory compliance in a great many regulatory programs and contexts.”<sup>64</sup> As such, “Excellent regulators... must invoke different strategies in different circumstances... there is no single template for regulatory excellence.”<sup>65</sup>

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<sup>64</sup> Ibid.

<sup>65</sup> Ibid.

In clarifying why this is so, Gunningham observes that different environmental challenges often require a varied regulatory approach, as do compliance and enforcement tactics. He notes, “Large point sources... are readily identifiable and their size and impact on the environment justify repeat visits from regulators... In contrast, small and medium sized enterprises (SMEs) are often hard to identify, let alone to visit given the vast disparity between the number of such enterprises and the number of regulators.”<sup>66</sup> Beyond such practical concerns, these SMEs often lag behind their larger counterparts in their knowledge of environmental requirements and regulations. This requires a more flexible and instructive approach to compliance and enforcement including, but not limited to “education and information, technological assistance, reliance on professional third parties as information disseminators, self-inspection and self-audit underpinned by (at least a perceived) credible threat of inspection and enforcement, industry blitzes, and considerable reliance on less resource-intensive instruments such as on the spot fines and administrative notices.”<sup>67</sup>

As this discussion and the above table attempt to illustrate, context is critical to the success or failure of any regulation strategy. Gunningham suggests the appropriate mix can be put into play through properly gauging “the different external pressures, skills, capabilities and motivations of regulated entities. ...The environmental risks posed by different operations are also intrinsically different... best practice means applying different intervention strategies in different circumstances.”<sup>68</sup>

In moving past purely theoretical conceptions, Gunningham identifies a few of the more common differences in capabilities and motivations among industry participants, and outlines

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<sup>66</sup> Ibid.

<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

how a range of regulatory strategies may be applied to best meet the inherent challenges. To begin, he contemplates a regulator that must devise an intervention strategy based on the level of intrinsic motivation to comply or exceed environmental regulatory requirements, as well as the likelihood and severity of environmental risk different operations may entail. This permits the creation of three main categories that will assist in defining the nature of the relationship between regulator and the regulated party, and the type of enforcement strategies that may be required. They are:

(i) ***Environmental Leaders***: Large, sophisticated organizations with self-interest in good environmental performance which require a license, but which can also be motivated to go beyond compliance to some extent – for example, large reputation-sensitive companies which need to protect their ‘social license to operate’.

(ii) ***Reactive Licensees***: Other organizations with the capacity to cause major environmental harm – put broadly, other licensed premises. SMEs would be considered within this category.

(iii) ***Low Risk Enterprises***: Non-licensed premises that do not have the potential to cause major environmental harm, including many small and medium sized organizations, and individuals.<sup>69</sup>

For Environmental Leaders, Gunningham proposes a combination of Meta-Regulation, Responsive Regulation and Smart Regulation.<sup>70</sup> Meta regulation, he argues, creates and preserves the incentives necessary “to acquire the specialized skills, knowledge and risk

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<sup>69</sup> Ibid.

<sup>70</sup> Ibid.

management systems to self-regulate, while also ensuring external scrutiny.”<sup>71</sup> Further, he states, Meta-Regulation and Responsive Regulation may be considered complementary strategies as the latter minimizes the risk of ‘backsliding’<sup>72</sup> sometimes associated with the former.<sup>73</sup> Finally, this mix also provides large companies with the space and means to properly manage their corporate responsibility portfolios and in turn, “protect their social license.”<sup>74</sup>

For Reactive Licensees, Gunningham proposes combining Responsive Regulation with a risk-based approach “to determine the extent of performance verification, reporting and monitoring activity required.”<sup>75</sup> A model of ‘progressive discipline’ is employed, whereby enforcement actions are gradually escalated in instances of ongoing non-compliance. The primary advantage of the responsive style approach with such organizations is its ability to provide “considerably greater guidance as to the appropriate regulatory response.”<sup>76</sup>

Finally, in the case of Low Risk Enterprises, neither a responsive or risk based approach are beneficial or practical. Because the frequency of contact between these organizations and the regulator is minimal, there is often insufficient history and information upon which to base an enforcement intervention, or to adequately assess risk. Therefore, Gunningham proposes that low cost approaches such as self-audits may be sufficient to ensure regulatory compliance.<sup>77</sup>

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<sup>71</sup> Ibid.

<sup>72</sup> Backsliding is the notion that left to one’s own devices, commitment to a particular idea, belief, or practice may diminish over time.

<sup>73</sup> Ibid.

<sup>74</sup> Ibid.

<sup>75</sup> Ibid.

<sup>76</sup> Ibid.

<sup>77</sup> Ibid.

## 5.2 - The Role of Hybrids

Much of the foregoing discussion has revolved around the need for excellent regulators to be flexible and adaptable, thus requiring a mix of two or more of the strategies from the above table. Gunningham refers to this as the hybrid approach.<sup>78</sup> Although the complexities of modern environmental regulation typically necessitate such a framework, settling on the appropriate combinations is far from simple. In fact, there is a very real risk of implementing strategies that do not complement one another, leading to problems of “incoherence and inconsistency.”<sup>79</sup>

Here, Gunningham offers a glimpse into which hybrids may not always work as intended. The first example he provides analyses the potential problems with integrating Criteria and Risk-based strategy. He writes:

“If risk trumps other criteria... then those criteria are rendered meaningless by the introduction of risk. This seems unlikely to have been the intent of policy makers. If, on the other hand, risk is simply one more factor to be taken into account then the indeterminacy of the criteria approach is not addressed and the role of risk may be modest.”<sup>80</sup>

Another possible, and often applied hybrid is to combine a risk-based approach with Responsive Regulation. This approach can lend itself to serious inconsistencies, primarily due to a difference in normative outlooks. Risk-based regulation assigns increasingly punitive enforcement actions in accordance with higher levels of environmental risk, while the responsive approach relies entirely on “the regulated entity assuming virtue... without an evaluation of risk shaping its decision as to the appropriate form of intervention.”<sup>81</sup>

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<sup>78</sup> Ibid.

<sup>79</sup> Ibid.

<sup>80</sup> Ibid.

<sup>81</sup> Ibid.

### 5.3 – Beyond Compliance

Perhaps, as Gunningham contends, one of the foremost considerations on the path to regulatory excellence is a regulator’s ability to make the best use of its scarce resources.<sup>82</sup> In addition to the considerations that have already been outlined is the question of implementing strategies that incentivize the best companies to go beyond compliance, or whether these resources would be more effectively utilized in addressing firms with the worst compliance challenges. Here, Gunningham observes, “The Clinton-Gore Reinventing Environmental Regulation initiatives, in retrospect, appear to have made only marginal differences to environmental outcomes and may not have justified the resources devoted to them.”<sup>83</sup>

As has already been implied, it is generally only the largest “reputation sensitive companies”<sup>84</sup> that, through the high levels of scrutiny from environmental groups, government, regulators, and the public, are sufficiently incentivized to move beyond compliance. Not meeting the demands of this ‘social license’, Gunningham states, invokes fears of increased regulation and costs.<sup>85</sup> One way to overcome this challenge may be to adopt a “... ‘name and shame’ strategy on regulatory websites, providing details of repeat offenders and their offenses, using this in tandem with more conventional enforcement strategies.”<sup>86</sup>

To summarize the preceding discussions, when defining and assessing regulatory excellence, a complex and diverse set of considerations, including environmental, economic, political, and social acceptability challenges must all be addressed. As Coglianese and Gunningham have argued, identifying specific characteristics of excellent regulators, and what

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<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

<sup>84</sup> Ibid.

<sup>85</sup> Ibid.

<sup>86</sup> Ibid.

regulatory approaches will best achieve the desired outcomes in terms of compliance and enforcement are equally critical. Again, there is no one single template to achieve these objectives, and regulators, as well as those they regulate must be amenable to changing needs and circumstances. This requires well-considered, hybrid regulatory frameworks that are at once comprehensive, flexible, adaptive, and resilient. I now turn to a brief description of how my assessments of each regulator will proceed.

### **6.0 – Assessment Framework**

Achieving regulatory excellence – as is the case in any industry or undertaking – requires commitment, flexibility, and adaptability. It is a journey, not a destination. Based on the framework that was established for defining regulatory excellence in sections 5.0 - 5.3, sections 6.4-6.7 will provide an overall evaluation for each of the four jurisdictions. As well, to simplify and condense the following more lengthy discussions, I have developed a rubric, comprised of five key areas to be presented in a table at the end of each assessment. An individual score will be assigned to these areas, and then averaged to produce a final score. The weighting for each category will not differ. The key areas are comprehensiveness and stringency of regulation, transparency<sup>87</sup>, competency, adaptability, and fairness.

For the written analyses, I will assess whether or not, and to what degree each regulator possesses the traits and regulatory strategies identified by Coglianese and Gunningham. To review, these include being knowledgeable, well-funded, adequately staffed, credible, honest, and legitimate, within an adaptive and responsive hybrid framework.

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<sup>87</sup> Under the guise of transparency will be a variety of considerations including stakeholder engagement and relations, media relations, organizational structure, as well as consistency of actions and outcomes.

## **6.1 - AER Compliance & Enforcement Framework**

I begin by looking at the Alberta Energy Regulator’s (AER) compliance and enforcement practices, structure, and record.

As indicated on their website, the AER’s Compliance Assurance Program is designed to “...help ensure the fair and responsible discovery, development, and delivery of Alberta's energy resources, all in the public interest. This program uses education, prevention, and enforcement activities to facilitate efficient and effective compliance. Its ultimate goal is to ensure compliance with written requirements, monitored and enforced by the AER on behalf of all Albertans.”<sup>88</sup>

The program’s primary objectives and purpose is outlined in *Directive 019: Compliance Assurance*.<sup>89</sup>

Predetermined levels of risk inform particular response processes, as outlined in Directive 019. Using the Compliance Assurance Risk Assessment Matrix (CARAM), risk levels are categorized as high or low based on the following requirements:

- Health and safety
- Environmental impacts
- Resources conservation
- Stakeholder confidence in the regulatory process<sup>90</sup>

Compliance assurance is broken down into two ‘activities’ – prevention activities and enforcement activities. Prevention activities are “conducted to address and prevent recurrence of a noncompliant event”, while enforcement activities are “the application of remedial, deterrence,

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<sup>88</sup> Alberta Energy Regulator. *Compliance & Enforcement*. Online: <https://www.aer.ca/compliance-and-enforcement/compliance-assurance> Accessed September 10, 2015.

<sup>89</sup> Ibid.

<sup>90</sup> Ibid.



and punitive measures to achieve compliance with all requirements administered by the AER.”<sup>91</sup> The tables included provided in Appendix B (B1-B2) outline the various stages of the AER’s compliance framework, which is broken down into low risk noncompliance prevention and enforcement, high risk noncompliance and enforcement, persistent noncompliance, failure to comply, and demonstrated disregard. Of further note in relation to low risk noncompliance and enforcement actions is that “...AER personnel will contact the licensee before enforcement consequences are escalated.”<sup>92</sup>

## **6.2 – AER Compliance & Enforcement Record**

At this stage, I now turn to a deeper look at how frequently and effectively the AER follows through on the enforcement of its regulations. The primary study of interest here will be a July 2013 study produced by Global Forest Watch (GFW). The study is highly critical of the AER’s enforcement record and several of its regulatory systems. As I will show, various questions of credibility undermine GFW’s report. One of these, that should be observed up front, is that the AER was in phase 1 of 3 of its transition from the Energy Resources Conservation Board (ERCB) just a month earlier. Completion of all phases was not expected until the spring of 2014.<sup>93</sup> Clearly, any regulator at such an early stage of its development should not be subjected to the level of scrutiny and criticism imposed by GFW. As well, in the short time since the study’s publication the AER, as discussed below, has gone to great lengths to improve its systems and requirements.

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<sup>91</sup> Alberta Energy Regulator. *Directive 19: Compliance Assurance*. September 1, 2010. Online: <https://www.aer.ca/documents/directives/Directive019.pdf> Accessed September 10, 2015.

<sup>92</sup> Ibid.

<sup>93</sup> Alberta Energy Regulator. *Bulletin 2013-23*. Online: <https://www.aer.ca/rules-and-regulations/bulletins/bulletin-2013-23> Accessed September 12, 2015.

To begin, an initial survey of the enforcement data presented on the AER's website, as well as the available tools, which include inspections, audits, investigations, the ability to file statements of concerns and complaints, as well as monthly enforcement actions and detailed enforcement reporting, all lend an air of credibility and transparency to the regulatory process. ST108: AER Monthly Enforcement Action Summary, for example, provides a comprehensive overview of enforcement actions across all compliance categories. For the period January-June 2014, the AER issued a total of 302 actions, or an average of roughly 50 per month.<sup>94</sup> Extrapolated annually, this would translate to just over 600 actions.

