# B. C. TAP WATER ALLIANCE

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**FINAL ARGUMENT**
**JULY 14, 2011**

**National Energy Board, Hearing Order GH-1-2011**
**KM LNG Operating General Partnership**
**Kitimat LNG Export licence Application**

Madame Chair.

This licence application, by the KM LNG Operating General Partnership (two Houston, Texas-based corporations, Apache Canada Limited, EOG Resources, and a Calgary-based corporation, Encana Corporation), to export LNG by large capacity tanker vessels over the Pacific Ocean from its two-stage production facility near Kitimat has been identified as potentially becoming the first such license ever granted by Canada's National Energy Board. [1] I say potentially, because of a number of inter-related and unresolved supply source issues that we have serious concerns about, and how the interpretation of our concerns may ultimately impinge upon Canada's energy security and "public interest" themes.

As we have written in our April 19, 2011 report about this application, *Follow the Gas: Kitimat LNG Export Terminal and Pacific Trails Pipeline Chronology* (available on our website), the originating intention of this twin Kitimat facility and 36-inch pipeline proposal tie-in at Summit Lake in 2005 was for import LNG to supply natural gas for the increasingly energy-hungry mining operations of Alberta's tar sands. Five years previous to KM LNG's application filing with the NEB in December 2010, the NEB, along with other American regulators, reported on the need to import natural gas from other producing continents to feed the needs of Canadian and American clients and businesses, identifying that Canadian conventional gas reserves and production were in decline.

However, within the last three years, natural gas energy companies (many of which are American-based) operating in western Canada are complaining that in their speculative rush to lease large tracts of public lands to own the exploration rights of deep shale gas has been confounded by the cheaper production of deep shale gas in the United States, sometimes, ironically, by the operations of their own companies, calling on the their collective desire to market Canadian gas elsewhere where profits are much higher.

[1] NEB Kitimat LNG Hearing transcript, June 8, 2011, section 1384.

When this scenario began to change from predictions by natural gas energy companies and market supporters based on the rapid advent of deep shale gas exploration and developments in the United States, in late 2008 KM LNG's originating owners were granted amended approval permits by both provincial and federal environmental and regulatory agencies for both the Bish Cove facility and the Pacific Trails Pipeline to reverse the flow of gas out of Canada, for export.

In other words, Alberta's tar sands' operators were becoming confident in new sources of natural gas within Canada from nearby shale gas sedimentary basins, as without these new reserves of domestic energy, the increased and controversial rate of Alberta's tar sands production could not occur. Evidence was recently submitted to the NEB by a Ziff Energy Group representative that Alberta's tar sands operations may ultimately require 4 Bcf/day by 2035. [2] And, depending upon the best interpretation of Ziff's forecast document with the NEB, this could represent at least one third or more of Canada's total gas production to be consumed by the tar sands in 2035. This information is both disconcerting and shocking. And, it could be argued, the primary reason for mass speculation for deep shale gas in my province, British Columbia, which was approved, so far, without cumulative environmental effects planning studies, which was originally fueled by energy companies to first benefit the tar sands, and secondly, to apparently provide new sources of natural gas to Canadians as conventional natural gas reserves had peaked and were in decline.

And, as we have learned by witnesses before the NEB, and in related documents, to market deep shale gas to the United States has become encumbered due to the higher development costs of shale gas in Canada's more isolated areas. That is why, purportedly, the present application is before the NEB, to make large profits by marketing what KM LNG has defined as 'excess' shale gas to overseas clients, that is to provide profits after paying off some $6 billion in expenditures in the two-phase Kitimat facility and Pacific Trails Pipeline, not including new facilities and upgrades to added infrastructure that will feed this new line.

In terms of these expensive operations, we have recently witnessed a significant fall-out announcement from one of KM LNG's triad partnership, Encana Corporation. Some two weeks after the end of the first phase of this Hearing process in June 2011, Encana's potential partner PetroChina defaulted on its $4.5 billion investment MOU, pulling out of British Columbia. The world media immediately reported on this significant abandonment, and soon news followed that Encana was selling off its Cabin Gas Plant that is presently under construction in the Horn River Basin, one of the largest natural gas production facilities in North America. The un-initiate can only speculate, at this time, on PetroChina's reasons for pulling the plug in Encana's bathtub. But, more importantly, given the unpredictable dynamics within the recent deep shale gas world, what are the implications of this sudden shift to the KM LNG partnership?

[2] Ibid, section 1449.

Getting back to the KM LNG's originating amendment to export LNG in late 2008. We would like to pose a question or consideration regarding the environmental approval processes by provincial and federal agencies in this matter:

- What would have been the case had KM LNG not sought an import application in 2005, and instead had begun to seek approvals for an export LNG facility and pipeline some three years later in late 2008?

- How might this process have affected the present application before the NEB?

We raise this point to introduce the possibility that there could have been something significantly different to the provincial and federal review processes, in that, given the special attention by the American public that deep shale gas developments have undergone since 2009, and investigative initiatives by U.S. federal committees, concerns may more that likely have arisen by the public here in British Columbia about the environmental impacts of deep shale gas operations, which in some cases have come under recent moratoriums and bans in other jurisdictions.

