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MARCH / APRIL 2016 - \$6



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## GPAC'S FOURTH ANNUAL CURLING FUNSPIEL

*Inventys*

*A Better Way to Capture CO<sub>2</sub>*

*Cenozon*

*Turn on Innovation*



Dawn Clough  
FRONT OFFICE & CIRCULATION

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Energy Processing Canada, 500 - 900  
6<sup>TH</sup> Ave SW, Calgary, AB T2P 3K2

### HEAD OFFICE

500 - 900 6<sup>TH</sup> Avenue SW  
Calgary, Alberta T2P 3K2

Phone: 403 263 6881  
Fax: 403 263 6886  
TF: 1 800 526 4177  
Email: energy@northernstar.ab.ca  
editor@northernstar.ab.ca

Subscription Enquiries:  
subscriptions@northernstar.ab.ca

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### COVER



Workplace safety is part of our culture today, so much so that it has become an integral part of any project undertaken in the oil and gas industry. We deal with safety issues in our editorial lineup all year, but this is a special focus edition that will deal with all issues related to safety. If you are a producer or a contractor, you will find fertile ground in this issue, and your message, whether it be a product or a service, or an innovative way to keep your people safe, happy, and on the job, we will be talking about it. And in an overall sense, we will be dealing with the environmental safety of the industry, as we all need to live on this planet, and we want to leave a green legacy while we provide for the current energy needs of the world.

This issue will also be over-printed and distributed at the Petroleum Safety Conference, held May 3-5, 2016, in beautiful Banff, Alberta.

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# Help Wanted - “Project Manager, Nation-Building”



By Scott Jeffrey, Publisher

I don't know about you, but I'm getting mighty sick of all the back and forth regarding pipelines, and so, in the interests of over-kill, I'm going to add my two bits to the clamour.

There are three pipelines that loom large in the national consciousness these days: Keystone XL, Northern Gateway, and Energy East. They wax and wane as deadlines are reached and extended, politicians dither and deny, and innumerable self-interested parties mount their soapboxes, spout off, and fade into well-deserved obscurity.

Each of these pipelines represents a chance for our politicians to state a position that works in favour of the national interest, but that seems to be beyond their capabilities.

The latest pipeline to catch its share of attention is the Energy East pipeline, a project that is so patently in the best interests of the nation as to be an absolute no-brainer. Proposed by TCPL, the pipeline is about 80 per cent built, with an existing line to be re-purposed to deliver up a million bpd of crude to the east coast. Not coincidentally, it will terminate in St. John, N.B., home to Irving's 300,000 bbl/d refinery. About 200 km. of line needs to be built in Alberta, and almost 1,000 km. in both Quebec and New Brunswick. The eastern build will essentially follow the TransCanada Highway, a right of way that has been well used since the road opened in 1962.

Every province but one is onside with the project, although some are warmer than others. Quebec, which has the largest total refining capacity in Canada, has come down against the line. Premier Philip Couillard has had the nerve to say that with the cancellation of a port facility downstream of Montreal, there is no longer any measurable advantage to backing the pipeline. He neglects to mention that he stayed mum when protests were launched that made TCPL decide against locating a port in the province.

I don't know how mayors get to figure so prominently in a national project, but Montreal's Denis Coderre and about 80 others also see no advantage to the line, and Coderre leads the chorus by stating that safety and environmental concerns trump the benefits of a line delivering crude to eastern Canada.

We of course all know Coderre for his statement that he had no choice but to release 8 billion litres of untreated sewage into

the St. Lawrence, starting on November 11 of last year (lest we forget). As for safety, he shows scant regard for the bereaved of Lac Megantic, site of that horrific rail disaster. Once again, as with the premier, we can hear the unspoken question "What's in it for me/us."

Perhaps the worst offender in all of this is our latest Prime Minister Trudeau. When he was on the campaign trail last summer, he was ever so clear that all pipelines currently stalled were patently in the "national" interest, and must proceed. Now that he has a comfortable majority, he doesn't seem to see so clearly.

Mr. Trudeau has said he doesn't intend to be a cheerleader for the pipeline industry. With this statement, he demeans his role as the leader of our country. Nobody asked him to be a shill, but how about a quarterback, or a solid two-way centreman, who can make plays, is aggressive, and can also back check. You might not have liked his dad, but when faced with a decision during the October Crisis, and asked how far he would go, Pierre said "Just watch me." Justin could take some lessons.