What is needed at this point is perspective as to how adequate these numbers are. To do this, it is necessary to review the frequency of inspections and audits and the effectiveness of the AER's responses to public complaints, as the results of these undertakings determine the enforcement response that is triggered. It will also be critical to look at the total number of energy projects under the AER's jurisdiction. Finally, I will attempt to assess the validity of GFW's claims that enforcement actions are dangerously low.

To begin, AER field inspectors "...inspect construction, operation, and abandonment operations at oil, gas, and oil sands facilities (including pipelines, compressors, and processing plants). Inspection activities are prioritized based on the weighting of three key criteria... including operator (licensee/contractor) history, sensitivity of the location, and inherent risk of the project or operation."<sup>95</sup> Audits, meanwhile are a more detailed review of regulatory compliance, and are conducted during initial application. They may also be conducted "post-

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<sup>94</sup> Alberta Energy Regulator. *ST108: AER Monthly Enforcement Action Summary*. Online: <http://aer.ca/data-and-publications/statistical-reports/st108> Accessed September 10, 2015.

<sup>95</sup> Alberta Energy Regulator. *Inspections & Audits*. Online: <http://aer.ca/compliance-and-enforcement/inspections-and-audits> Accessed September 10, 2015.

application... under certain conditions. Selection criteria for these audits include inspection results, public complaints, and risk potential related to a facility's operations.”<sup>96</sup> As per their website, the AER regulates:

- Over 181 300 wells and 415 000 km of pipelines,
- 782 gas processing plants;
- 9 oil sands mines
- More than 50 thermal in situ and 200 primary/enhanced schemes
- 5 bitumen upgraders
- 11 coal mines
- 4 coal processing plants<sup>97</sup>

In terms of hydraulic fracturing, approximately 174,000 wells have been fracked in Alberta since the 1950s, translating to roughly 2,700-3,000 new wells per year.<sup>98</sup> Since 2008, roughly 1,250 of these new wells have involved multistage horizontal fracturing.<sup>99</sup> Further, 75% of crude oil and 2/3 of gas wells involve horizontal drilling.<sup>100</sup> In 2013, the number of approved fracking licenses in Alberta rose by 647 per cent, to a total of 1516.<sup>101</sup> By comparison, the AER employs 70 field inspectors, stationed at 12 locations throughout Alberta. Notwithstanding the other energy projects the AER oversees, based on the average number of new fracking wells every year, each

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<sup>96</sup> Ibid.

<sup>97</sup> Alberta Energy Regulator. *What We Do*. Online: <http://aer.ca/about-aer/what-we-do> Accessed September 10, 2015.

<sup>98</sup> Alberta Energy Regulator. *Alberta's Unconventional Oil & Natural Gas*. Online: [https://www.aer.ca/documents/projects/URF/URF\\_Powerpoint.pdf](https://www.aer.ca/documents/projects/URF/URF_Powerpoint.pdf) Accessed September 10, 2015.

<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> Dean Bennett, “Fracking ‘Almost Completely Unregulated’ in Alberta, NDP Charges,” *The Globe & Mail*, updated Feb. 4, 2014. Online: <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/fracking-almost-completely-unregulated-in-alberta-ndp-charges/article16694749/> Accessed August 3, 2015.

inspector would be required to inspect anywhere from 38-43 wells per year. The AER acknowledges that only “a portion” of Alberta’s wells is inspected annually.<sup>102</sup> Given the sheer volume of projects relative to the available resources, and the associated costs, it is neither possible nor desirable to inspect every well. Nonetheless, according to a 2014 Worley-Parsons report, inspections and audits are conducted with ‘regularity’, and ongoing monitoring of water and air emissions is commonplace.<sup>103</sup> The question then becomes whether or not an adequate number are monitored on an ongoing basis. Although it is theoretically possible to determine an optimal level of inspection and monitoring activities, the answer to the question of adequacy depends less on overall numbers as it does on what other strategies are in place to ensure compliance. As such, in addition to “stop work orders, financial penalties, community service, suspensions and/or cancellation of permits”<sup>104</sup> the AER relies on a suite of other mechanisms to fill in any potential gaps that result from an inability to conduct hands on monitoring for all projects. These include the previously mentioned inspection selection criteria, education, and the “Voluntary Self-Disclosure policy... intended to encourage licensees to proactively identify, report, and correct noncompliance of AER requirements.”<sup>105</sup> These factors, along with ongoing public engagement, and a degree of industry self-regulation are all strong indicators that the AER has gone a long way in implementing a comprehensive, responsive, and flexible regulatory regime.

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<sup>102</sup> Alberta Energy Regulator. *Inspections & Audits*. Online: <https://www.aer.ca/compliance-and-enforcement/inspections-and-audits> Accessed September 10, 2015.

<sup>103</sup> WorleyParsons. *Environmental Regulation: An International Comparison of Leading Oil and Gas Producing Regions*. Commissioned by the Canadian Association of Petroleum Producers. © WorleyParsons 2014. Online: [http://aer.ca/documents/about-us/CAPPWorleyParsons\\_Report.pdf](http://aer.ca/documents/about-us/CAPPWorleyParsons_Report.pdf) Accessed August 24, 2015.

<sup>104</sup> Ibid.

<sup>105</sup> Alberta Energy Regulator. *Compliance & Assurance*. Online: <http://www.aer.ca/compliance-and-enforcement/compliance-assurance> Accessed September 10, 2015.

This however, has not spared the agency from substantial criticism in the areas of enforcement from environmental groups and the media. As the following discussion demonstrates, questions remain regarding the adequacy of enforcement rates relative to apparent violations, as well as regulatory inconsistencies that appear to undermine the AER's credibility and transparency. The 2013 Global Forest Watch (GFW) study referenced at the beginning of this section challenges the adequacy and frequency of the AER's enforcement procedures and activities.

The study investigates a total of 9,262 alleged environmental incidents<sup>106</sup> between 1996-2012 in Alberta's northeastern bitumen sands region, and claims that only 0.9% of these resulted in an enforcement action.<sup>107</sup> The violations were documented on the Alberta Environmental Management System (EMS), a database that compiles environmental incidents reported by industry, government, and the public. In addition to inadequate levels of enforcement, the study maintains, many enforcement tools, such as monetary fines and self-disclosure, and the EMS itself are "ineffective and dysfunctional."<sup>108</sup> The average fine of \$4500, it is charged, is too low to be an effective compliance incentive.<sup>109</sup> Further, the report's criticism of self-disclosure contends that such practices lead to "...chronic poor management practices, under-reporting, poor oversight, and lax enforcement."<sup>110</sup> In the area of data management and disclosure, significant gaps are identified with respect to the provision of "...timely, accurate, error free,

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<sup>106</sup> Incidents represent an unknown fraction of the true number of incidents occurring per unit time as a result of missing records, redacted records, multiple contraventions subsumed under a single incident, and under-reporting. Actual contraventions are believed to be approximately 4,063 during the period 1996-2012.

<sup>107</sup> Kevin Timoney and Peter Lee. *Environmental Incidents in Northeastern Alberta's Bitumen Sands Region, 1996-2012*. Global Forest Watch, July 2013. Online: [http://www.globalforestwatch.ca/files/publications/20130723A\\_Envir\\_Incidents\\_July-22-2013.pdf](http://www.globalforestwatch.ca/files/publications/20130723A_Envir_Incidents_July-22-2013.pdf) Accessed August 25, 2015, 9.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

<sup>110</sup> Ibid., 62

and complete information... The practice of not updating the EMS database when incident status changes from open investigation to closed deprives the public of critical information and prevents public involvement in environmental enforcement.”<sup>111</sup> Beyond the enforcement related challenges, it is argued these factors demonstrate the AER is not meeting its goals of transparency and accountability.<sup>112</sup>

To address these alleged shortcomings, authors Timoney and Lee propose a suite of recommendations. First, based on the ‘dysfunctional’ nature of the EMS, a complete overhaul was required. Given this study was published in 2013, it is worth observing what changes have been made. In May of 2013, the Alberta government launched their open data portal, although Timoney and Lee claim this did little to rectify problems of informational access and transparency.<sup>113</sup> As well the AER website’s compliance dashboard now includes an online incident reporting tool to improve public engagement.

Other recommendations include abandoning self-reporting strategies in favour of independent third party agencies to monitor industry activities, and improved responsiveness to public complaints.<sup>114</sup> On the first of these points, while there may certainly be some risk associated with self-reporting, or other self-regulation strategies (as indicated by specific incidents referenced in the GFW study), there is also evidence that due to external pressures such as social acceptability, that firms do in fact have strong incentives to oversee their own activities in a manner consistent with compliance expectations. This aligns with Gunningham’s view of the largest, reputation sensitive firms, as non-compliance with not only existing regulations but

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<sup>111</sup> Ibid., 238

<sup>112</sup> Ibid.

<sup>113</sup> Ibid.

<sup>114</sup> Ibid.

social acceptability pressures, may in many instances prove to be more costly than implementing and following best practices. Further, the Canadian Association of Petroleum Producers (CAPP) has led several industry self-regulation initiatives aimed at improving hydraulic fracturing activities, including promoting industry wide self-disclosure of the chemical composition of fracking fluid and increased waste water recycling. Websites like FracFocus, with both a Canadian and an American homepage, assist in promoting energy literacy and positive public engagement. Another benefit of industry self-monitoring rests upon evidence that shows higher levels of compliance. This is because industry stakeholders grant more deference to the knowledge and expertise of their colleagues than to government officials or other external sources.<sup>115</sup> Despite this, others academics such as Kenneth Green, have shown support for including independent third party project approvals and monitoring as a way to strengthen the overall regulatory process. Green writes, “There is more to be done... including the development of independent certifying organizations that can exert public pressure to encourage responsible behavior. Obtaining such third-party verification could be required by government to attain permission to operate.”<sup>116</sup>

With respect to public complaint responsiveness, Timoney and Lee cite the work of Heather L. Eckert to suggest that should a regulatory agency wish to “...discourage public participation, it can do so by failing to provide accurate, objective, timely, and relevant information, by failing to communicate the complaints of other citizens, and by failing to respond effectively to citizen complaints.”<sup>117</sup> Conspiracy theories aside, it is hard to disagree

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<sup>115</sup> Angela J. Campbell. “Self Regulation and The Media”. *Federal Communications Law Journal*, May 1999, 716.

<sup>116</sup> Kenneth P. Green. “Managing The Risks of Hydraulic Fracturing.” *The Fraser Institute*, December 2014, iii.

<sup>117</sup> Kevin Timoney and Peter Lee. *Environmental Incidents in Northeastern*

with the notion that information that is at once complete, factual, and accessible plays a critical role in promoting public awareness and engagement. Nonetheless, Eckert's investigation of public complaints and their relationship to the enforcement of Alberta's environmental regulations would seem to support conclusions that not only is enforcement inadequate, but that the existing framework actually discourages it. Specific findings include the following:

1. Public complaints played a smaller role in enforcement over time (from 1996 to 2002)
2. AESRD discounted public complaints relative to reports from government personnel
3. Public complaint investigations were less likely to lead to enforcement than other sources of incident reports
4. The frequency of past complaint incidents reduced the probability of investigations of public complaints but increased the probability of investigations for incidents reported from other sources.<sup>118</sup>

As Eckert acknowledges, governments and regulators tend to promote public complaints frameworks as both a low cost and effective alternative to more costly and resource intensive enforcement options.<sup>119</sup> Of course, the above findings force a rejection of claims pertaining to effectiveness, instead giving the appearance of a bottom line focused approach to compliance and enforcement. However, Eckert's argument is considerably more nuanced than presented by Timoney and Lee. Although the GFW study acknowledges the lack of consideration public complaints are given in determining an appropriate course of action, why this may be the case is not addressed. Simply stated, members of the general public rarely have any significant expertise in assessing the severity of environmental incidents. Eckert casts reasonable doubt as to the effectiveness of public complaint initiatives, stating, "The public has an incentive to improve the

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*Alberta's Bitumen Sands Region, 1996-2012*. July 2013, 111.

<sup>118</sup> Heather L. Eckert, 2006. "Public Complaints and Alberta's Environmental Regulation." *B.E. Journal Of Economic Analysis & Policy: Topics In Economic Analysis & Policy* 6, no. 1: 1-23. Business Source Complete, EBSCOhost Accessed August 25, 2015.

<sup>119</sup> Ibid.



local environmental quality and can more regularly monitor local conditions. However, citizens lack the information to assess environmental threats properly.”<sup>120</sup> Other empirical research noted by Eckert observes, “Citizens have difficulty identifying genuine environmental hazards”<sup>121</sup>, and, “The occurrence of an environmental incident does not significantly increase the number of public complaints... such complaints are more representative of preferences than of environmental harm.”<sup>122</sup> These findings indicate that Timoney and Lee’s study may have over emphasized the importance and relevance of citizen complaints documented via the EMS in asserting a crisis of enforcement. They may also explain why regulators typically confer less weight to these complaints when determining whether or not any follow up action or enforcement may be required.