We must state that these hydraulic fracturing operations over expansive areas in northeast British Columbia are still without proper planning initiatives. Had the controversial issues of deep shale gas developments been properly addressed in the early approval stages for an export LNG application, there may have been different and constrained contingencies placed upon the development of deep shale gas basins, particularly as they relate to the present day environmental and social controversies, which in turn may have limited or even halted the future production of deep shale gas.

With regard to this concern, is the recent B.C. Supreme Court suit action filed by the Treaty 8, Dene Tha in June 2011 with the government of British Columbia on the cumulative environmental impacts by hydraulic fracturing developments in the Cordova sedimentary basin in the far northeastern corner of B.C., an area that neighbours the applicant's operations in the Horn River basin. As stated in a June 22, 2011 media release:

> Dene Tha' First Nation is taking its concerns about shale gas development in northeastern British Columbia to the British Columbia Supreme Court. Dene Tha' has filed a Petition with the B.C. Supreme Court to challenge the B.C. Ministry of Energy and Mines' decision to sell oil and gas tenures in the "Cordova Basin" in June 2010 for the purpose of shale gas development.
>
> Dene Tha' Chief James Ahnassay explained the reason for the lawsuit, saying: We are deeply concerned about the lack of adequate information necessary to understand the impacts of shale gas development to the environment and our rights, given that shale gas technologies are new to northeastern B.C., enormous volumes of water are required, serious contamination problems have arisen with shale gas development in the United States, and insufficient studies have been undertaken to identify and address impacts from shale gas technologies.

Here's an ancient structural image simile that helps to illustrate our concerns. It is the image of the keystone in the masonry arch made of up individual and specially angled stones, used for an entrance or a window area. Each side of the arch has two columns built vertically from flat and rectangular stones, and these columns are in turn dependent upon the main interconnecting and carefully angled ediface, the keystone or keystones in the arch, upon which the entire weight of the upper structure depends upon. We see KM LNG's Kitimat facility and Pacific Trail Pipeline as the two columns. The natural gas production supply issues in western Canada, with all of the exploration, production, regulatory, environmental, health and social issues that relate to it, make up the keystones. Without the keystones, there is no entrance, there is no window. When you deliberate or weigh on this export LNG application, we would like you to contemplate this image.

In addition to this being a unique license application before the NEB, it seems as though it could possibly become precedent-setting. There may be at least two more LNG export proposals - as indicated in media reporting - lining up in the queue with the NEB following applications with provincial and federal agencies for additional export manufacturing and holding facilities and possible additional pipeline routes nearby the proposed site at Bish Cove, Kitimat. This, along with rumours of yet another large LNG export facility proposal by Korea Gas in the far north near the mouth of the Mackenzie River. Though not specifically identified in the applicant's documents, it is possible that some of this additional gas from one or both of these two additional LNG export proposals along coastal British Columbia may as a result be piggy-backed onto/into KM LNG's proposed Pacific Trails Pipeline through additional costs and expansion of proposed pumping facilities. [3]

However, as we will argue, it appears as though KM LNG's application may not be viable if Canada's long-term security of production supply of natural gas is jeopardized as a result, and if the cumulative production of natural gas in western Canada, primarily from deep shale gas sources, further harms both our surface and sub-surface natural environment complexes and increases Green House Gas emissions.

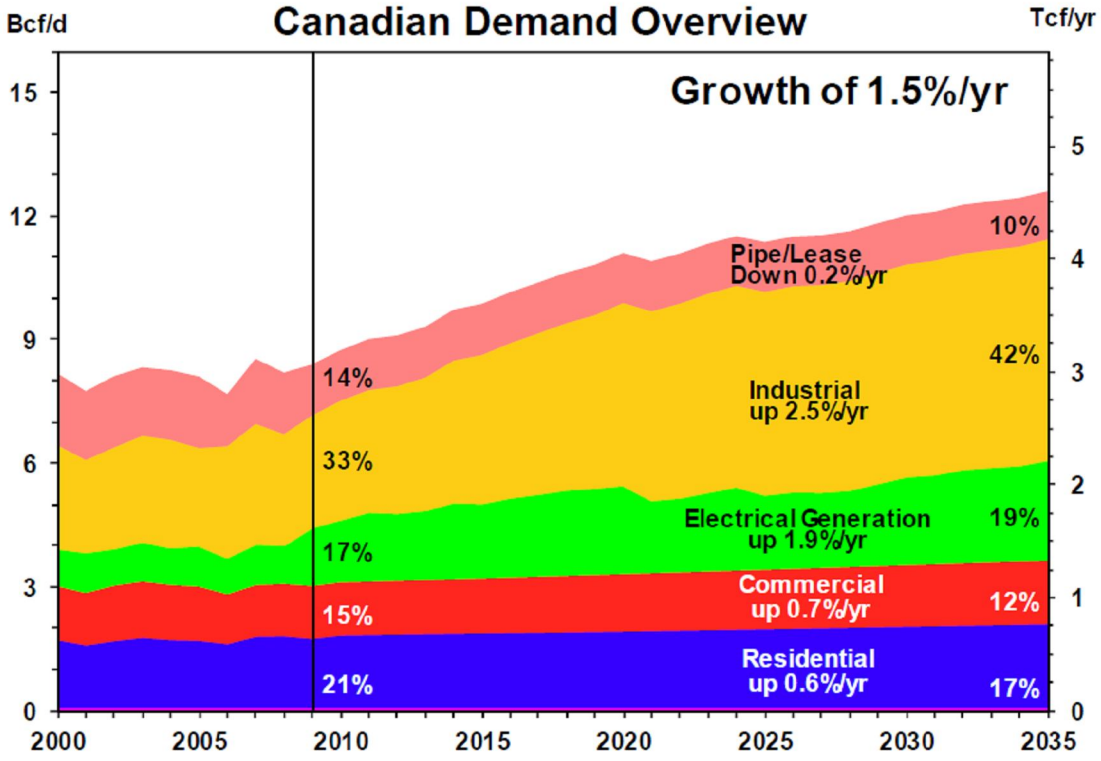
The B.C. Tap Water Alliance was the only intervenor during the Hearing proceedings in Kitimat to question or cross-examine members of the Export Impact Assessment Panel concerning the information and data supply forecasts of North American and Canadian production of natural gas by the applicant's key document authored by Ziff Energy Group, and the supportive document by Roland Priddle. We did so, because it is our judgement that these two report documents sponsored by KM LNG provide the principal and underpinning arguments for its export LNG application with the NEB. Should these arguments therefore be found wanting, and should they be found leaning towards unreasonableness, then there may be strong grounds for the NEB to comprehensively question the application's viability.