The latter part of the 20th Century was a period of true nation building projects. All we need do is remember the St. Lawrence Seaway, James Bay Hydro, Churchill Falls, The TransCanada Highway, TransCanada Pipeline, Hibernia, Syncrude, Atomic Energy, and great social projects like Universal Healthcare and our National Parks System. The list goes on and on. There was no shortage of criticism then, but there always seemed to be the collective will to work through the problems, most often resulting in a better outcome.

The triumph of petty regionalism and special interests over the national good is what seems to prevail today. In the face of what-if scenarios, clear and demonstrable benefits in jobs, assertion of sovereignty, distribution of wealth, and the maintenance of our truly just society take a back seat until all palms are greased.

Sir Wilfred Laurier said famously "The 20th Century Belongs to Canada", and great people and projects made that quote largely true. In the early years of the 21st Century, more people seem to view Canada as a bunch of Balkan states rather than a Confederation, and sadly, self-interest rules supreme.





## RICK'S PICKS

By Richard G. Strand

The fact that Energy Processing Canada is an oil and gas publication does influence the choice of investments highlighted in this column, but I try to choose sustainable oil and gas investments with a management's record to add shareholder value.

The guiding principles are:

- Does the management team have a record of adding good value for the investor?
- Does the investment represent the top 10 per cent of the comparable investment type?
- Does the investment have the ability to thrive in an adverse commodity environment?
- Would I recommend it to my sister?

# BE AFRAID—VERY AFRAID

I am not talking about cancer, global warming, lead in our water, or starch in your undies.

### We need to be afraid of Trump.

You have to believe that it would be crazy for the Americans to elect a verbose, spouting, argumentative, litigious, egotistical maniac.

He has some crazy ideas but there are a few I could get behind—put a tax on goods imported from China, I agree that China is operating unfairly as I stated in my May 2015 article.

***"The North American manufactures that have their products built in China are:***

*Abusing the earth, the workers, and passing the cost of manufacturing on to the future generations in the form of sick children and polluted rivers.*

*Next time you buy anything: turn it over and think about the total costs.*

*If China had a floating currency, enforced pollution standards, and respect for their workers, would that product be so cheap?*

*So in our idiocy we have decimated the manufacturing industry in North America and polluted the world's most populous country (and its neighbours). All so our widget is cheaper."*

I agree that things should change with moral suasion, and increasing cooperation and maybe increasing tariffs if standards don't improve.

His thoughts are to put a 45 per cent duty on goods from China, and taxes on goods manufactured in Mexico by the large American companies will help them keep jobs in the U.S.

You kind of see his point. But read on, there are some consequences.

He wants to build better borders, dismantle NAFTA and move production back to the U.S.

This idea would crush the auto industry in Canada, and the U.S. that already has protectionist leanings (softwood lumber) would bar the door.

He would also destroy the U.S. economy buying the best military goods for a strengthened and expanded U.S. military.

His plans would cause an increasing deficit and a load more uncontrolled debt, that hey, Donald – the U.S. borrows from China but they won't play anymore because you have stopped their manufacturing and in less than three years they want big chunks of their money back.

He might sound good to the uneducated –right of Genghis Khan-gun toting-working class republican that is coming out to push him into the Whitehouse but for every half baked policy he touts, for every protectionist jingoistic idea he has, he has not thought of the consequences.

This groundswell comes from the non traditional republican and this ultimate outsider with his bombastic rhetoric scares me silly.

The U.S. dollar would crash taking the Loonie with it; and an increasingly militaristic China would push its weight around to protect its markets.

Donald would have his hand on the "football" (you know the pet name for the suitcase where they keep the nuke codes).

Once in a while democracy makes a mistake.

I think Volkswagen execs need to be in a Canadian jail, or they should not be able to sell their products in Canada.

I still do not like blackmail.

I still like Horizon Logistics.

I still like dividends.

I still worry about the cyclical nature of RBC's (and other banks') earnings.

I still like Crescent Point but I did sell some and take profits.

I still like Strad Energy.

I still think the banks have a "government sanctioned" advantage in the financial and insurance sectors.

I still like Keyera.

I still don't like Air Canada, and don't hold your breath for me to change my mind.

Not only am I afraid of jumping into this market with both feet, I'm long on dividend stocks and partially hedged.