Finally, as has already been established, regulators have access to finite resources to ensure the most effective and efficient outcomes. Compliance and enforcement are cost intensive activities, and it is simply not feasible to respond to every potential incident. Worse yet, Eckert writes:

“Relying on public complaints for environmental violation information may cost more than the benefits received. In Alberta, approximately 83 hours is spent each year simply to process reports, which then must be investigated and only lead to 2 enforcement actions each year. These resources may be better used to improve... and increase inspections.”<sup>123</sup>

To clarify, the 0.9% enforcement rate cited by Timoney and Lee, having not taken into account the variables cited above, cannot be taken at face value. While there may be an argument

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<sup>120</sup> Ibid.

<sup>121</sup> S. Dasgupta and D. Wheeler. “Citizen Complaints As Environmental Indicators.” *Evidence from China*, 1996. World Bank, PRDEI working paper 1704.

<sup>122</sup> R. McKittrick and M. Raymond. “Citizen Complaints and The Environment: An Examination of The Guard.” *Mimeo*, University of Guelph, Department of Economics, 2004.

<sup>123</sup> Heather L. Eckert, 2006. “Public Complaints and Alberta’s Environmental Regulation.”

to be made that the AER has allocated too many resources to public complaints based monitoring as a compliance and enforcement tool, any insinuation that enforcement levels are inadequate is premature without due consideration of these other factors.

### **6.3 – Media Controversies – AER**

The portrayal of the AER in the mainstream media has been less than flattering. This section briefly highlights and discusses some of the more contentious controversies that have negatively impacted the regulator and its goals of transparency and accountability. An important caveat to this discussion is being conscious of the sensationalism that often characterizes mainstream news reporting, and hence, the validity of information being presented. Nevertheless, because the influence of media on public opinion is substantial, regulators must be adept at dealing with the challenges it poses. Failing to do so has potentially negative consequences for the social acceptability of hydraulic fracturing projects. As the examples below demonstrate, the AER’s media relations approach is counterproductive to this objective.

In 2013, a Group 10 Engineering independent report aimed at assessing the adequacy of the AER’s regulations was notable for not providing any information related to enforcement. In fact, prior to the project’s official commencement, e-mails were exchanged between AER advisor Tom Pesta and lead author Theo Abel confirming that enforcement data would not be included.<sup>124</sup> The public response from both the AER and Group 10 was, at least from a public relations standpoint, unsatisfactory. Both simply reiterated in various ways that the scope was

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<sup>124</sup> Leslie Young. “In Contract, Emails and Meetings, Alberta Officials Ensured ‘Independent’ Pipeline Safety Review Wouldn’t Look At Enforcement.” *Global News*, November 28, 2013. Online: <http://globalnews.ca/news/996461/in-contract-emails-and-meetings-alberta-officials-ensured-independent-pipeline-safety-review-wouldnt-look-at-enforcement/> Accessed August 26, 2015.

limited to three key areas, including public safety, but not enforcement or specific incidents.<sup>125</sup>

In fairness, there may well have been valid reasons enforcement was not included, but failing to clearly articulate why undermines the regulator's overall credibility. As Pembina Institute program director Jennifer Grant noted, "You can't really determine whether something is safe without assessing enforcement and compliance with regulations."<sup>126</sup> In combination, these factors give the appearance of simply managing public opinion in a way favourable to government and industry, rather than being committed to transparency and improvement.

Perhaps the most concerning issue pertaining to the AER involves the regulator's handling of a recent Canadian Natural Resources Ltd. (CNRL) pipeline spill that occurred near Red Earth Creek in northern Alberta in December 2014. CNRL's record is claimed to be by far the worst of any operator in the province, having been responsible for 45 spills over the last year alone.<sup>127</sup> As of December 2014, many of these spills had not yet been properly contained, although AER led investigations were ongoing.<sup>128</sup> Numerous CNRL projects involve steam-assisted technology and the company admitted it may have played a role in this most recent spill.<sup>129</sup> The problem with the AER's response, aside from the fact that CNRL is being permitted to continue operations, is the apparent contradiction of a 2014 bulletin in which they stated:

"The Alberta Energy Regulator (AER) is currently completing a thorough technical review of the factors that affect reservoir containment of steam-assisted gravity drainage (SAGD) projects and will be consulting with stakeholders to develop formal regulatory

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<sup>125</sup> Ibid.

<sup>126</sup> Leslie Young. "Alberta Pipeline Safety Review Does Not Examine Pipeline Incidents or Enforcement Record." *Global News*, August 23, 2013. Online: <http://globalnews.ca/news/798540/alberta-pipeline-safety-review-does-not-examine-pipeline-incidents-or-enforcement-record/> Accessed August 26, 2015.

<sup>127</sup> Anna Mehler Paperny and Leslie Young. "Alberta Oil Spill: Examining CNRL's Safety Record." *Global News*, December 2, 2014. Online: <http://globalnews.ca/news/1703807/alberta-oil-spill-examining-cnrls-safety-record/> Accessed August 27, 2015.

<sup>128</sup> Ibid.

<sup>129</sup> Ibid.

requirements. Until those requirements are issued, the AER will defer decisions on applications for thermal oil sands projects...”<sup>130</sup>

Despite this bulletin, CNRL would be allowed to proceed with lower pressure steam operations, with the AER stating it “is satisfied this approach will successfully mitigate potential risks of further bitumen release at the sites.”<sup>131</sup> Again, such apparent inconsistencies do little to inspire public confidence that the AER is intent on enforcing their regulations, whether it be in relation to pipelines or hydraulic fracturing.

#### **6.4 – Assessing the AER**

In the area of knowledge, the AER, which replaced the Energy Resources Conservation Board (ERCB) in 2013 to streamline the regulatory process, employs engineers, technical and policy analysts, as well as individuals with a diverse range of public and private sector experience. CEO Jim Ellis is a former energy and environment deputy minister. In short, the AER brings a high level of knowledge, experience, and expertise to its daily operations.

Funding for the AER is provided exclusively by the industries it regulates, and its annual budget stands at roughly \$165 million, employing approximately 1200 staff.<sup>132</sup> To alleviate any concerns around transparency, government engages in a formal consultation process with the AER and approves its final budget.<sup>133</sup> Assessing the overall adequacy of funding and staffing would be an onerous task, and is beyond the scope of this report. However, a common sense

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<sup>130</sup> Alberta Energy Regulator. *AER Bulletin 2014-03: Regulatory Approach for Shallow Thermal In Situ Oil Sands Applications in the Wabiskaw-McMurray Deposit of the Athabasca Oil Sands Area*. January 28, 2014. Online: <http://www.aer.ca/rules-and-regulations/bulletins/aer-bulletin-2014-03> Accessed August 27, 2015.

<sup>131</sup> Anna Mehler Paperny and Leslie Young. “Alberta Oil Spill: Examining CNRL’s Safety Record.” *Global News*, December 2, 2014.

<sup>132</sup> The Alberta Energy Regulator. “The Alberta Energy Regulator.” 2013. Online: [http://www.aer.ca/documents/about-us/AER\\_Brochure.pdf](http://www.aer.ca/documents/about-us/AER_Brochure.pdf) Accessed August 27, 2015.

<sup>133</sup> Ibid.

analysis dictates that industry represents a predictable and stable source of funding that does not rely on public funds. One potential drawback is oil price volatility, and the repercussions that reduced revenue streams for industry may have for the AER's budget and ability to properly conduct its compliance and enforcement activities. Overall, the AER must be viewed as both a stable and reliable regulatory agency in this regard.

As the issues discussed in sections 6.2 and 6.3 illustrate, an assessment of credibility, honesty and legitimacy presents more of a mixed bag. The AER's responses to the Group 10 Engineering report and the CNRL pipeline issues are not, at least superficially, demonstrative of a regulator that seeks to be best in class. This should not be taken to mean that there were not legitimate reasons for excluding enforcement data from the Group 10 study, or permitting CNRL to continue operations utilizing a lower pressure method. However, if there were legitimate reasons, the AER failed to adequately articulate them. Still, there is much the AER has done right in this regard. Beginning with the regulations themselves, the AER has, when compared with the other jurisdictions in this study, the most comprehensive and complete set of directives regulating hydraulic fracturing. For example, none of the other three requires baseline testing of water wells and aquifers prior to the commencement of drilling. This is an important facet in establishing long term social acceptability of hydraulic fracturing. In addition to a robust set of regulations, the AER's website is well equipped with information on enforcement protocols, detailed monthly enforcement actions, investigation updates and summaries, and an online incident reporting tool. There are also mechanisms for the filing of public complaints or statements of concern. The GFW report authored by Timoney and Lee was highly critical of the public complaint and informational systems in 2013. However it is important to note that their

study's publication roughly coincided with the transition from the ERCB to the AER, and many improvements have since been put in place.

After only two years in its role as the province's energy regulator, the AER has already demonstrated both its expertise and commitment to environmental protection through the innovative play-based regulation to oversee unconventional oil and gas development. Rather than the standard one well-one license approach, play-based regulation seeks to "consider the cumulative effects of development, water and waste management, air quality, and public safety."<sup>134</sup> It does this by encouraging firms to collaborate with one another on unconventional projects, with the goal of reducing both surface and subsurface environmental impacts. In addition to enhanced levels of environmental protection, policies such as these help to promote the continued economic viability of oil and gas development. In fact, a recent report by Ernst & Young outlines several of the potential benefits of play-based regulation including reduced operating costs, optimized facility development, and shorter project durations.<sup>135</sup> As the global transition to a low carbon economy continues, the ability to skillfully balance these considerations will be essential.

In terms of regulatory approaches, the AER's may be described as the ultimate hybrid model, incorporating virtually each of the seven strategies outlined by Gunningham in one way or another. The larger question here is how successfully the AER has been able to incorporate these different approaches, while also avoiding the incoherence and inconsistencies Gunningham warns may result. Evidence of the advice and persuasion strategy is present in the AER's

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<sup>134</sup> Alberta Energy Regulator. "Play Based Regulation Pilot Project." *AER*, 2015. Online: <http://www.aer.ca/about-aer/spotlight-on/pbr-pilot-project> Accessed August 27, 2015.

<sup>135</sup> Ernst & Young, 2015. *Alberta's Oil and Gas sector Regulatory Paradigm Shift: Challenges and Opportunities*. Online: [http://www.ey.com/Publication/vwLUAssets/EY-Alberta-oil-gas-regulatory-paradigm-shift/\\$FILE/EY-Alberta-oil-gas-regulatory-paradigm-shift.pdf](http://www.ey.com/Publication/vwLUAssets/EY-Alberta-oil-gas-regulatory-paradigm-shift/$FILE/EY-Alberta-oil-gas-regulatory-paradigm-shift.pdf) Accessed September 1, 2015.

approach to compliance and enforcement that permits a progressive escalation that includes measures to educate, communicate and support the operator before more punitive measures are invoked. A rules and deterrence strategy may be applied when advice and persuasion fails through already mentioned mechanisms, including fines and potential cessation of operations. In terms of risk-based regulation, the AER employs a risk matrix to assist in determining whether or not a project will be approved, the frequency of investigations and audits, and whether or not to follow up on reported incidents. Here, there is a degree of cross over with the criteria strategies approach. Meta, or self-regulation, is also a prevalent factor in Alberta's overall regulatory scheme. This is reflected in the AER's self-disclosure requirements, as well as through industry led initiatives (CAPP). Responsive regulation approaches, as with advice and persuasion, are reflected in the AER's willingness to support organizations facing compliance challenges through ongoing dialogue and education. Finally, one area that could perhaps benefit from further development is smart regulation, in which third party organizations provide an arms-length independent level of monitoring and approval of hydraulic fracturing operations. Nevertheless, there are signs that steps are being taken towards incorporating such measures. For example, in 2013, in recognition of the need to improve Alberta's environmental monitoring and reporting, the provincial government established the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) to provide independent environmental data and assessments.

The above factors, combined with the AER's numerous measures to respond to public concerns pertaining to unconventional oil and gas development reveals a portrait of a regulator that is flexible, credible, transparent, knowledgeable, and most of all, fair in its application of enforcement. The hybrid model is largely, though not entirely immune to the incoherence and

inconsistencies Gunningham warns of. For example, the exclusion of enforcement data in the Group 10 report may be explained by the AER wanting to insulate itself from public criticism on one hand, or industry criticism on the other. As this report illustrates, proper interpretation and presentation of enforcement data may be highly subjective. Situations such as these indicate how the AER is at times a victim of its own highly flexible regulatory system. Had the Group 10 report included enforcement, one demographic or another would have surely claimed the presentation of the data to be biased. Avoiding the issue, however, did nothing to enhance the AER's perceived level of transparency and credibility. As well, permitting CNRL to resume operations after the release of a bulletin that appeared to place a temporary moratorium on future steam assisted recovery projects garnered further negative media attention. A positive public perception of effective compliance and enforcement activities is, in some sense, more important than whether or not it is occurring in reality. This is due to notions of social acceptability, and the economic repercussions associated with not having it.