[3] NEB Kitimat LNG Hearing transcript, June 8, 2011, sections 2646 - 2654, sections 2679 - 2715, sections 2747 - 2769.

KM LNG hired Ziff Energy Group, a Canadian-based, highly reputable and international consulting company, with decades of experience in the energy field. As stated in the Hearing transcript on June 8th, Ziff Energy spent three months compiling the forecast supply data and writing the report. And, as Ziff summarizes in its report, that data was extracted from its "extensive and detailed proprietary sectorial and regional demand analysis, basin-by-basin gas supply work, and understanding of changing continental gas flows."

As stated on its website, two of Ziff's partner companies include Halliburton and Schlumberger, two of the world's largest energy service companies, both of which have numerous and profitable deep shale hydraulic fracturing service contract operations in western Canada, operations undertaken not without public controversy.

**Figure 2**
**Canadian Demand Overview**




If we assume Ziff's Canadian and American forecast natural gas data to be highly reputable, noting that all long-term forecasts are uncertain, let us turn to Ziff's report section 3.3, *North American Gas Demand to 2035*, [4] with a focus on Figures 3 through 5.

In Figure number 3, North American Gas Supply to 2035, we see two general themes under the increase of natural gas supply from 74 Bcf/day in 2010 to to 90 Bcf/day in 2035:

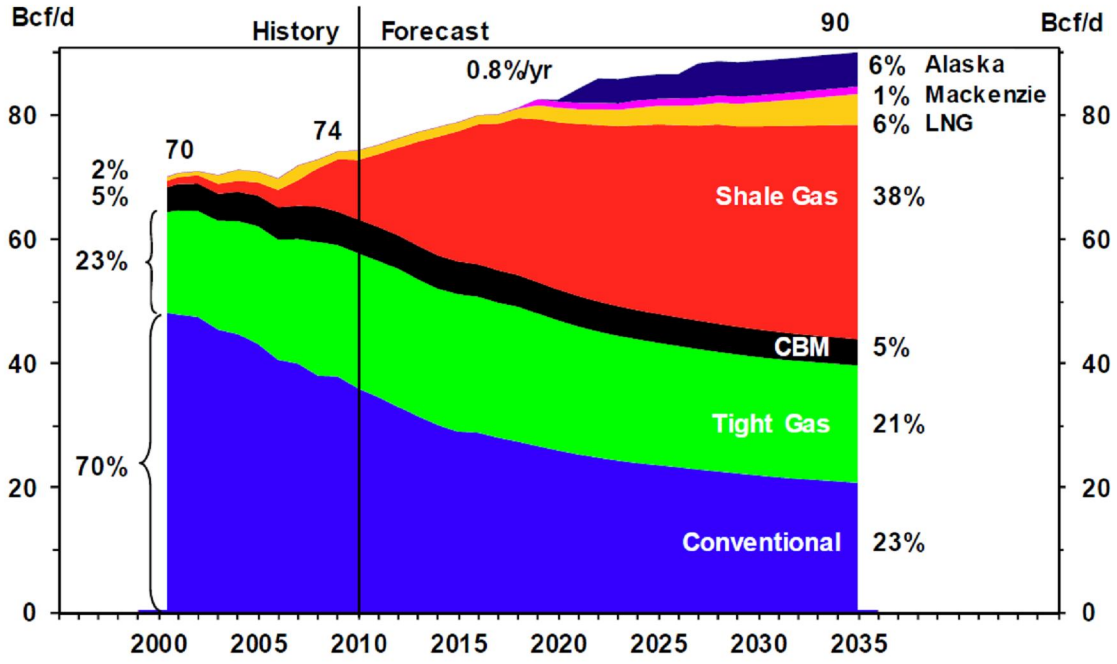
[4] Exhibit B1-18, *Natural Gas Demand and Supply Forecast - North America and Canada (2010-2035).*

- first, the significant decline of Conventional gas supplies, the slight decline in Tight Gas, and the even production of Coalbed Methane;

- secondly, the significant increase of shale gas, the increase in LNG, the assumption of augmented reserves from the implementation of two gas pipelines, the Alaska and Mackenzie pipelines.