And I'm still bothered by partial metrification.

To view Rick's previous picks, visit [www.homeinvmgmt.ca/articles.php](http://www.homeinvmgmt.ca/articles.php)

*Richard G. Strand, CIM, FCSI, DMS, CSWP, is the President of HOME Investment Management Inc., a registered portfolio manager in Alberta.*

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*Teammates sweeping the rock on its way to the house.*

# GPAC Fourth Annual

On Friday, Feb. 26, at the Calgary Curling Club, GPAC hosted its fourth annual Curling Funspiel. The Funspiel, which started at 1 p.m., had a great turnout. An introductory clinic was offered for the participants, as curling can be a hard sport to play and learn for first-time participants.

It was a great opportunity for team building and networking amongst companies and co-workers.



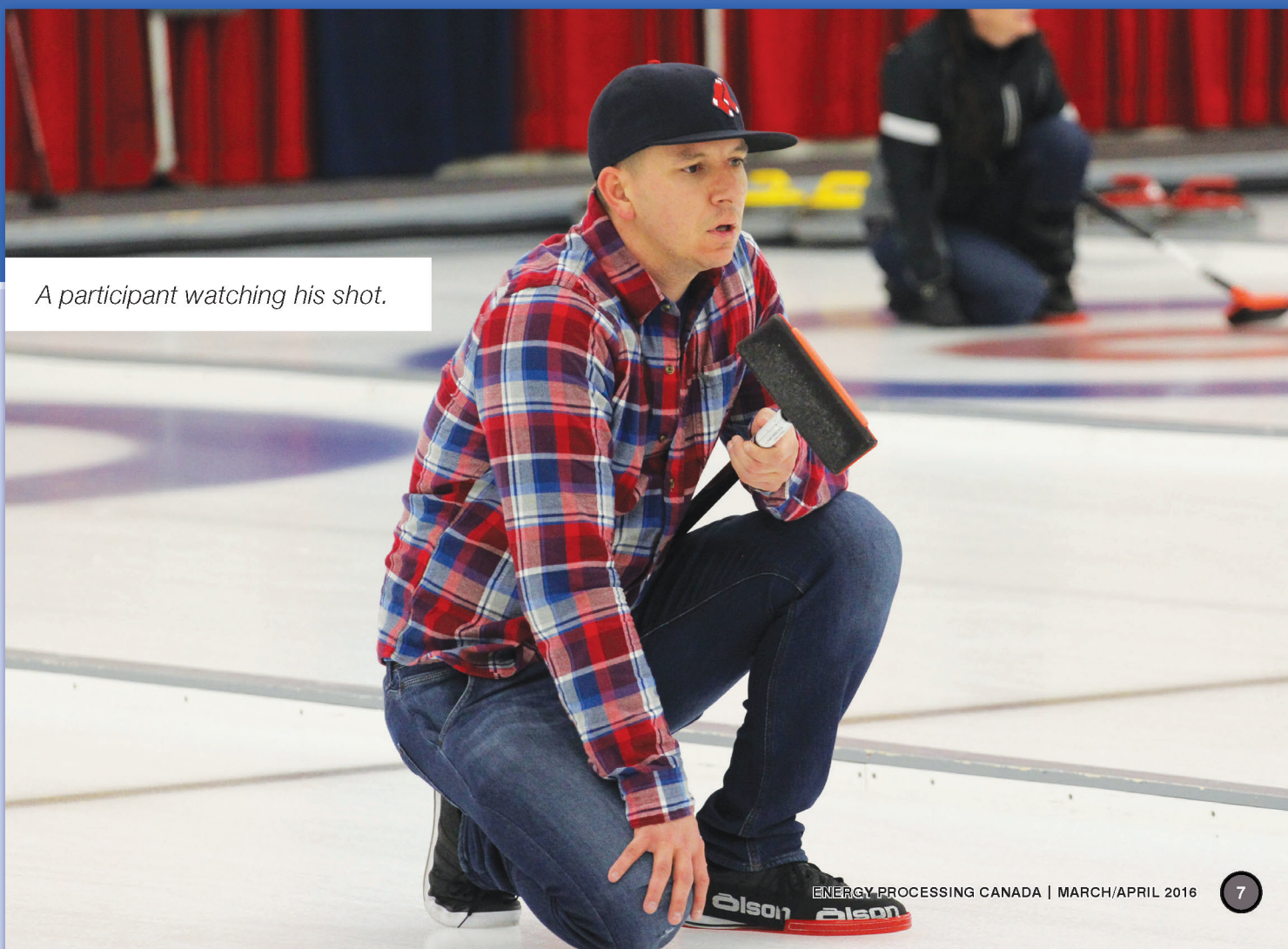
*Teammates discussing where they would like the next shot to go.*