One possible explanation for the AER's decision in the CNRL case may rest upon the notion of regulatory flexibility. Perhaps the AER chose to incorporate elements of advice and persuasion, responsive regulation, as well as criteria and risk based strategies in allowing CNRL to proceed. The challenge is that the media and the public are seldom if ever privy to how such decisions are made, or the rationales that inform them. The onus is therefore on the regulator to explain what factors were considered in arriving at, amending or reversing, a particular decision. Ambiguous responses such as "...we are satisfied this approach will successfully mitigate potential risks"<sup>136</sup>, are not good enough. The end result, once again, is diminished transparency

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<sup>136</sup> Anna Mehler Paperny and Leslie Young. "Alberta Oil Spill: Examining CNRL's Safety Record." *Global News*, December 2, 2014.



and public trust. However, these are relatively minor quibbles in the grand scheme, as the AER is considered by many to be a model of regulatory excellence.

The following sections will provide similar evaluations of the remaining three jurisdictions. It should be noted from the outset of this analysis that each applies a relatively stringent and thorough regulatory framework for hydraulic fracturing. As well, all incorporate a mix of the discussed regulatory strategies (hybrid model) to one degree or another. Of course, as is the case in Alberta with the AER, they are not without their own areas for improvement or controversy. Texas in particular is implicated in a 2012 Earthworks study that outlines an alleged crisis in oil and gas enforcement in the United States. As I further hope to demonstrate, there are some significant differences between the AER and these jurisdictions – not only in terms of specific regulations (or their absence) – but also in other key areas such as innovation, stakeholder engagement, and enforcement strategies by which the AER has become broadly recognized as the model to emulate. In fact, a recent WorleyParsons report ranks the AER number one in ensuring regulatory compliance and public transparency, and second in terms of the stringency of environmental regulations.<sup>137</sup>

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<sup>137</sup> WorleyParsons, 2014. *Environmental Regulation: An International Comparison of Leading Oil and Gas Producing Regions*.

**Table 6.4 - Alberta Energy Regulator Performance Rubric**

| <b>Category</b>                            | <b>Score (out of 5)</b> | <b>Rationale</b>   |
|--|-------------------------|--|
| Comprehensiveness/Stringency of Regulation | 4.5                     | The AER boasts (though not by a wide margin) the most extensive and rigorous set of regulations of the four jurisdictions. Improvements could be made in the areas of mandatory water recycling and expanded baseline water well testing requirements.   |
| Transparency                               | 3.5                     | The lower score here is attributed not only to the media controversies and the Global Forest Watch report, but the non-responses to those challenges. Still though, especially given the AER's relative infancy, they must be commended for vast improvements to data access/reporting, and changes to environmental monitoring processes. |
| Competency                                 | 4.5                     | AER staff brings excellent credentials, and apply that expertise in developing policy that strikes a difficult balance between economic and environmental concerns.  |
| Adaptability                               | 4.0                     | The AER has done an adequate job of building in adaptability through ongoing education and energy literacy initiatives for both industry and the public. Room for improvement in terms of being proactive rather than reactive on introducing new regulatory measures, i.e. Fox Creek seismic monitoring                                   |
| Fairness                                   | 4.0                     | Although the public and the media may not always approve, the AER has done a good job balancing the needs of multiple stakeholders, i.e. CNRL approvals to continue Primrose operations, new seismic monitoring requirements for Fox Creek   |

*\*Each category worth 5 possible points; total possible points = 25*

*\*AER Total = 20.5/25*

**AER Final Score: 8.2/10**

## **6.5 – British Columbia**

Established in 1998, the BCOGC, as illustrated in Appendix tables A1-A8, measures up well to the AER in its regulation of hydraulic fracturing. An Ernst & Young report, undertaken at the request of the BCOGC, concluded that despite “a number of improvement opportunities... overall, hydraulic fracturing is well regulated in B.C.”<sup>138</sup> In total, the report identifies twenty-three opportunities for improvement, along with four “strategic considerations.”<sup>139</sup> These include the development of improved requirements to baseline testing and monitoring of surface and groundwater, data collection and submission requirements for enhanced protection of shallow aquifers, greater regulatory oversight including higher fines, measures to increase transparency, and the adoption of play based regulation.<sup>140</sup> The AER already has regulations in place requiring baseline testing of groundwater for shallow coal bed methane wells. In addition, there are comprehensive requirements for data collection to assist in identifying and mapping for base of groundwater protection (BGWP), and the previously mentioned play based regulation project.

The BCOGC also suffers from a comparative lack of transparency. As the Ernst & Young report notes, one way transparency may be improved involves requiring operators to report both the volume and source of water used for fracking activities; such requirements are already present in Alberta. Specifically, licensees must submit a detailed report of their frack fluid water source after the completion of every hydraulic fracturing operation.<sup>141</sup> To be fair, it is not all bad new for the BCOGC on matters pertaining to water use. For example in 2012, B.C. became the first province to make disclosure of frack fluid compositions mandatory along with the

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<sup>138</sup> Ernst & Young. *Review of British Columbia’s Hydraulic Fracturing Regulatory Framework*, March 3, 2015. Online: <http://www.bcogc.ca/node/12471/download> Accessed September 1, 2015.

<sup>139</sup> Ibid.

<sup>140</sup> Ibid.

<sup>141</sup> Ibid.

establishment of the FracFocus website. Alberta would follow suit soon thereafter. In addition, certain areas of the BCOGC's water management, including scarcity, groundwater and aquifer protection, fracking fluid composition disclosure, and produced water storage, disposal, and reuse, the Ernst and Young report concluded B.C. to be a leader.<sup>142</sup>

To return to the question of transparency, the BCOGC has also had its share of problems in terms of negative media coverage and public perception. According to a 2013 Vancouver Sun story, 4,223 inspections revealed "...more than 800 deficiencies... including... natural gas drilling sites that use the controversial practice of hydraulic fracturing."<sup>143</sup> Of these deficiencies, 80 resulted in formal charges, mostly due to failures to report volume of water use as required by the province's *Water Act*.<sup>144</sup> The primary problem, however, rests with how the commission has chosen to deal with these incidents. Although the number of deficiencies was made available, specific details and which companies were involved were not because "...the commission will not provide that information."<sup>145</sup> The article further observes that the commission refrained from publishing the names of companies convicted in court cases involving more serious environmental transgressions, despite the fact that the province's Ministry of Environment and agencies such as WorkSafeBC have long provided such information.<sup>146</sup> Then commissioner and CEO Paul Jeakins admitted shortcomings in the way the BCOGC reports its compliance and enforcement data, stating, "It's a bit of a gap."<sup>147</sup>

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<sup>142</sup> Ibid.

<sup>143</sup> Gordon Hoekstra. "B.C. Oil and Gas Commission Lacks 'Transparency' on Fracking Violations." *The Vancouver Sun*. February 18, 2013. Online: <http://www.vancouversun.com/technology/Commission+lacks+transparency+fracking+violations/7982077/story.html#ixzz2LJxOTr2b> Accessed September 1, 2015.

<sup>144</sup> Ibid.

<sup>145</sup> Ibid.

<sup>146</sup> Ibid.

<sup>147</sup> Ibid.

Clearly, these examples – of regulatory gaps where no formal reporting of water volumes or sources is required, along with incomplete or unavailable information for public consumption – illustrate the BCOGC’s transparency standards require improvement. It should also be noted that many of these concerns were stated in response to 2012 enforcement data. In 2013, the commission began posting both quarterly and annual compliance and enforcement summaries, including company names along with incident descriptions and outcomes. The introduction of FracFocus is worth mentioning again here, as is an overall increased commitment to transparency and public engagement.

Other areas in which the BCOGC has failed to equal the standards set by the AER include public engagement, microseismic data collection, mapping and data collection for BGWP, adequate centralizing and placement of surface casings, and offset well risk assessments to mitigate the potential for interwellbore communication.<sup>148</sup> Here, I will briefly address the areas of public engagement and microseismic data collection. In Alberta, an innovative model for community and public engagement has been put into place via a non profit organization known as Synergy Energy.<sup>149</sup> Operating as “...a partnership between the regulator, government, and industry... Synergy Alberta provides support to community based groups that serve as forums... to discuss impacts to local quality of life caused by oil and gas activities.”<sup>150</sup> In addition to the already implemented improvements, BCOGC would do well to establish a similar model.

With respect to microseismic monitoring, Alberta currently requires results to be included as part of the daily drilling and completion reports; in B.C., microseismic data is not considered

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<sup>148</sup> Ibid.

<sup>149</sup> Ibid.

<sup>150</sup> Ibid.

to be part of well completion data and is therefore not submitted to the BCOGC.<sup>151</sup> As the Ernst & Young report contends, including such data would not only enhance transparency, but would also provide the additional benefit of helping to determine the most effective and efficient hydraulic frack technique to maximize well production.<sup>152</sup>

Despite the numerous regulatory challenges facing the BCOGC, the Ernst & Young report identifies several notable achievements as well. These include the already mentioned water lifecycle and management regulations, as well as recognized research in the area of induced seismicity, increased levels of seismic monitoring, and ongoing measures to address quality of life concerns.<sup>153</sup>

Finally, the BCOGC's regulatory approach, as with the AER may be best described as a hybrid model. However, unlike the AER, it is less clear when and how a specific regulatory strategy may be employed. The AER's website has clear and easily accessible documents and tables outlining the progression of non-compliance and enforcement actions. The BCOGC website meanwhile has one brief document that details the general philosophy and process, but is short on specifics. Nonetheless, many of the same elements appear to be in place, including education, progressive discipline up to and including work stoppages and fines, and self-regulation components, which encourage industry to develop and promote best practices. As in Alberta, the commissions website provides tools for the filing of complaints, as well as information regarding investigations and emergency response procedures.

In the final analysis, the BCOGC's regulatory record, despite a few shortcomings pertaining to transparency and regulatory gaps, remains solid. Evaluating the adequacy of

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<sup>151</sup> Ibid.

<sup>152</sup> Ibid.

<sup>153</sup> Ibid.

compliance and enforcement raises the same questions as in Alberta; out of 4,223 inspections in 2012, which identified over 800 deficiencies, only 80 resulted in any enforcement action. This translates to roughly 10%. Meanwhile, the second quarterly enforcement action summary for 2015 lists 21 enforcement actions, including 10 orders, 5 tickets, and 8 administrative penalties.<sup>154</sup> Prorated over four quarterly reports, this would translate to roughly 80 enforcement actions, consistent with 2012 numbers. Unavailable is the total number of inspections and found deficiencies that produced these results. In either case, the 10% enforcement rate from 2012 is more than 10 times higher than Alberta's rate from the GFW study. Does this indicate better enforcement, or simply lower levels of compliance based on regulatory gaps and inefficiencies? It is impossible to know for certain.

As for the identified areas for improvement, the commission has demonstrated a willingness to address the challenges and criticisms in an honest and concrete fashion. Its leadership in the areas of water management and seismicity, along with the establishment of the FracFocus portal are prominent examples. The BCOGC's performance rubric appears on the following page.

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<sup>154</sup> British Columbia Oil & Gas Commission. *BC Oil and Gas Commission Quarterly Enforcement Action Summary*. April 1, 2015 to June 30, 2015. Online: <https://www.bco.gc.ca/node/12714/download> Accessed September 2, 2015.