As we will argue shortly, there are a number of undisclosed and controversial assumptions about the significant increase in shale gas which appears to become an inverted substitute for the previous reserves in conventional gas.

**Figure 3**
**North American Gas Supply to 2035**



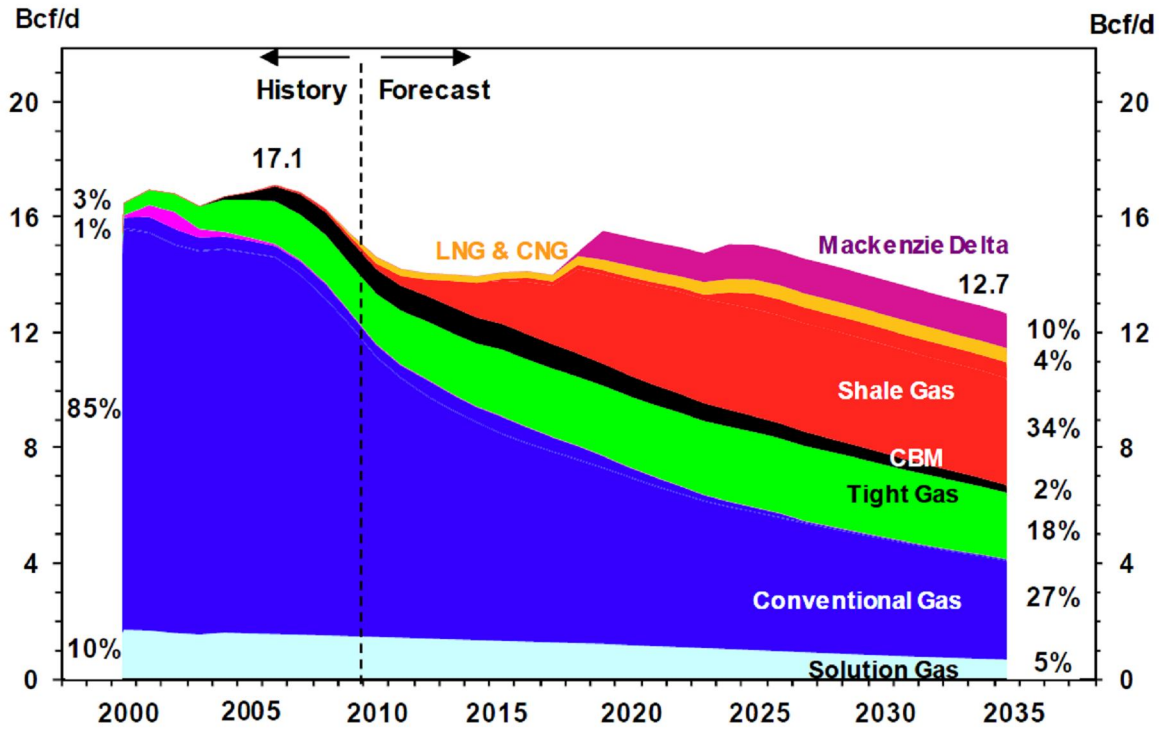

In addition, a week after KM LNG submitted the Ziff report with the NEB in early December, 2010, the Energy Information Administration announced on December 16th that it had "removed the Alaska natural gas pipeline from its most recent projections of the domestic energy picture over the next 25 years", [5] and therefore, will not augment gas as forecast in Ziff's Figure 3.

Also, as it relates to information presented in Figure 4, the Mackenzie Delta gas pipeline is also in doubt at this time.

[5] Petroleum News Bulleting, *EIA Drops Alaska Gas Pipeline from Energy Outlook*, December 17, 2010, Vol. 16, No. 118.

Aside from questions we have of introducing import LNG into the framework of gas that is produced in North America, if we subtract the percentages from the two pipelines, which total 7 percent, then this brings the gas supply forecast to 2035 down to about 84 Bcf/day in Figure 3.

**Figure 4**
**Canadian Gas Production to 2035**




In Figure 4, Canadian Gas Production to 2035, is a different scenario from that presented in Figure 3, whereby there is a steady decline in overall gas production. Again, introducing the possibility of the Mackenzie Delta pipeline which represents 10 percent of the total gas production in 2035, may be in doubt.

In addition, as stated in the Hearing transcripts from June 8th, the yellow portion representing Import LNG and offshore CNG is primarily not related to gas produced in Canada, and is gas routed to American markets. It was identified, that 3% of this 4% category was gas not produced in Canada.

We asked the Export Impact Assessment panel to provide a new total for gas produced in 2035 if the hypothetical Mackenzie Delta data and the majority of the import LNG & CNG data was subtracted. Mr. Mauger from Ziff stated that this new figure would be about 11 Bcf/day, down from Ziff's 12.7 Bcf/day for 2035.