*Delivering the rock is a challenge for people who have played very little curling. This participant has strong form.*

# *Curling Funspiel*



*A participant watching his shot.*





*Sweeping the rock to the house in an attempt to score points.*



*Teammates ponder strategy and where they want the stone to be placed.*





*The Funspiel was a great opportunity for team building and networking. Opponents shake hands after a game.*



*Two teammates sweep the rock down the ice sheet.*



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Hash Browns	Vegetarian	Pork Chops	Vanilla Ice Cream
Hot Chocolate	Grilled Chicken	Steak & Potatoes	Chocolate Cake
Soft Drinks	Salmon & Mayo	Roast Beef	Ice Cream Sundae
Smoothies	BBQ Chicken	Prime Rib	Hot Fudge
Energy Bars	Spicy Chicken	Filet Mignon	Hot Apple Cider
Granola Bars	Buffalo Chicken	Port Tenderloin	Hot Chocolate
Yogurt Bars	Teriyaki Chicken	Prime Rib	Hot Chocolate
Protein Bars	Grilled Chicken	Prime Rib	Hot Chocolate

*Pondering strategy and rock placement.*







*Preparing to deliver the stone.*



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*\*Editor's Note\** Energy Processing Canada would like to apologize to Paul Homik for abbreviating Williams Energy Canada in the January-February issue of Energy Processing Canada to Williams Eng.\*





# Inventys

## A Better Way to Capture CO<sub>2</sub>

**C**limate change is a complex and challenging problem with many variables. Developing a portfolio or range of responses is thought by many to be the best strategy for dealing with this issue.

Many experts agree, in fact, that to hold temperature rise to the 2°C, let alone the aspirational target of 1.5°C agreed upon at COP21, will require deploying technologies that remove anthropogenic emissions of carbon dioxide.

Fossil fuels—coal, oil, and natural gas—provide the vast majority of energy needed daily to power businesses, industry, recreation, and general quality of life. Unfortunately, when fossil fuels are burnt they release CO<sub>2</sub> into the atmosphere.

Carbon capture and storage (CCS) is needed to reduce CO<sub>2</sub> emissions from fossil fuel power plants, principally plants fired by coal and natural gas. However, CCS can also be applied to CO<sub>2</sub>-intensive industries, such as petrochemicals, and oil and gas processing. Carbon capture, however, has faced plenty of criticism lately, with some questioning its role in a carbon mitigation portfolio. Critics say it's too energy-intensive and expensive.

Inventys, located in Burnaby, B.C., is pursuing what the founders believe is a better way to capture CO<sub>2</sub>.

André Boulet, President and CEO, Inventys, says their VeloxoTherm process is cheaper, non-toxic, and more efficient than the incumbent amine solutions. Self-described as a breakthrough technology, he says, VeloxoTherm™ is the world's first commercially available post-combustion CO<sub>2</sub> capture process that uses structured adsorbents within a thermal swing adsorption process.

Carbon capture isn't new, and neither is Inventys. Four engineers that had a history of working together on some of the most complex gas separation projects founded the company in 2007.

"We had this piece of gas separation technology that we already contemplated filing some patents around. While looking for the right application for the technology, we identified CO<sub>2</sub> emissions as being one of the ideal places where we could deploy it," Mr. Boulet said. "At the time, there seemed to be a lot of momentum building within government and policy makers in regards to GhG and climate change."

Nobody anticipated what would happen next...the financial crisis that peaked in 2008 followed by the Copenhagen climate meeting in 2009 that failed to achieve protocol. Possibly a testament to its technology, the start up was able to secure both government grant support and investor interest during this difficult time to fund technology development.

Even at a conceptual stage, Mr. Boulet and his team felt with the technology on hand, this would be a better approach, which they've certainly demonstrated over the last eight years. To date, Inventys has 27 patents granted or pending, and more than 185,000 CO<sub>2</sub> capture-release cycles of data collected, including having its pilot plant running on coal flue gas for hundreds of hours. Inventys is satisfied with how things have progressed and very happy with the fact governments are again talking about GhG reductions.