*Table 6.5 – British Columbia Oil and Gas Commission Performance Rubric*

| <b>Category</b>                            | <b>Score (out of 5)</b> | <b>Rationale</b>  |
|--|-------------------------|---|
| Comprehensiveness/Stringency of Regulation | 4                       | Little significant difference from the AER, but improvements are needed in the areas of baseline data collection and rules pertaining to injection/disposal wells   |
| Transparency                               | 3                       | Public engagement, data collection and recording processes, incomplete information, and BGWP mapping are all areas for improvement relative to AER standards. Ongoing measures to address these areas.  |
| Competency                                 | 4                       | As with the AER – knowledgeable, well staffed and adequately funded. Also considered leader in many regulatory areas including induced seismicity and water management practices (1 <sup>st</sup> to implement FracFocus mandatory fracking fluid disclosure) |
| Adaptability                               | 4.5                     | All indications are that the BCOGC is aware of and committed to existing gaps – already introduced measures (increased seismic monitoring and FracFocus) as well as verbal acknowledgments indicate willingness to grow                                       |
| Fairness                                   | 4                       | The sum of the BCOGC’s actions over the last several years indicate a willingness to work with operators to promote compliance, while using enforcement penalties when necessary  |

*\*Each category worth 5 possible points; total possible points = 25*

*\*BCOGC total points = 19.5/25*

***BCOGC Final Score: 7.8/10***

## **6.6 – Texas**

The regulatory picture in Texas is best described as convoluted, and fraught with significant controversy. In contrast to the frameworks in Alberta and British Columbia, where regulation, compliance and enforcement, as well as legislative oversight are under the



jurisdiction of a single regulator, Texas employs both the Railroad Commission (RRC) and the Texas Commission on Environmental Quality (TCEQ) to manage the state's oil and gas activities. Texas Administrative Code (TAC) rule §3.30 acts as a Memorandum of Understanding (MOU) between the two agencies outlining their respective roles and jurisdictions in key areas.<sup>155</sup>

The RRC, initially established in 1891 to regulate the state's railroads, was granted jurisdiction over oil and gas development in 1920.<sup>156</sup> Originally known as the Texas Natural Resource Conservation Commission, the TCEQ came into being in 1993 to provide "...comprehensive environmental protection... and make natural-resource protection more efficient."<sup>157</sup> Both agencies employ a variety of academics and technical professionals with both public and private sector credentials. The RRC staffs anywhere from 500-1000 employees, and as a government agency, is publicly financed.<sup>158</sup> The TCEQ meanwhile, employs approximately 2,750 staff across 16 regional offices, and operates on an annual budget of \$368 million.<sup>159</sup>

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<sup>155</sup> Texas Administrative Code, 2015. *Rule §3.30 Memorandum of Understanding Between The Railroad Commission of Texas (RRC) and The Texas Commission on Environmental Quality (TCEQ)*. Title 16, Part I, Chapter 3. Online: [http://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=16&pt=1&ch=3&rl=30](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30) Accessed September 3, 2015.

<sup>156</sup> Railroad Commission of Texas (RRC), 2015. *Railroad Commission Milestones*. Online: <http://www.rrc.state.tx.us/about-us/history/milestones/> Accessed September 3, 2015.

<sup>157</sup> Texas Commission on Environmental Quality (TCEQ), 2015. *History of The TCEQ and Its Predecessor Agencies*. Online: <https://www.tceq.texas.gov/about/tceqhistory.html> Accessed September 3, 2015.

<sup>158</sup> LinkedIn, 2015. *Railroad Commission of Texas: Overview/LinkedIn*. Online: <https://www.linkedin.com/company/railroad-commission-of-texas> Accessed September 3, 2015.

<sup>159</sup> Texas Commission on Environmental Quality (TCEQ), 2015. *History of The TCEQ and Its Predecessor Agencies*. Online: <https://www.tceq.texas.gov/about/> Accessed September 3, 2015.

I begin by evaluating these agencies on the basis of stringency and comprehensiveness of regulation. Through a direct comparison of the RRC's hydraulic fracturing rules to the AER, there is little to differentiate the two regulators, with the only significant gap relating the absence of any mandatory baseline data collection for groundwater and aquifers (see Appendix tables A1-A8). For its part, the TCEQ boasts an exhaustive list of environmental regulations (see included link in Appendix C.3) to supplement the oil and gas rules outlined by the RRC in the Texas Administrative Code. Further, both agencies have garnered a high level of respect and recognition for their regulatory practices. As David Blackmon observes, "The new Rule 13<sup>160</sup> once again puts Texas's regulatory structure at the forefront of state level industry regulation and now serves as a state of the art role model that other states are in the process of emulating."<sup>161</sup> Another recent and significant regulatory addition was the commission's implementation of Rule 29, described as "One of the nation's most comprehensive rules for disclosure of chemical ingredients used in hydraulic fracturing fluids. The rule requires Texas oil and gas operators to disclose on the FracFocus website chemical ingredients and water volumes used in hydraulic fracturing treatments."<sup>162</sup> Based on these considerations, the RRC ranks well in the areas of stringency and comprehensiveness of regulation.

With respect to staffing, governance, and issues of transparency, the RCC has faced and continues to deal with a range of challenges. In 2012, the not for profit environmental group

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<sup>160</sup> RRC Rule 13 updates completions requirements, groundwater protection, and hydraulic fracturing operations.

<sup>161</sup> David Blackmon. "The Texas Railroad Commission Isn't Broken." *Forbes Business*, May 15, 2014. Online: <http://www.forbes.com/sites/davidblackmon/2014/05/15/the-texas-railroad-commission-isnt-broken/> Accessed September 3, 2015.

<sup>162</sup> Railroad Commission of Texas (RRC), 2015. *Hydraulic Fracturing*. Online: <http://www.rrc.state.tx.us/about-us/resource-center/faqs/oil-gas-faqs/faq-hydraulic-fracturing/> Accessed September 3, 2015.

Earthworks published a study alleging a crisis of oil and gas enforcement throughout the United States, including Texas.

Beginning with staffing, the study claims, “Overall, and without exception, inspection capacity for each of the six states examined is egregiously lacking... in 2010... Texas inspectors did not inspect approximately 139,000 wells (53% of active wells).<sup>163</sup> In 2011, the RRC employed 97 field inspectors to oversee 270, 233 active wells, conducting a total of 114,878 inspections.<sup>164</sup> This meant that 42.5% of Texas’ active wells were inspected in 2011. Earthworks further observes that, when compared with 1993 numbers, the RRC employed 20 more inspectors to oversee 24,000 fewer wells.<sup>165</sup> The ultimate conclusion here is that staffing levels and inspection numbers have fallen as oil and gas activity has increased. This, the study suggests, is cause for concern. However, an important question that this analysis does not address is what the appropriate level of inspections ought to be. Regulation and its enforcement is an expensive endeavour and 100% inspection levels are neither possible nor desirable from an economic, cost benefit perspective. To better illustrate this point, it is worthwhile to contemplate the economic principle of a socially optimal level of pollution. The overall objective is to maximize the net societal benefits that result from a given polluting activity. Hence, the socially optimal level of pollution occurs when the marginal benefit of the last unit of pollution equals its marginal cost, with all associated externalities adequately accounted for. Though well beyond the scope of this project, it ought to be possible to establish an optimal level of inspections, such that beyond a

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<sup>163</sup> Lisa Sumi. *Breaking All The Rules: The Crisis In Oil & Gas Regulatory Enforcement*. Earthworks Oil & Gas Accountability Project, September 2012. Online: [https://www.earthworksaction.org/library/detail/breaking\\_all\\_the\\_rules\\_the\\_crisis\\_in\\_oil\\_and\\_gas\\_regulatory\\_enforcement#.VejOCCj7CF8](https://www.earthworksaction.org/library/detail/breaking_all_the_rules_the_crisis_in_oil_and_gas_regulatory_enforcement#.VejOCCj7CF8) Accessed September 3, 2015.

<sup>164</sup> Earthworks, 2015. *Texas Oil & Gas Enforcement – Inspections*. Online: [https://www.earthworksaction.org/issues/detail/texas\\_oil\\_gas\\_enforcement\\_inspections#.VfBvNyj7CF9](https://www.earthworksaction.org/issues/detail/texas_oil_gas_enforcement_inspections#.VfBvNyj7CF9) Accessed September 7, 2015.

<sup>165</sup> Ibid.

certain point, the marginal cost of conducting any additional inspections would outweigh the marginal benefit. I do not profess to know where that point would be, however any assertion that the existing rates are too low must be met with a degree of caution and skepticism. Simply stating that they are too low because they are less than before is insufficient to establish a problem exists.

Another feasible explanation behind any apparent staffing shortages is the shale gas revolution itself. Whenever a highly regulated industry such as oil and gas experiences such intense, rapid growth, regulators are inevitably required to play catch up. David Blackmon writes:

“The Commission was caught a bit short-staffed by the state’s shale oil and gas boom that ramped up very rapidly in the 2008 through 2010 time frame, but that should not be surprising. It always takes a period of time for any government agency at any level to react and modernize in response to such dramatic and rapid change in any regulated industry. Frankly, the response by the Railroad Commission to what has really been an unprecedented and massive boom has been quite efficient when compared to the glacial pace of agencies at the federal level, and in other states around the country.”<sup>166</sup>

Another key argument of the Earthworks study is that existing fines are too low to truly incentivize compliance. Between 2006 and 2012, the average enforcement penalty was \$2508.<sup>167</sup> In 2010, the RRC collected a total of \$2 million from enforcement penalties.<sup>168</sup> While this number may appear substantial, the average value of one Marcellus shale gas well in 2010 was \$2.9 million, with over 250,000 total wells under the commission’s jurisdiction in any given year.<sup>169</sup> Financial penalties are so low, the study claims, that they are simply viewed as “the cost

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<sup>166</sup> David Blackmon. “The Texas Railroad Commission Isn’t Broken.” *Forbes Business*, May 15, 2014.

<sup>167</sup> Lisa Sumi. *Breaking All The Rules: The Crisis In Oil & Gas Regulatory Enforcement*. Earthworks Oil & Gas Accountability Project, September 2012.

<sup>168</sup> *Ibid.*

<sup>169</sup> *Ibid.*

of doing business.”<sup>170</sup> Although I agree with the overall position that penalties are an important compliance tool, and that existing levels may be too low<sup>171</sup>, it remains important to consider the broader impacts of increasing these amounts. The firms that are least likely to be incentivized towards compliance by fines (perhaps at any level) are the large players. As noted earlier, these companies are driven to comply based on their reputation and social acceptability, rather than punitive financial measures. Large increases in penalties for violations may have a disproportionate impact on smaller and medium sized operations, perhaps threatening their profitability and longevity. Therefore, any such increase would need to be carefully considered. To revisit the work of Coglianesse and Gunningham, other less adversarial and more cost effective strategies may be implemented, including education and awareness initiatives for both industry and the general public. Although the Earthworks study is highly critical of the RRC’s record on staffing, monitoring and enforcement, these counterpoints illustrate the need for a more balanced and nuanced perspective.

Agency transparency is another area where the RRC has faced substantial criticism and challenges. Earthworks’ allegations of substandard, lax enforcement represent the most obvious critique – after all, regulatory transparency is measured first and foremost by a willingness and ability to enforce the rules. There have been other notable concerns as well however, related to the accuracy, completeness, and accessibility of data, and various conflict of interest issues. In 2011, the Texas Sunset Commission observed that the RRC failed to properly record and publish information on serious and repeat violations.<sup>172</sup> With regards to conflict of interest, the fact that state government representatives chair the commission, and that those seeking election to the

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<sup>170</sup> Ibid.

<sup>171</sup> The Earthworks study notes that maximum penalties are often based on outdated state ordinances.

<sup>172</sup> Lisa Sumi. *Breaking All The Rules: The Crisis In Oil & Gas Regulatory Enforcement*. Earthworks Oil & Gas Accountability Project, September 2012.

commission are permitted to receive campaign donations from industry does little to promote transparency. The RRC not being an arms length, independent agency is further problematic to the extent that it opens the door, however slightly, to partisan influence. The Texas state government responded to the citizens of Denton's decision to ban hydraulic fracturing by passing bill HB40, effectively overturning municipalities' ability to stop unwanted projects from going forward.

With the Earthworks study having been published in 2012, it is reasonable, before offering a final assessment of the RRC to investigate what changes if any, have been made. First, as with the AER, the RRC has made significantly more information available on its website regarding enforcement actions, summaries, penalties, serious incidences and repeat offenders than it did in 2012. These moves certainly assist in improving transparency and removing barriers to citizen involvement. In addition, the RRC's 2013-2017 Strategic Plan identifies the need to improve enforcement processes and transparency. To that end, in 2011 the commission established an Enforcement Roundtable to discuss the specifics of such improvements, as well as technological improvements and training.<sup>173</sup> Other initiatives, as noted by Blackmon, have included industry agreeing to raise various project application and administrative fees to increase the commission's available budget, thereby permitting the hiring of additional field inspectors.<sup>174</sup>

As for Earthworks' claims of inadequate enforcement, it must be restated that low enforcement numbers are not necessarily indicative of an enforcement problem; they may in fact reveal a high level of compliance. Still, the RRC suffers from not being at arms length to the government, and despite recent improvements, accessibility to and completeness of information

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<sup>173</sup> Railroad Commission of Texas. *Strategic Plan For The Fiscal Years 2013 – 2017*, June 2012. Online: [http://www.rrc.state.tx.us/media/19894/stratplan\\_2013-2017.pdf](http://www.rrc.state.tx.us/media/19894/stratplan_2013-2017.pdf) Accessed September 8, 2015.