Given the anticipated, eventual rate of gas of 1.4 Bcf/day scheduled for final delivery to Kitimat as export LNG, Mr. Roland Priddle estimated that this would represent about 13

to 14 percent of total Canadian gas production in 2035, assuming the subtractions just stated. In actuality, it is about 13 percent, which is not an insignificant figure, a figure almost identical to total Canadian residential natural gas use in 2011, and slightly lower that three times the amount of British Columbia's total combined natural gas client category consumption in 2010. [6]

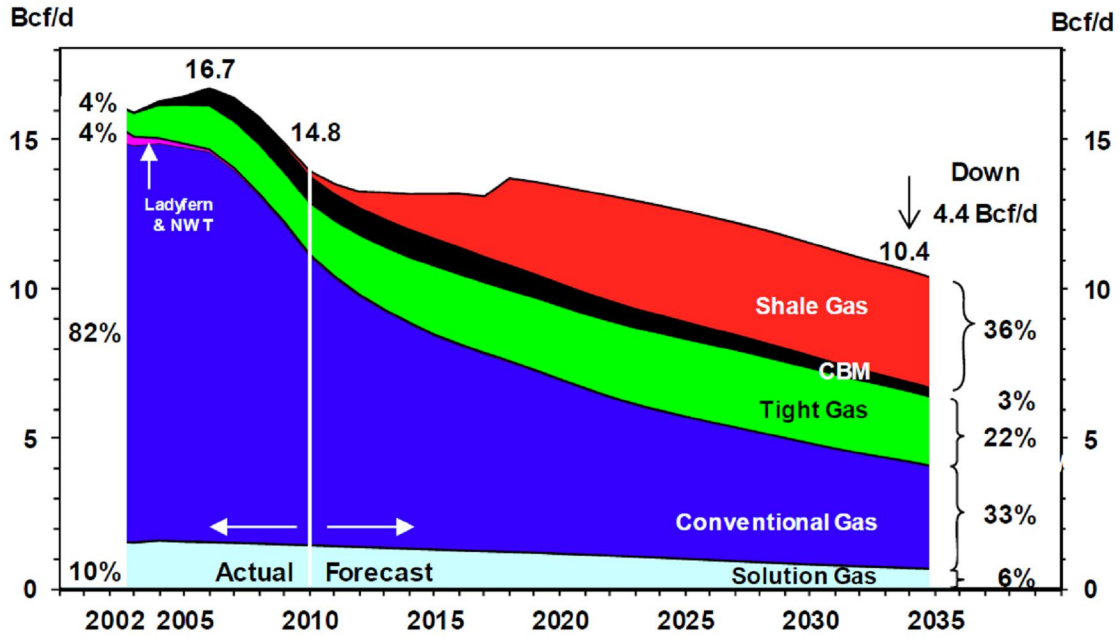
Of importance, the data indicates that as the demand for all sources of natural gas client use is expected to rise by 50 percent in 2035 in Ziff's Figure 2, the production of natural gas is scheduled to decline in Figure 4. This should be a red flag for anyone concerned about Canada's energy security.

We draw your attention to Ziff's significantly rosy predictions about shale gas in Figures 3, 4 and 5, identified by the bold red color. In Figure 3, *North American Gas Supply to 2035*, Shale gas production rises from about 10 Bcf/day in 2010 to about 35 Bcf/day, almost replacing, in essence, the former status of conventional gas reserves. Almost all of the produced shale gas shown in Figure 3 is from the United States, not from Canada.

In Figure 4, Ziff assumes shale gas produced in Canada to rise from under 2% in 2010 to represent 34% of gas produced in 2035, or just under 5 Bcf/day, a rise of some 3,200%. However, we do not know what the data was for this estimate of shale gas production, and as we will suggest, some of this data may be in question.

**Figure 5**

**Western Canada Gas Production Forecast**




[6] The data from the BC Ministry of Energy states that BC industrial, commercial and residential users amounted to 5,282,344,900 cubic meters for 2010, or a figure of 0.51 Bcf/day.

For instance, Ziff states on adobe page 15 of its report that it "assumes the Utica Shale Gas play in southern Quebec" "will be economically successful." When Ziff finished its report with its author's professional seal on October 7, 2010, the Quebec government was in the midst of a public review process of deep shale gas, with the later outcome in February/March 2011 of a quasi-moratorium of shale gas development. Given the ongoing public protests about shale gas developments in southern Quebec, we don't know how this may affect Ziff's forecast data based on its own interpretation of well production success, or what percentage of its data was dependent upon gas production from southern Quebec. Ziff simply assumes on adobe page 14, following the bold lettering of "Government policies", that "workable solutions will be found" to clear the way for "producers to employ Shale Gas hydraulic fracturing technology" throughout North America.

Given this new robust scenario in shale gas, what many gas producers, service industry companies, and energy advocates have repeatedly heralded as a "game changer" - which in essence has arisen to provide new hope for domestic markets as conventional gas reserves decline - is a recent report by the Post Carbon Institute and recent investigative stories in the New York Times that question and probe the legitimacy and promise of shale gas.