Mr. Boulet likes to highlight how they've approached the problem of carbon capture. Inventys deals with post-combustion CO<sub>2</sub> capture, the only carbon capture approach





André Boulet, President  
and CEO, Inventys

*"To date, Inventys has 27 patents granted or pending, and more than 185,000 CO<sub>2</sub> capture-release cycles of data collected, including having its pilot plant running on coal flue gas for hundreds of hours."*

have are enormous and the reason why the company was started. "When you look at CO<sub>2</sub> emissions, we're strong believers of climate change and it has to be dealt with. What we have is a very important piece of the puzzle in dealing with CO<sub>2</sub> emissions."

The savings a company sees is the primary driver for what sets Inventys apart from their competition. "For those who are on the leading edge of dealing with their own emissions, some of them have been looking for technologies for a very long time. We've come onto the scene with a really different approach and lower costs associated. Dollars and cents matter most. We're a third of the cost compared to other CO<sub>2</sub> capture."

This is going to be a pivotal year for CCS and Inventys. No one believes this more than Mr. Boulet, who says government policy has been challenging.

that can be retrofitted into existing power plants. Post combustion is the most challenging because CO<sub>2</sub> is very low pressure, large volumes of gas, and the big barrier in the cost associated with CCS is on the capture side.

"We steered clear of a chemical solution approach by using solid materials called adsorbents. Taking the solid material, an activated carbon, we've created a structure, and packaged it into proven industrial hardware, which is commonly used in power generation," Mr. Boulet explained. "This process captures CO<sub>2</sub> with solid materials at one temperature; as flue gas passes, CO<sub>2</sub> sticks to the surface of the adsorbent and the rest of the gases, mostly nitrogen, go up the stack. By injecting steam, the CO<sub>2</sub> that's clinging to the material is recovered when the steam heats up the material and releases the CO<sub>2</sub>. After condensing the water vapour out of the combined CO<sub>2</sub> and water vapour you are left with purified CO<sub>2</sub> product. This is what drives this thermal swing- capturing gas at one temperature, and then through use of steam, recovering the CO<sub>2</sub>."

Inventys did have a project scheduled with NOVA Chemicals in Joffre, but have relocated to Saskatchewan, just outside Lloydminster with Husky. They are in the final details of engineering and construction and hoping operations start in 2017. "Ultimately, the goal is to work with Husky to demonstrate CO<sub>2</sub> removal capacity. We are very focused on heavy oil sand production," Mr. Boulet exclaimed. Inventys targets a 90 per cent recovery rate, an arbitrary benchmark.

Mr. Boulet said it takes a forward-looking company to be comfortable in adopting this new way of recovery and production. The environmental impacts this technology can



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# Royalty Report Sets Stage to Review Alberta's Competitiveness: **CAPP**

**T**he Alberta royalty review has led to a balanced report that sets the stage for more work between industry and government to ensure Alberta's oil and gas sector is competitive in North America to attract investment and create more jobs and value for Albertans, the Canadian Association of Petroleum Producers (CAPP) said.

"The new royalty framework is principle-based and provides a foundation to build the predictability industry needs for future investment," said Tim McMillan, CAPP's President and Chief Executive Officer.

"The report recognizes royalties are just one part of the competitiveness equation for Alberta. With today's economic situation, now is the time for industry and the Alberta government to work together on solutions that will make Alberta a world-class province to do business."

"This announcement has been the result of a fair and credible process, one Albertans can trust," Mr. McMillan said.

The royalty panel produced a detailed, 200-page report over its five-month review.

"We will take the time to review the report thoroughly to assess its full impact on our industry," Mr. McMillan said.

CAPP will continue to work with government during its 60-day calibration period to finalize details of the royalty framework.

"We will be engaging government to understand further the implementation phase and proposed value-added programs, two areas where we have some initial questions," Mr. McMillan said.

"But I can say today that the grandfathering of existing projects, the fact that the new rules will only apply to projects starting in 2017, and maintaining the oil sands royalty regime, are signals that the government is serious about encouraging investment in Alberta at this difficult time."

CAPP's submission recommended a royalty framework that is stable, predictable and competitive; encourages investments to develop more oil and gas; supports research and development to reduce environmental impacts further; and allows industry to reach more customers in more markets.