<sup>174</sup> David Blackmon. "The Texas Railroad Commission Isn't Broken." *Forbes Business*, May 15, 2014.

have been ongoing issues. In comparing the RRC’s website to the AER, it is immediately apparent how hidden and buried much of the information is, if it is available at all. At least part of the problem stems from the shared role the RRC has with the TCEQ. As such, the RRC would benefit greatly from adopting the single regulator approach employed by the AER. In certain instances, regulatory non-compliance may be simply the result of unawareness. If important regulatory information is too decentralized, scattered, or not readily available, compliance is inadvertently discouraged. As I stated at the outset of this section, the portrait of the RRC is a convoluted and contentious one. On one hand, it is broadly recognized as a leader in the regulatory realm, while on the other it has been beset by significant challenges pertaining to its transparency and credibility.

**Table 6.6 - Railroad Commission Performance Rubric**

| <b>Category</b>                            | <b>Score</b> (out of 5) | <b>Rationale</b>   |
|--|-------------------------|--|
| Comprehensiveness/Stringency of Regulation | 4                       | Full and extensive set of regulations governing hydraulic fracturing enforced by the RRC and the TCEQ. Baseline data for water wells, and mandatory water recycling regulation are areas for improvement |
| Transparency                               | 2.5                     | Elected commissioners; election campaign funding from industry permissible; conflicts of interest; a lack of easily available and accessible enforcement data  |
| Competency                                 | 3.5                     | Inadequate levels staffing and funding have been issues, negatively impacting inspection levels. Increases to administrative fees for operators may help to address this.                                |
| Adaptability                               | 4.0                     | Government agencies less amenable to change than other organizations, but the RRC is trying. Mandatory fluid content disclosure, inclusion of online enforcement data, Rule 13                           |

|          |     |   |
|----------|-----|---|
|          |     | updates for completions requirements and groundwater protection, and the a focus on transparency in the 2007-2013 Strategic Plan indicate a willingness to adapt.   |
| Fairness | 4.0 | Compliance over enforcement, and robust regulations means a willingness to balance the economic and environmental challenges. Opinions are divided after RRC’s decision to continue issuing approvals after the passing of bill HB40. |

\*Each category worth 5 possible points; total possible points = 25

\* RRC total points = 18/25

**RRC Final Score: 7.2/10**

**6.7 - Oklahoma**

The Oklahoma Corporation Commission (OCC) was established in 1907, and was granted jurisdiction over oil and gas regulation in 1914.<sup>175</sup> According to the commission’s 2012 fiscal report, the Oil and Gas Conservation Division (OGCD) employs approximately 123 staff, with an annual budget of \$15 million.<sup>176</sup> Its organizational structure closely resembles that of the RRC, being a government agency chaired by three elected commissioners.

In 2011 the OCC volunteered to have its hydraulic fracturing program assessed by the not for profit, multi-stakeholder organization known as State Review of Oil and Natural Gas Environmental Regulations (STRONGER). The review concluded, “The

<sup>175</sup> Oklahoma Corporation Commission, 2015. *Oklahoma Corporation Commission History*. Online: <https://www.occeweb.com/Comm/commissionhist.htm> Accessed September 8, 2015.

<sup>176</sup> Oklahoma Corporation Commission, 2015. *Fiscal Year 2012 Annual Report*. Online: <http://www.occeweb.com/News/FY12%20Annual%20Report%202c.pdf> Accessed September 8, 2015.



Oklahoma program is, over all, well-managed, professional and meeting its program objectives.”<sup>177</sup> The report outlines what it considers the OCC’s program strengths, while also noting areas for improvement. In particular, STRONGER credits the OCC for its comprehensive regulations and standards, strategic planning to further improve the program, as well as the development and distribution of the Guardian Guidance document.<sup>178</sup> In terms of regulation, STRONGER points to revisions made to OCC Rule 165:10-3-10, which introduced well completion standards for hydraulic fracturing, as well as the storage and recycling of produced water and frack fluid waste.<sup>179</sup> Also included in this rule is a general prohibition against pollution of both surface and groundwater, as well as a reference guide to the 35 other rules governing hydraulic fracturing activities.<sup>180</sup> STRONGER observes, “These comprehensive standards provide a model for other states.”<sup>181</sup> A particularly innovative tool employed by the OCC is the Guardian Guidance document, which “...provides a step-by-step process an operator follows to assess, clean up if necessary, and close: 1) historically impacted sites and 2) complex and/or unusually extensive sites, and sites that have known or likely impacts to ground water or surface water.”<sup>182</sup>

As for areas of improvement, STRONGER recommends including a regulatory requirement to notify the OGCD prior to the commencement of fracking operations, modifications to how well completion data are recorded, and improved program funding.<sup>183</sup> On

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<sup>177</sup> State Review of Oil & Natural Gas Environmental Regulations (STRONGER). *Oklahoma Hydraulic Fracturing State Review*, January 2011. Online: <http://www.occeweb.com/STRONGER%20REVIEW-OK-201-19-2011.pdf> Accessed September 8, 2015.

<sup>178</sup> Ibid.

<sup>179</sup> Ibid.

<sup>180</sup> Ibid.

<sup>181</sup> Ibid.

<sup>182</sup> Ibid.

<sup>183</sup> Ibid.

the last point, the review maintains, “Rig activity has increased 40% over last year... the State of Oklahoma ought to develop a more stable source of funding for the OGCD and provide resources to allow the filling of positions and provision of equipment to a level that is sufficient to meet program responsibilities.”<sup>184</sup> STRONGER further commends the OCC for engaging in their own internal review of hydraulic fracturing operations, which resulted in numerous rule additions and revisions to bring the OCC’s standards in line with current trends and best practices.<sup>185</sup>

On the compliance and enforcement side, the OGCD, as part of a five year strategic plan (2007-2011), implemented measures to increase well data compliance through the compliance tracking system.<sup>186</sup> In a departure from the standards set by the other regulators evaluated in this study, no data pertaining to compliance and enforcement rates is immediately available, save through a public records request. In fact, the only area of the OCC’s website that contained any enforcement data was part of a presentation given by chairman Bob Anthony, in which he responds to critics of hydraulic fracturing. Anthony’s presentation notes that in 2011, the OCC inspected 58,425 out of 138,500 total active wells.<sup>187</sup> This translates to roughly 42%, virtually identical to Texas’ inspection ratio during the same period. Strangely absent is any data on the number of inspections that resulted in any enforcement action, although the total dollar figure the OCC collected in fines, \$199,250, is given.<sup>188</sup> The lack of complete data makes it impossible to

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<sup>184</sup> Ibid.

<sup>185</sup> Ibid.

<sup>186</sup> Ibid.

<sup>187</sup> Commissioner Bob Anthony, Oklahoma Corporation Commission. *Response To Attacks On Hydraulic Fracturing (A Proven Well Completion Technology For Shale Gas)*. Presented at the Woodford Shale Summit, University of Oklahoma, Norman Oklahoma, March 30, 2011. Online: [http://www.occeweb.com/Comm/Anthony/Woodford%20Summit%2003302011v\\_final3.pdf](http://www.occeweb.com/Comm/Anthony/Woodford%20Summit%2003302011v_final3.pdf) Accessed September 9, 2015.

<sup>188</sup> Ibid.

establish what the average penalty may have been, which operator(s) were responsible, and whether or not compliance was finally achieved. Incorporating accurate, complete, and (easily) accessible information regarding enforcement activities would greatly enhance transparency and improve public accountability.

In furthering the discussion on transparency, the OCC's governance and organizational structure, like its Texas counterpart, creates the potential for partisanship and conflicts of interest. As I stated in my RRC evaluation, the AER's 'arms length' single regulator approach, combined with the presence of a strong self-regulation model through industry associations like CAPP, ensures a fairer, more balanced regulatory regime.

An additional challenge associated with exclusively administered regulation includes the notion of regulatory capture. Regardless of whether a jurisdiction's primary regulator is state operated, corporate, or independent, contributions and insights from all these areas provide the most effective overall mix. Kenneth Green maintains, "Purely regulatory approaches have their limitations: they can be cumbersome, and lend themselves to regulatory capture (where the regulators come to have more in common with the industry than the public)... They also protect companies from full liability—companies are rarely prosecuted if they are following the rules government has set for them."<sup>189</sup> Innovative projects, such as the previously mentioned Synergy Alberta, along with Green's suggestions for stronger property rights, strict liability insurance, and independent project approval organizations are potential pieces of this puzzle.<sup>190</sup>

Beyond the OCC's organizational limits, it also shares, to an extent, oversight duties with the Oklahoma Water Resources Board (OWRB). As its name implies the OWRB's mission is:

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<sup>189</sup> Kenneth P. Green. "Managing The Risks of Hydraulic Fracturing." *The Fraser Institute*, December 2014, 22.

<sup>190</sup> *Ibid.*,

“To protect and enhance the quality of life for Oklahomans by managing and improving the state’s water resources to ensure clean and reliable water supplies... our duties and responsibilities include water use appropriation and permitting, water quality monitoring and standards, water supply planning, technical studies and research, and water resource mapping.”<sup>191</sup>

As with the RRC’s shared responsibility with the TCEQ, this dual oversight creates unnecessary complexity and confusion for citizens and industry alike regarding the various rules pertaining to hydraulic fracturing. Simply stated, unlike the AER, which has jurisdiction and authority on all matters pertaining to fracking’s regulation, including water licensing and permits, operators must invest substantially more time understanding how to achieve regulatory compliance. Adopting a true single regulator approach would go a long way to alleviating these sorts of unnecessary bureaucratic impediments.

Finally, similar complaints regarding low or lax enforcement standards have been levied against the OCC. A September 2015 article appearing in the online publication *The Big Story*, decries the apparent infrequent and insignificant enforcement action the OCC has taken against operators who commit environmental violations. It states, “Spills by the tens of thousands have denuded farm and ranch lands and polluted waters in oil-producing areas for decades, yet only a small minority resulted in discipline... Since early 2013, the agency has proposed \$2,575,000 in fines but collected only \$203,112.”<sup>192</sup> The OCC’s Matt Skinner responded by stating, “We certainly believe there's a time and a place for that hammer, but we want to be very judicious in

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<sup>191</sup> The Oklahoma Water Resources Board, 2015. *About Us – Missions & Responsibilities*. Online: <http://www.owrb.ok.gov/about/index.php> Accessed September 9, 2015.

<sup>192</sup> John Flesher. “States Rarely Punish Companies For Oil Wastewater Spills.” *The Big Story*, Associated Press, September 8, 2015. Online: <http://bigstory.ap.org/article/2d0de615d98841f9b4ac5ea74f499979/states-rarely-punish-companies-oil-wastewater-spills> Accessed September 9, 2015.

its use.”<sup>193</sup> In Texas, RRC spokeswoman Ramona Nye also weighed in, arguing a regulator’s primary objectives ought to lie in achieving compliance through cooperative and consultative approaches, with fines acting as “a last resort.”<sup>194</sup> It is worth noting that these statements reflect what Coglianese and Gunningham have identified as crucial elements of regulatory excellence, and that a heavy handed rules and deterrence strategy, used in isolation, seldom produces the desired outcomes.

Clearly, as with the other jurisdictions I have evaluated, the OCC could benefit from some revisions to its structure, division of roles, data accessibility, and enforcement model to enhance transparency. Nevertheless, the other evidence I have presented – internal reviews, volunteering to be a part of the STRONGER review, a demonstrated willingness to revise and adapt when necessary – all illustrate strong examples of a transparent regulatory model. Other positive elements that I have not mentioned include a robust public complaints system and online links to important issues currently facing the commission and the hydraulic fracturing industry. Perhaps the most prominent current example of this is the earthquakes.ok.gov link that the commission has established to inform citizens about the potential link between seismic events and hydraulic fracturing, and what is being done to minimize any potential risks.

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<sup>193</sup> Ibid.

<sup>194</sup> Ibid.

**Table 6.7 - Oklahoma Corporation Commission Performance Rubric**

| <b>Category</b>                            | <b>Score (out of 5)</b> | <b>Rationale</b>  |
|--|-------------------------|---|
| Comprehensiveness/Stringency of Regulation | 4                       | On par with the other jurisdictions in this study, with similar gaps – need to introduce mandatory baseline testing, although OWRB does conduct its own testing.  |
| Transparency                               | 3.5                     | Similar challenges to RRC; government agency with elected commissioners; potential for conflicts of interest, partisanship. Compliance and enforcement data not available online, except through a public records request. Higher score than RRC due to internal review and volunteered participation in STRONGER |
| Competency                                 | 3.5                     | The OCC and OGCD have made good use of their available resources, but inadequate staffing, inspection and budget levels are an issue. <sup>195</sup>  |
| Adaptability                               | 4                       | Internal reviews and STRONGER participation reveal responsiveness to changing circumstances and criticism. Strong public complaints system & implementation of earthquakes.ok.gov all demonstrate high level of adaptability  |
| Fairness                                   | 4                       | Regulators must satisfy the needs of a wide range of stakeholders. The OCC has done a good job here, developing solid regulation, and promoting compliance over rules and deterrence style enforcement.   |

\*Each category worth 5 possible points; total possible points = 25

\*OCC total points = 19/25

**OCC Final Score: 7.6/10**

<sup>195</sup> State Review of Oil & Natural Gas Environmental Regulations (STRONGER). *Oklahoma Hydraulic Fracturing State Review*, January 2011.