The report we refer to is by David Hughes, *Will Natural Gas Fuel America in the 21st Century*, the one we entered into evidence during the Hearing process in Kitimat on June 9th before the supply panel. The New York Times articles we are referring to are a series of four articles published some two weeks ago from June 25 to June 28, 2011, called:

- *Insiders Sound an Alarm Amid a Natural Gas Rush;*
- *Behind Veneer, Doubt on Future of Natural Gas;*
- *S.E.C. Shift Leads to Worries of Overestimation of Reserves;*
- *Lawmakers Seek Inquiry of Natural Gas Industry*. [7]

Before we examine the relevant issues of the Hughes report, which happened to be a forerunner to the New York Times' articles, we have to summarize that we, as an Intervenor, were unable to provide related questions to KM LNG about these concerns before NEB's Information Request closing date of March 29, 2011. The reason for this is that the Hughes report was published in mid-May, 2011, almost a month and a half after that closing date. After reading the report, we realized its potential significance to the present application, with respect to Ziff's forecasting document. And, upon the advisement by the NEB to consult with its Board Counsel about how to best deal with this matter, we immediately filed a Notice of Motion on May 19, 2011 in order to obtain Ziff's data spreadsheets that it relied upon for the natural gas forecast Figures in its report. Though the NEB Board had the discretionary powers to have the applicant provide us with this data, unfortunately it denied us that privilege.

[7] Combined copies of these articles are posted on our website.

Had KM LNG provided us with the data, we had an expert ready to examine Ziff's data and to provide us with an initial professional interpretation of matters that relate to issues brought up in the Hughes report prior to the Hearing process in Kitimat. However, the matter was, to be fair, difficult for the Hearing process, as referenced by KM LNG's counsel on June 9th (Sections 4071-4074).

Why do we think the Hughes report and the New York Times' investigation bear some significance to this application? Because they raise disturbing questions about the claims made by Ziff about the nature of deep shale gas as a significant contributor to natural gas production and supply, as is evidenced in Ziff's Figures 3 and 4, what Mr. Hughes refers to as placing all the eggs "in the shale gas basket" (adobe page 3).

If there is doubt cast upon Ziff's overall predictions about shale gas over the following 25 years - which we have already in part attempted to do - then all of the remaining related comparative statistics, including the total percentage of export LNG as it relates to total Canadian gas production by 2035, which may be in the neighbourhood of 13%, will be changed accordingly. Therefore, in terms of understanding the significance of energy security in Canada, this could become a critical consideration, because as Ziff's data about shale gas becomes less promising, the amount of gas exported by KM LNG becomes increasingly more significant as a result.

The Hughes report suggests, in a prelude by Post Carbon Institute's Senior Fellow-in-Residence, Richard Heinberg, that the shale gas industry had "fudged supply and price forecasts in the interest of drumming up investment capital" (Adobe page 6), also implicating the Energy Information Administration in "making similar mistakes in its too-rosy projections with regard to shale gas supplies and natural gas prices."

The Hughes report makes reference to energy analyst Arthur Berman. [8] In the report, Berman, "who has studied the Barnett Shale in depth, suggests that the estimated ultimate recovery from shale gas wells and overall recoverable reserves have been overstated by operators" (Adobe page 27), as "shale gas wells decline at much higher rates" than conventional gas wells. Mr. Hughes suggests that because shale gas reserves are not what companies say they are, it requires "higher drilling rates and much higher gas prices than forecast for this to happen" (Adobe page 56).

However, as Mr. Hughes states, "The environmental impacts of shale gas drilling and hydraulic fracturing are becoming highly evident to the public and its elected officials. There is a great deal of public pushback against these practices, which could restrict the rates at which these wells are drilled and hence reduce the forecast growth rates of shale gas production."

The New York Times' investigative articles by Ian Urbina begin with an examination of "hundreds of industry emails and internal documents and an analysis of data from thousands of wells" which the Times reviewed over a six-month period, all the

[8] Berman has a website with information about these matters.

documents of which are posted on the Times' website. The following are a series of intriguing quotes from the first article:

> In the e-mails, energy executives, industry lawyers, state geologists and market analysts voice skepticism about lofty forecasts and question whether companies are intentionally, and even illegally, overstating the productivity of their wells and the size of their reserves.
>
> The word in the world of independents is that the shale plays are just giant Ponzi schemes and the economics just do not work," an analyst from IHS Drilling Data, an energy research company, wrote in an e-mail on Aug. 28, 2009.
>
> "And now these corporate giants are having an Enron moment," a retired geologist from a major oil and gas company wrote in a February e-mail about other companies invested in shale gas. "They want to bend light to hide the truth."
>
> "These wells are depleting so quickly that the operators are in an expensive game of 'catch-up,' " Ms. Rogers wrote in an e-mail on Nov. 17, 2009, to a petroleum geologist in Houston, who wrote back that he agreed.
>
> The e-mails do not explicitly accuse any companies of breaking the law. But the number of e-mails, the seniority of the people writing them, the variety of positions they hold and the language they use — including comparisons to Ponzi schemes and attempts to "con" Wall Street — suggest that questions about the shale gas industry exist in many corners.
>
> "Do you think that there may be something suspicious going with the public companies in regard to booking shale reserves?" a senior official from Ivy Energy, an investment firm specializing in the energy sector, wrote in a 2009 e-mail.
>
> A former Enron executive wrote in 2009 while working at an energy company: "I wonder when they will start telling people these wells are just not what they thought they were going to be?" He added that the behavior of shale gas companies reminded him of what he saw when he worked at Enron.
>
> "This kind of data is making it harder and harder to deny that the shale gas revolution is being oversold," said Art Berman, a Houston-based geologist who worked for two decades at Amoco and has been one of the most vocal skeptics of shale gas economics.
> The Barnett shale, which has the longest production history, provides the most reliable case study for predicting future shale gas potential. The data suggest that if the wells' production continues to decline in the current manner, many will become financially unviable within 10 to 15 years.