"We would like to compliment the royalty panel for completing its work in a timely and transparent manner that was open to input from all Albertans, including our industry," Mr. McMillan said.

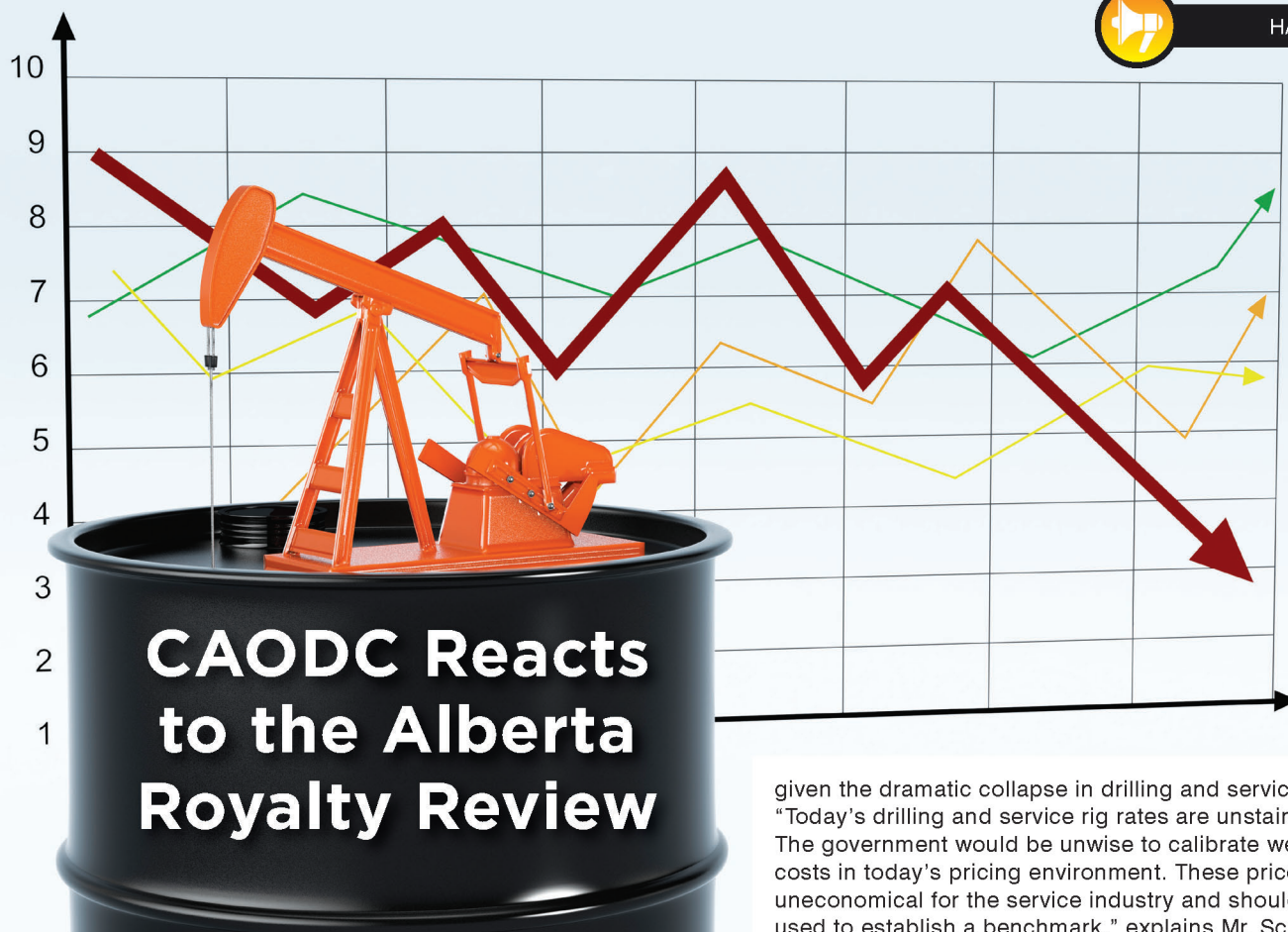
CAPP will seek to work with the Government of Alberta to develop a strategy that ensures the province's oil and gas sector is competitive. Such a strategy should focus on what industry and government can do in the short term, as well as a longer-term plan that examines the province's cost structure in light of current and future policies, and what industry can do to improve productivity and efficiencies through technological innovation.