## **7.0 – Recommendations & Conclusions**

As indicated in the executive summary, the impetus for this study rested upon discovering to what degree the allegations of an enforcement crisis in the regulation of the oil and gas industry, and hydraulic fracturing in particular, might be true. As my research progressed a number of different considerations evolved. The first is that although the literature on hydraulic fracturing is extensive, few if any of the existing works deal with the issue of compliance and enforcement in any direct sense. Instead, the majority focuses on how to best regulate and minimize the associated negative impacts. Constraining any productive discussion on this topic is the often highly contentious nature of the fracking narrative, whether it is in relation to disagreements regarding scientific analyses, or the severity and likelihood of negative consequences for the environment and human health. Here, I conclude, that with strong, comprehensive, and adaptable regulation, coupled with effective enforcement, it is more likely that the net economic and social benefits will exceed costs. As Green has maintained, bans and moratoria simply defer risk, at the expense of prosperity and knowledge.

The second consideration involves gaining an in depth understanding of what modern environmental regulatory excellence requires. A common, yet subtle thread runs throughout the various critiques of oil and gas enforcement – the notion that adequate enforcement must be frequent and severe. Yet, none of the studies taking this view ever investigate or propose what an adequate level of enforcement would look like. Such an approach falls into what Gunningham describes as rules and deterrence, which has proven to be highly inefficient in producing positive regulatory outcomes. In fact, reflection upon the research presented by Coglianese and Gunningham, as well as the regulatory models of the agencies in this study, demonstrates that successful regulation and enforcement requires a mixed, hybrid strategy that is at once

comprehensive, adaptable, and addresses the multi-stakeholder nature of our society. A properly implemented hybrid regulatory framework recognizes that enforcement ought to be a proactive, rather than a reactive exercise. Said another way, the focus is on compliance. OCC spokesman Matt Skinner and RRC spokeswoman Ramona Nye, who I quoted in the Oklahoma assessment, lend strong supporting rationales to these statements in noting that punitive measures must be doled out judiciously, with an emphasis on cooperation rather than confrontation. When looking at all the agencies presented in this study, and particularly the AER, it is for these reasons that all are considered leaders in environmental oil and gas regulation.

This is not to say the criticisms of hydraulic fracturing enforcement are entirely without merit. There are – and these studies need to be credited for playing an important role in bringing attention – notable areas for improvement. And, to one extent or another, they all have an important role to play in improving compliance and performance outcomes. While some have been addressed already, or are being gradually incorporated, these areas include improvements in availability and accessibility of compliance and enforcement data, improved data collection for well completions, more expansive programs to capture baseline and mapping data for groundwater aquifers, improved seismic and emissions monitoring, technological advancements, and mandatory water volume, disposal, and recycling requirements. Challenges with staffing and budgets are other identified problem areas. In continuing to diversify the regulatory landscape, as Green has proposed, there is also room for the implementation of strict liability insurance and independent third party project approvals. Incorporating these and other measures will provide agencies with additional tools to promote compliance, better minimize fracking's risks, increase public confidence, and lessen the need for additional internal staffing and funding.



Returning to the issue of punitive enforcement, there will always be instances when taking such action cannot and should not be avoided, particularly in cases of what the AER describes as persistent noncompliance. Based on the diverse contexts and changing circumstances across jurisdictions, establishing the appropriate frequency of enforcement action, or level of monetary fines, is a virtual impossibility. While I believe it is a path that should be tread with caution, there is an opportunity here for agencies and governments to conduct their own internal reviews, and determine where and if changes are required. Doing so would be an effective way of responding to the various criticisms, while also having a positive impact on transparency and public trust. Without the proper perspective on how regulators determine whether or not a complaint or incident warrants further investigation or enforcement (i.e. the AER's risk assessment matrix), the numbers (i.e. 0.9% enforcement, 42.5% inspection rate) may well appear perilously low. But without proper consideration of existing regulatory strategies (i.e. education, awareness, staffing levels vs. total wells and other projects, budgetary considerations), it is impossible to say with any certainty what these levels should be. The additional clarity gained by producing such reports may help to reduce the current tensions surrounding the enforcement of hydraulic fracturing, and the oil and gas industry more generally.

Some may say that such internal investigations would be redundant and therefore unnecessary, as many agencies already provide monthly or quarterly enforcement data through their websites. However, in their current form, the data's only real purpose is to provide raw numbers, without context, leaving individuals to decide of what significance they are. Assessing the data within a particular regulatory context, and providing insights as to how and why particular decisions were made, promotes energy and regulatory literacy across industry and the public.

Staying with the theme of energy literacy, the Global Forest Watch (GFW) study noted how a substantial percentage of the incidents reported on the EMS were from citizens, while also being critical of the low possibility of these complaints triggering any further investigation. Yet, they fail to mention the AER's criteria for determining the nature of any follow up or enforcement, or the fact that citizens generally lack the required expertise to properly assess and identify environmental harms. GFW further criticized the AER's over reliance on such complaints to take the place of more formal means of monitoring and inspection. On this point, GFW identifies a crucial gap – one that can be overcome by continued initiatives aimed at increasing energy literacy. Not only would public complaints become more reliable, but levels of public engagement and transparency would also improve.

To conclude, I maintain that while the debate surrounding the compliance and enforcement of hydraulic fracturing is really just beginning, there is little doubt that the existing regulatory frameworks are both robust and comprehensive. Moving forward, the challenge is to remain flexible in order to implement the necessary improvements, and adaptable so as to best respond to changing circumstances. Hopefully, this study will assist in providing a preliminary foundation to build upon.

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## Appendix

### A) Hydraulic Fracturing Regulation Comparison By Jurisdiction

Table A.1 - Overview of Regulatory Agencies & Legislation (Provincial & State)

|                      | Alberta  | British Columbia   | Texas  | Oklahoma  |
|----------------------|--|--|--|---|
| Regulatory Agency    | The Alberta Energy Regulator (AER) – 14 regulatory directives pertaining to hydraulic fracturing   | BC Oil & Gas Commission (BCOGC)  | Railroad Commission of Texas (RRC), Texas Commission on Environmental Quality (TCEQ) | Oklahoma Corporation Commission (OCC), Oklahoma Water Resources Board (OWRB)          |
| Relevant Legislation | <i>Responsible Energy Development Act (REDA)</i><br><br><i>Environmental Protection &amp; Enhancement Act (EPEA)</i><br><br><i>Public Lands Act (PLA)</i><br><br><i>Water Act (WA)</i> | <i>Oil &amp; Gas Activities Act</i><br><br><i>Environmental Protection and Management Regulation</i><br><br><i>Oil and Gas Activities Act, Drilling and Production Regulations</i> | <i>Texas Administrative Code</i>   | Oklahoma Corporation Commission, <i>Chapter 10 - Oil and Gas Conservation 9-12-14</i> |

**Table A.2 - Federal Regulatory Bodies & Legislation**

|                      | Canada  | United States  |
|----------------------|---|--|
| Regulatory Agency    | National Energy Board   | Environmental Protection Agency  |
| Relevant Legislation | <i>Environmental Assessment Act</i><br><br><i>Canada Oil and Gas Operations Act</i> | <i>Safe Drinking Water Act</i><br><br><i>Clean Water Act</i><br><br><i>Underground Injection Control Program</i> |

**Table A.3 - Casing & Cementing Requirements**

|  | Alberta   | British Columbia   | Texas   | Oklahoma                      |
|--|---|--|---|-------------------------------|
| Minimum Surface Casing Depth Requirements? | Yes – AER <i>Directive 08</i> : Surface Casing Depth Requirements     | Yes – <i>Drilling and Production Regulation</i> , Section 18 | Yes – <i>Texas Administrative Code</i> , Rule §3.13 | Yes – OCC OGC Rule 165:10-3-4 |
| Casing Cementing Minimum Requirements?     | Yes – AER <i>Directive 09</i> : Casing Cementing Minimum Requirements | Yes – <i>Drilling and Production Regulation</i> , Section 32 | Yes – <i>Texas Administrative Code</i> , Rule §3.13 | Yes – OCC OGC Rule 165:10-3-4 |

**Table A.4 – Groundwater Protection**

|   | Alberta  | British Columbia                                     | Texas   | Oklahoma                                    |
|---|--|--|---|---|
| Baseline Water Well Testing?                      | Yes – AER <i>Directive 035</i> : Baseline Water Well Testing Requirements for Coalbed Methane Wells Completed Above The Base of Groundwater Protection | No   | No  | No – Water Resources Board (OWRB) oversight |
| Produced Water Surveillance, Sampling & Analysis? | Yes – AER <i>Directive 044</i> :   | Yes – <i>Oil and Gas Activities Act</i> , Section 37 | Yes - <i>Texas Administrative Code</i> - Rule §3.8, Chapter 307 | Yes – OGC Section 165:10-7-4                |

**Table A.5 – Waste Management, Injection/Disposal Wells, & Recycling**

|   | Alberta   | British Columbia  | Texas   | Oklahoma  |
|---|---|---|---|---|
| Waste Management Regulations & Requirements?    | Yes – AER <i>Directive 050: Directive 058:</i>  | Yes – <i>Oil and Gas Waste Regulation, Drilling and Production Regulation, Section 51, 74, Oil and Gas Act General Regulation, Section 10, Environmental Management Act, Oil and Gas Activities Act</i> | Yes - <i>Texas Administrative Code - Rule §3.8</i><br><br>Also: Rule §3.98, Standards for Management of Hazardous Oil and Gas Waste             | Yes – OCC, OGC Section 165:10-3-10, and OAC 165:10-7-24 |
| Injection and Disposal Wells Regulations?       | Yes – AER <i>Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements</i> | Yes – however, permit standards only.   | Yes - <i>Texas Water Code, Chapter 27, Injection Well Act</i> , regulated by both Texas Commission on Environmental Quality (TCEQ), and the RRC | Yes – OCC, OGC SubChapter 5<br><br>* New seismic rules  |
| Recycling Regulations/Requirements/Initiatives? | No – however, Evidence of self-regulation: (CAPP) recommended industry practices  | No – CAPP industry recommendations again apply  | No – but some companies are voluntarily adopting the practice   | No – but some self-regulation                           |

**Table A.6 - Well Drilling & Completions Regulations**

|   |   |   |   |                                       |
|---|---|---|---|---------------------------------------|
| Well Drilling and Completion Data Filing? | Yes – AER <i>Directive: 059</i> Well Drilling and Completion Data Filing Requirements | Yes – <i>Drilling and Production Regulation</i> , Section 24, 26 and 36 | Yes – <i>Texas Administrative Code</i> , Rule §3.16, <i>Log and Completion or Plugging Report</i> | Yes – OCC, Chapter 10 Part 3 & Part 5 |
| Well Abandonment?                         | Yes – AER <i>Directive: 020</i> Well Abandonment                                      | Yes – <i>Drilling and Production Regulation</i> , Section 41            | Yes – <i>Texas Administrative Code</i> , Rule §3.14, <i>Plugging</i>                              | OCC, Chapter 10                       |

**Table A.7 - Subsurface Integrity**

|  |                                |   |   |                                    |
|--|--------------------------------|---|---|------------------------------------|
| Protection against unintentional wellbore communication? | Yes – AER <i>Directive 083</i> | Yes – <i>Drilling and Production Regulation</i> , Section 9, 10, and 18<br><br><i>Safety Advisory 2010-3</i><br><br><i>ENFORM (IRP) #24</i> | Yes – <i>Texas Administrative Code</i> , Rule §3.13 | Yes – OCC, Chapter 10, Rule 165:10 |
| Measures to ensure well integrity?                       | Yes                            | Yes – <i>Drilling and Production</i>  | Yes   | Yes                                |
| Protection for nonsaline aquifers?                       | Yes                            | Yes   | Yes   | Yes                                |
| Protection for water wells and surface integrity?        | Yes                            | Yes   | Yes   | Yes                                |

**Table A.8 – Seismic Monitoring & Miscellaneous**

|   |  |  |   |     |
|---|--|--|---|-----|
| Mandatory Seismic Monitoring & Reporting? | Yes – AER <i>Directive 083</i> : Subsurface Integrity, Subsurface Order No 2 – Fox Creek, 40 monitoring stations | Yes – 10 monitoring stations and numerous reporting/mitigation regulations | Yes – <i>Texas Administrative Code</i> Rule 3.9 & 3.46 – disposal, monitoring & reporting | Yes |
| Storage Requirements?                     | Yes – AER <i>Directive 055</i> : Storage Requirements for the Upstream Petroleum Industry                        | Yes  | Yes   | Yes |
| Noise/Nuisance Prevention Measures?       | Yes – AER <i>Directive 038</i> : Noise Control   | Yes  | Yes   | Yes |