In the second Times' article is a quote from a senior Energy Information Administration official who refers to the "irrational exuberance" of shale gas. It quotes from an internal Energy Information Administration document which states that "companies have exaggerated "the appearance of shale gas well profitability," and are highlighting the performance of only their best wells and may be using overly optimistic models for projecting the wells' productivity over the next several decades."

In the third Times' article, which studies controversial natural gas company reserve filings with the federal Securities and Exchange Commission, makes reference to a comment by John E. Olson, "an energy market analyst at Houston Energy Partners", saying that "he believes shale gas companies have been aggressively booking their reserve estimates and playing down costs to make themselves appear more profitable."

The fourth Times' article concerns federal lawmakers who are now requesting the Securities and Exchange Commission, the Energy Information Administration, and the Government Accountability Office "to investigate whether the natural gas industry has provided an accurate picture to investors of the long-term profitability of their wells and the amount of gas these wells can produce." It goes on to state that:

> The New York attorney general, Eric T. Schneiderman, sent subpoenas to five oil and gas companies ordering them to provide documents relating to the disclosure the companies made to investors about the risks of hydrofracking, according to sources briefed on the investigation.

According to the article, one of the KM LNG triad, EOG Resources, was issued a subpoena.

Madame Chair, there appears to be a major and serious shake up just starting to take off in the United States regarding the shale gas industry complex. And, the questions are, how does this relate to Canada, seeing that many of the same companies operating here are based in the United States, and how does this relate to this present application inquiry for export LNG?

It would therefore seem as though there may be strong grounds for the NEB to conduct a careful audit of Ziff's spreadsheet data, and to dovetail that investigation with events now brewing or unfolding in the United States. If the NEB were to do so, and we strongly encourage it to so do, then we would ask the NEB to make the Ziff data public, so that others may also investigate its merits. Given the unique and special circumstances about the late nature of this evidence before the Board, we believe the matters are nevertheless relevant for its consideration.

Here's what we guess could possibly be occurring in Ziff's forecast data about shale gas. There could be grounds to suggest that the promise of shale gas production in Canada provided in Figure 4 could be too high. If this were the case, then the export natural gas figure of 1.4 Bcf/day takes on a greater significance, and therefore becomes a more relevant issue under Canadian Energy Security, which is a strong "public interest" theme.

Remember the image of the keystone we brought up earlier. These concerns we just spoke about form part of that archway. The other stones that make up that arch largely embrace the greater theme of environmental impacts, which include the "lifecycle" of shale gas through hydraulic fracturing.

We note that the complex theme of environmental concerns related to deep shale gas development is something that Counsel for KM LNG has argued before these Hearings as irrelevant to this application. It is in the interest of KM LNG to persuade the NEB not to contemplate this matter, a matter which we believe is unresolved and integral to this application, because at least here, in British Columbia, our legislators have so far refused to either implement cumulative environmental effects studies or to conduct a public inquiry as took place in Quebec, as is taking place in the United States, as is taking place in European states and in South Africa. We can understand that industry desires some form of or 'limited' regulation, but it is opposed to comprehensively accountable regulation which is being sought in many sectors elsewhere, including banning of this practice by some legislators.

Aside from the provinces of Alberta and Saskatchewan that also contain deep sedimentary deposits of shale gas in western Canada, British Columbia lags behind the rest of world in addressing the need to investigate shale gas developments on public and private lands. Following our press release of April 14th calling on the BC government to implement a public inquiry on health and environmental risks, on May 26th two independent MLAs called on the government to convene a special Committee to comprehensively investigate shale gas development in northeast BC.

MLA Bob Simpson presented an address to the BC Legislature on May 30th (posted on our website), wherein he states that the BC Oil and Gas Commission "does not have the responsibility for cumulative impacts. It doesn't look at the cumulative impacts of this exercise on land, on water, on health and safety issues, on greenhouse gas emissions."

> The issue we have is whether or not the public policy we have is the right public policy for the expansion of this publicly-owned resource.... Here's one statement that speaks to the issue of public policy. This again, is from an entity established by the provincial government to give it advice on Climate Change issues. It states:
>
> > The potential rise in emissions from shale gas will make it extremely difficult for B.C. to achieve its CO2 reduction target. For the Province to meet its legislative emission reduction of 33% below 2007 levels, it must reduce total provincial emissions by 33.6 million tonnes per year. However, our forecast shows that shale gas development alone would increase provincial emissions by almost 10 percent.
>
> That is a public policy issue, because the government has mandated, by law, Greenhouse Gas Emission reduction that its own entity, funded by government, cannot be achieved by that one natural resource extraction activity alone.