"We are prepared to roll up our sleeves and work with the Government of Alberta," Mr. McMillan said. "I believe we both share the same desire to make Alberta's oil and gas industry competitive now and for the long-term - to create value and benefits for all Albertans."



Tim McMillan,  
President and CEO,  
CAPP





given the dramatic collapse in drilling and service rig rates. "Today's drilling and service rig rates are unsustainable. The government would be unwise to calibrate well costs in today's pricing environment. These prices are uneconomical for the service industry and should not be used to establish a benchmark," explains Mr. Scholz.

**T**he Canadian Association of Oilwell Drilling Contractors (CAODC) is cautiously optimistic given the release of the Alberta Royalty Review and Advisory Panel Report, but concerned about the impact on the service sector.

The report provides industry with the certainty it needs to move forward. "In today's economic environment, industry is looking for certainty from the Alberta Government in a time of unprecedented market volatility. The fact that industry has an understanding of what to expect relative to royalties is important," says Mark Scholz, President of CAODC.

"This report does not make significant changes to the overall royalty take by the province however it falls short of our recommendation to reduce rates in order to incent drilling activity and offset higher provincial taxes," Mr. Scholz notes. "Furthermore, the recommendations do not address Alberta's competitiveness gap with other Canadian oil and gas jurisdictions such as Saskatchewan and British Columbia."

CAODC is concerned about the Alberta Government's objective to incentivize oil and gas producers to reduce costs through the Drilling and Completion Cost Allowance. "It's ironic that the Alberta Government wants to encourage cost leadership by the industry when it has effectively increased industry's costs through increased corporate taxes, carbon levies and minimum wage. The Alberta Government should show its own cost leadership in order to support lower costs in the basin," says Mr. Scholz.

CAODC will be closely monitoring the mechanics of the calibration period for the Drilling and Completion Cost Allowance. It is not clear how well costs will be determined

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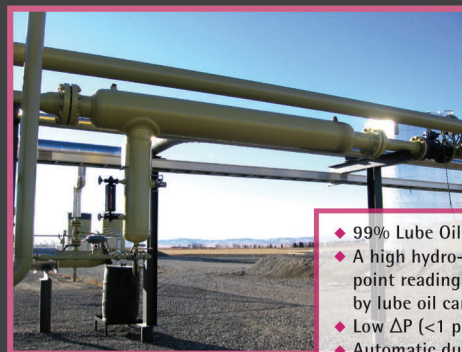
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# North American Oil and Gas Companies Face Difficult Year in 2016, IHS Says

As oil prices continue to decline, North American exploration and production (E&Ps) companies have hedged just 15 per cent of their total production volumes for 2016, including 14 per cent of oil and 18 per cent of natural gas, leaving the companies largely exposed to current depressed market prices, according to new analysis from IHS, the leading global source of critical information and insight.

According to the IHS Energy *Comparative Peer Group Analysis of North American E&Ps*, production hedging for the group of 51 companies studied will fall even more significantly in 2017, when just 4 per cent of total production will be hedged, including only 2 per cent of oil and 7 per cent of gas, IHS said.

"Companies hedge their production to provide a level of protection against oil and gas price fluctuations, and in 2016 and 2017, we see a significant decline in hedging protections, which means more companies are exposed to the current depressed prices and market conditions," said Paul O'Donnell, principal analyst at IHS Energy and author of the hedging analysis. "For most companies in the sector, 2016 is going to be another very tough year, as plunging revenues lead to balance sheet deterioration, and financial pressures mount."

The small U.S. E&Ps have the highest level of hedging protections, the IHS report, said, with 47 per cent of their oil production hedged at \$74.31 per barrel, and 46 per

cent of gas production hedged at \$3.43 per thousand cubic feet (MCF), compared with 77 per cent of oil at \$83.15 per barrel, and 58 per cent of gas at \$3.67 per MCF in fourth-quarter 2015. Within this group, IHS said, Comstock Resources, Approach Resources, and Stone Energy are among the most at risk of financial stress owing to high debt and little hedging.