**B) Alberta Energy Regulator Compliance and Enforcement Matrix**

**Table B.1 - Prevention and Enforcement Responses for Low Risk Noncompliance**

| Notice of Low Risk Noncompliance   | Low Risk Enforcement Action   |
|--|---|
| <p><b>What must the licensee do when the AER identifies a noncompliant event?</b> After receiving a Notice of Low Risk Noncompliance, the licensee must</p> <ul style="list-style-type: none"> <li>• Correct or address the low risk noncompliance within the time specified by the AER group that initiated the notice,</li> <li>• Notify the AER group that the low risk noncompliance has been corrected or addressed in the specified time, and</li> <li>• Pay any noncompliance fee set out in the notice.</li> </ul> <p><b>When is compliance achieved?</b></p> <p>Compliance is achieved immediately after the licensee completes all of the requirements of the Notice of Low Risk Noncompliance to the satisfaction of the AER group.</p> <p><b>What happens if the licensee does not correct or address the low risk noncompliance in the time specified by the AER group?</b></p> <p>The licensee will be issued a Low Risk Enforcement Action.</p> | <p><b>What must the licensee do when the AER uses Low Risk Enforcement Action?</b></p> <ul style="list-style-type: none"> <li>• Immediately correct or address the low risk noncompliance</li> <li>• Notify the AER group that the low risk noncompliance has been corrected or addressed in the specified time, and</li> <li>• Develop, implement, and submit written action plan within 30 calendar days or in the time specified by the AER group.</li> </ul> <p>The licensee may also be required to meet with the AER group to discuss the low risk noncompliance, the licensee’s compliance history, or the written action plan.</p> <p>The AER group may also apply one or more of the following enforcement consequences, as its authority provides:</p> <ul style="list-style-type: none"> <li>• Noncompliance fees,</li> <li>• Partial or full suspension</li> <li>• Suspension and/or cancellation of permit license or approval</li> <li>• Issuance of an Order (Miscellaneous, Closure, or Abandonment) and/or,</li> <li>• Refer status: global or local</li> </ul> <p><b>When is compliance achieved?</b> Compliance is achieved immediately after the licensee completes all of the requirements of Low Risk Enforcement Action to the satisfaction of the AER group.</p> <p><b>What happens if the licensee does not comply with the requirements of Low Risk Enforcement Action?</b> The licensee is required to meet with senior AER personnel and is subject to escalated enforcement consequences within Low Risk Enforcement Action.</p> |

Source: [www.aer.ca/documents/directives/Directive019.pdf](http://www.aer.ca/documents/directives/Directive019.pdf)

**Table B.2 - Prevention and Enforcement Responses for High Risk Noncompliance**

| Notice of High Risk Noncompliance  | High Risk Enforcement Action   | High Risk Enforcement Action (Persistent Noncompliance)   |
|--|--|---|
| <p><b>What must the licensee do when the AER identifies a high risk noncompliant event?</b></p> <p>To address the specific noncompliant event, the licensee must</p> <ul style="list-style-type: none"> <li>• Immediately correct or address the high risk noncompliance upon notification,</li> <li>• If necessary, suspend operations, either partially or fully, when safe to do so, in order to remove any potential impact or hazard associated with the noncompliance; suspension of operations must not occur if it results in an increased impact or hazard to the environment or the public,</li> <li>• Notify the AER group that the high risk noncompliance has been corrected or addressed.</li> </ul> <p>The AER group may also apply one or more of the following consequences in the Notice of High Risk Noncompliance:</p> <ul style="list-style-type: none"> <li>• Develop, implement, and/or submit a written action plan<sup>4</sup> in the time specified by the AER group, and/or</li> <li>• Meet with the AER group to discuss the high risk noncompliance and the licensee’s compliance history.</li> </ul> <p><b>When is compliance achieved?</b></p> <p>Compliance is achieved immediately after the licensee completes all of the requirements of Notice of High Risk Noncompliance to the satisfaction of the AER group.</p> <p><b>What happens if the licensee does not comply with the requirements of Notice of High Risk Noncompliance?</b></p> <p>The licensee is subject to High Risk Enforcement Action (Failure to Comply).</p> | <p><b>What must the licensee do when the AER identifies a high risk noncompliant event?</b></p> <p>To address the specific noncompliant event, the licensee must</p> <ul style="list-style-type: none"> <li>• Immediately correct or address the high risk noncompliance,</li> <li>• If necessary, suspend operations, either partially or fully, when safe to do so, in order to remove existing or potential impact/hazard associated with the noncompliance; the suspension of operations must not occur if it results in an increased impact or risk to the public or the environment,</li> <li>• Develop and implement a written action plan<sup>4</sup> within 60 calendar days or in the time specified by the AER group, and</li> <li>• Notify the AER group that the high risk noncompliance has been corrected or addressed.</li> </ul> <p>The licensee may be required to submit the written action plan. A meeting with the AER group to discuss the high risk noncompliance, the licensee’s compliance history, and the written action plan may also be required.</p> <p>The AER group may also apply one or more of the following enforcement consequences, as its authority provides:</p> <ul style="list-style-type: none"> <li>• Noncompliance fees,</li> <li>• Self-audit or inspections,</li> <li>• Increased audits or inspections,</li> <li>• Partial or full suspension, and/or</li> <li>• Suspension and/or cancellation of permit, license, or approval.</li> </ul> <p><b>What happens if the licensee has a subsequent high risk noncompliance during the period for development and implementation of its action plan?</b></p> <p>Subsequent high risk noncompliant events that occur in the same compliance category during this time may result in either additional Notice of High Risk Noncompliance or High Risk Enforcement Actions. However, if a subsequent high risk noncompliance during this time results in the determination of persistent noncompliance, High Risk Enforcement Action (Persistent Noncompliance) may be initiated.</p> | <p><b>What will happen if a specific high risk noncompliant event results in the licensee being identified as persistently noncompliant?</b></p> <p>To address the specific noncompliant event, the licensee must</p> <ul style="list-style-type: none"> <li>• Immediately correct or address the high risk noncompliance,</li> <li>• If necessary, suspend operations, either partially or fully, when safe to do so, in order to remove existing or potential impact/hazard associated with the noncompliance; the suspension of operations must not occur if it results in an increased impact or risk to the public or the environment,</li> <li>• Develop, implement, and submit written action plan<sup>4</sup> within 30 calendar days or in the time specified by the AER group,</li> <li>• Notify the AER group that the high risk noncompliance has been corrected or addressed in the specified time, and</li> <li>• Meet with the AER group to discuss the high risk noncompliance, the licensee’s compliance history, and the written action plan.</li> </ul> <p>The AER group may also apply one or more of the following enforcement consequences, as its authority provides:</p> <ul style="list-style-type: none"> <li>• Noncompliance fees,</li> <li>• Self-audit or inspections,</li> <li>• Increased audits or inspections,</li> <li>• Third-party audits or inspections,</li> <li>• Partial or full suspension, and/or</li> <li>• Suspension and/or cancellation of permit, license, or approval.</li> </ul> |

**Table B.2 Con't - Prevention and Enforcement Responses for High Risk Noncompliance**

| High Risk Enforcement Action (Failure to Comply)  | High Risk Enforcement Action (Demonstrated Disregard)  |
|---|--|
| <p><b>What happens if the licensee does not comply with the requirements of any of the following:</b></p> <ul style="list-style-type: none"> <li>• Notice of High Risk Noncompliance</li> <li>• High Risk Enforcement Action</li> <li>• High Risk Enforcement Action (Persistent Noncompliance)</li> <li>• High Risk Enforcement Action (Failure to Comply)</li> <li>• High Risk Enforcement Action (Demonstrated Disregard)</li> </ul> <p>The licensee must</p> <ul style="list-style-type: none"> <li>• Immediately correct or address the high risk noncompliance,</li> <li>• Notify the AER group that the high risk noncompliance has been corrected or addressed in the specified time,</li> <li>• If necessary, suspend operations, either partially or fully, when safe to do so, in order to remove existing or potential impact/hazard associated with the noncompliance; the suspension of operations must not occur if it results in an increased impact or risk to the environment or the public,</li> <li>• Develop, implement, and submit a written action plan<sup>4</sup> acceptable to the AER group, and</li> <li>• Meet with the AER group to discuss the high risk noncompliance, the licensee's compliance history, and the written action plan.</li> </ul> <p>The AER group may also apply one or more of the following enforcement consequences, as its authority provides:</p> <ul style="list-style-type: none"> <li>• Noncompliance fees,</li> <li>• Self-audit or inspections,</li> <li>• Third-party audits or inspections,</li> <li>• Partial or full suspension,</li> <li>• Suspension and/or cancellation of permit, license, or approval,</li> <li>• Issuance of an Order (Miscellaneous, Closure, or Abandonment), and/or</li> <li>• Refer status: focused or global.</li> </ul> <p><b>When is compliance achieved?</b></p> <p>Compliance is achieved when the licensee immediately completes all of the requirements of High Risk Enforcement Action (Failure to Comply) to the satisfaction of the AER group, and no additional high risk noncompliance occurs within the compliance category for 180 calendar days or the time specified by the AER group from the date the AER group accepts the written action plan.</p> <p><b>What happens if the licensee does not comply with the requirements of High Risk Enforcement Action (Failure to Comply)?</b></p> <p>The licensee is required to meet with senior AER personnel and is subject to escalated enforcement consequences.</p> | <p><b>What happens if the ERCB determines that enforcement starts with High Risk Enforcement Action (Demonstrated Disregard)?</b></p> <p>The licensee must</p> <ul style="list-style-type: none"> <li>• Immediately correct or address the high risk noncompliance,</li> <li>• Notify the ERCB group that the high risk noncompliance has been corrected or addressed in the specified time,</li> <li>• If necessary, suspend operations, either partially or fully, when safe to do so, in order to remove existing or potential impact/hazard associated with the noncompliance; the suspension of operations must not occur if it results in an increased impact or risk to the public or the environment,</li> <li>• Develop, implement, and submit a written action plan<sup>4</sup> acceptable to the ERCB group, and</li> <li>• Meet with the ERCB group to discuss the high risk noncompliance, the licensee's compliance history, and the written action plan.</li> </ul> <p>The ERCB group may also apply one or more of the following enforcement consequences, as its authority provides:</p> <ul style="list-style-type: none"> <li>• Noncompliance fees,</li> <li>• Self-audit or inspections,</li> <li>• Third-party audits or inspections,</li> <li>• Partial or full suspension,</li> <li>• Suspension and/or cancellation of permit, license, or approval,</li> <li>• Issuance of an Order (Miscellaneous, Closure, or Abandonment), and/or</li> <li>• Refer status: focused or global.</li> </ul> <p><b>When is compliance achieved?</b></p> <p>Compliance is achieved when</p> <ul style="list-style-type: none"> <li>• The licensee immediately completes all of the requirements of High Risk Enforcement Action (Demonstrated Disregard) to the satisfaction of the ERCB group, and</li> <li>• No additional high risk noncompliance occurs within the compliance category for 180 calendar days or the time specified by the ERCB from the date the ERCB group accepts the written action plan.</li> </ul> <p><b>What happens if the licensee does not comply with the requirements of High Risk Enforcement Action (Demonstrated Disregard)?</b></p> <p>The licensee is required to meet with senior ERCB personnel and is subject to escalated enforcement consequences within High Risk Enforcement Action (Failure to Comply).</p> |

Source: [www.aer.ca/documents/directives/Directive019.pdf](http://www.aer.ca/documents/directives/Directive019.pdf)

## ***C) Compliance & Enforcement Data Links***

### **C.1 Alberta Energy Regulator (AER) Compliance & Enforcement**

<http://www1.aer.ca/compliancedashboard/enforcement.html>

<http://aer.ca/data-and-publications/statistical-reports/st108>

<http://www1.aer.ca/compliancedashboard/incidents.html>

<http://www1.aer.ca/compliancedashboard/investigations.html>

### **C.2 British Columbia Oil & Gas Commission (BCOGC) Compliance & Enforcement**

<https://www.bcogc.ca/publications/Reports>

<https://www.bcogc.ca/node/12466/download>

<https://www.bcogc.ca/node/12713/download>

### **C.3 Railroad Commission of Texas (RRC) Compliance & Enforcement**

<http://www.rrc.state.tx.us/oil-gas/compliance-enforcement/>

[https://texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac\\_view=4&ti=16&pt=1&ch=3&rl=Y](https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=16&pt=1&ch=3&rl=Y)

### **C.4 Oklahoma Corporation Commission (OCC) Compliance & Enforcement**

<http://www.occeweb.com/ad/OpenRecords.html>