This issue, Madame Chair, of greenhouse gas CO2 emissions is a fundamentally significant issue, and as Mr. Hughes states in his report, and more recently updated on July 1, 2011 by Mr. Hughes on the Post Carbon Institute's Energy Bulletin, in addition fugitive methane from shale gas wells are, and will become, a considerable problem for global warming, that is because of the nature of methane gas itself, which has properties concentrating the impacts of GHG of 70 to 100 times that produced by oil and coal. In essence, Mr. Hughes critiques the assumption "that natural gas is much cleaner and safer than other fossil fuels, from the standpoint of greenhouse gas emissions and public health", qualifying that this, and other assumptions, "need to be re-thought." As Mr. Hughes unfolds the story on why American gas producers must significantly increase the rate of shale gas well production, what he refers to as an "exploration treadmill", this in turn unleashes a significant problem with added fugitive methane emissions.

In contrast, we note from the Poten and Partners document, *2015-2035 LNG Market Assessment Outlook for the Kitimat LNG Terminal*, [9] on adobe page 8, that it believes that one of the principal selling features of marketing LNG to overseas customers are its "less carbon-intensive emissions profile of natural gas as compared to competing energy sources such as oil and coal."

As some staff with the NEB may have read, the debate about fugitive methane emissions from deep shale gas operations was profiled by Cornell University professor Robert Howarth in late 2010, following statements he made before a New York State Hearing into fracking. The energy industry responded in kind, particularly following the release of Howarth's report in February 2011, upon which Mr. Hughes provided healthy and sober responses. As he summarizes in his most recent report, *Life cycle greenhouse gas emissions from shale gas compared to coal: An analysis of two conflicting studies*:

> Shale gas full-cycle GHG emissions are higher than those of coal when comparing both the existing electricity generating fleets and best-in-class electricity generating technologies for fuels over a 20-year timeframe basis, but are lower than those of coal on a 100-year timeframe basis. This has significant policy implications for utilizing natural gas as a "transition" fuel to a low carbon future in mitigating near-term GHG emissions.
>
> If short-term emissions from shale gas (the major hope in increasing U.S. supply) in fact make emissions worse over the next two or three decades, a significant increase in shale gas production would be counterproductive to nationwide efforts to reduce GHG emissions.

We are not going to summarize all of the significant environmental and health issues related to hydraulic fracturing for shale gas, as we have already summarized that these matters have been left unattended here in British Columbia, including the remarks and review recommendation by Mr. Parfitt in his final argument before the Board on behalf of the Fort Nelson First Nation. Suffice it to say, there are numerous reports and issues that have recently surfaced over the last 6 months in the United States and Canada, and

[9] Exhibit B1-13.

will continue to be published, that can attest to the fact that this is a serious matter which may likely lead to reductions in deep shale gas drilling, some of which are already unfolding.

There is one last matter we would like to address, and that relates to the document by the former chair of the NEB, Mr. Roland Priddle, *Export Impact Assessment Report*, regarding his therein repeated advice that "there will be no need for Canadian gas users to adjust their energy consumption patterns by conservation or by switching to alternative fuels" (on adobe pages 7, 13 and 20). Given the global concerns and circumstances today concerning the use and abuse of fossil fuels, and their impact on the environment and on the future status of energy reserves, we are disappointed in and perplexed by Mr. Priddle's statement.

In this regard, we note that the May 2011 Hughes report, however, strongly advises the opposite. We would remind the Board, that both Mr. Hughes and Mr. Priddle were members of the same committee in Canada, the Potential Gas Committee. Here is what the Hughes report states:

> ***The Unavoidable Solution: Energy Conservation***
> It is past time for policy makers to get serious about the most important strategy we can and must adopt in order to succeed in this new era—energy conservation. Reducing demand for energy and using energy more efficiently are the cheapest and most effective ways of cutting carbon emissions, enhancing energy security, and providing a stable basis for economic planning.
>
> Unfortunately, energy supply limits and demand reduction do not support robust economic growth. This is probably the main reason why policy makers and many energy analysts and environmentalists shy away from conveying the real dimensions of our predicament. However understandable this response may be from a political perspective, it is one that only compromises our prospects as a nation and a species. There is much we can do to ensure a secure social and natural environment in a lower-energy context, but we are unlikely to take the needed steps if we are laboring under fundamentally mistaken assumptions about the amounts of energy we can realistically access, and the costs of making that energy available.
>
> Reducing the consumption of energy through efficiency and conservation is paramount if we are to reduce emissions, enhance energy security, and promote a more sustainable energy future. The growth mindset that has served us so well for the past few centuries no longer suits the situation we find ourselves in. Fossil fuels are a finite, one-time resource. Neither natural gas nor oil nor coal can fuel the 21st century to its end in the manner to which we have become accustomed. Understanding the full-cycle environmental costs of future energy choices is crucial. Although there are no silver bullets, there are many options in planning a more sustainable way forward, and I have tried to outline some of them here. We'd best get on with them.

In summary, Madame Chair, we have some serious concerns about the long-term viability of KM LNG's export license with the NEB. These concerns relate to the applicant's claims from its associated Hearing documents and Hearing Transcript statements, including KM LNG's final argument this morning, about the viability of this project based on the interpretation and forecast of data about the long-term supply of natural gas produced in Canada primarily from the exploration and production of deep shale gas in Canada's three western-most provinces, British Columbia, Alberta and Saskatchewan. We believe that the interpretation of this data by the applicant's primary natural gas supply consultants, Ziff Energy Group, and the supportive document filed by Mr. Roland Priddle, seem to have a number of problems and narrow interpretations about serving Canadians over the long term, in what they generally and narrowly define as serving the "public interest".