The midsize U.S. E&Ps have hedged 43 per cent of oil production at \$60.54 per barrel and 26 per cent of gas production at \$3.34 per MCF. High-debt companies with little hedging include Ultra Petroleum and SandRidge Energy. (Reuters reported Jan. 25 that SandRidge Energy is exploring debt restructuring options, according to people familiar with the matter, as the heavily indebted U.S. oil and gas exploration and production company struggles with the fallout from plunging energy prices).

The large U.S. E&Ps have hedged just 6 per cent of oil production at \$53.85 per barrel and 16 per cent of gas at \$3.58 per MCF, making them the most exposed of the U.S. peer groups, IHS said. The majority of companies in this group are unhedged in 2016 and 2017, although their balance sheet strength is superior to that of their smaller counterparts, offering a bigger financial cushion.

The Canadian E&Ps have hedged just 9 per cent of oil at C\$78.54 per barrel and C\$3.87 per MCF, IHS said. Penn West and Canadian Natural Resources are the most exposed higher-debt companies.





# PSAC Responds to Royalty Review Announcement

**T**he announcement in Calgary from Premier Rachel Notley releasing Alberta's New Royalty Framework now provides certainty to the oil and gas industry, and clearly sets the stage for a strong partnership between industry and the government for the Alberta energy industry's overall success, said Mark Salkeld, President and CEO of the Petroleum Services Association of Canada (PSAC).

"We were pleased there were no surprises," he added. "PSAC was involved in the process from the very beginning, and we were confident the Royalty Review Advisory Panel would deliver a fair and equitable report. We are encouraged the Alberta government accepted all of its recommendations; however, it is very comprehensive and in depth and will require further review."


During industry consultation on Alberta's royalty framework, PSAC successfully advocated for two main priorities:

- ***A royalty regime that incents investment when commodity prices are low in order to stimulate activity levels and thereby enable the service, supply and manufacturing sector and other businesses that support the sector to maintain jobs and generate corporate and income tax revenues for government.***
- ***Royalties should not be viewed in isolation. Rather they should be considered together with all other costs associated with development including corporate taxes, climate strategy, carbon taxes and land sale costs to ensure we are competitive with other jurisdictions in Canada and globally for capital investment in oil and natural gas development.***

"We hope this new royalty framework works for our customers so that when oil prices rebound, capital investment will return. One concern we have is regarding the incentives to lower costs in this high-cost basin, which we do appreciate and understand," said Mr. Salkeld. "However, the services sector already has reduced costs considerably

in support of the producers and the industry to weather this economic downturn. Current low prices by services companies are not sustainable."

Mr. Salkeld said, "We believe the genuine intent of the report is to incent innovation and efficiencies. PSAC members already do that very well and will continue to do this to improve operational efficiency for their customers. PSAC member companies also adhere to high standards of safety, training and equipment quality and any further cost saving measures should not compromise these values."

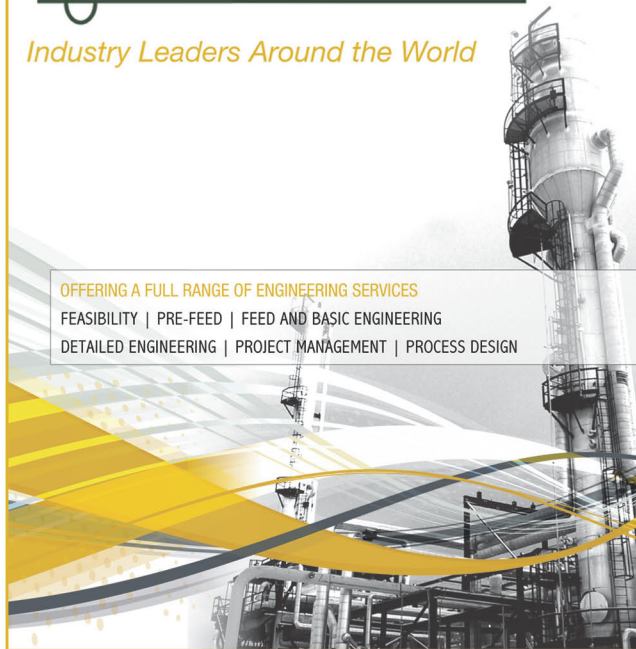


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# INTERVIEW WITH SHAYNE MCCALLUM, VICE PRESIDENT, NORTH AMERICA, UNITED SAFETY

*United Safety has seen a sharp growth since its inception. How can you explain such a positive expansion?*

At the time United Safety opened its doors, the need for well-maintained, high-quality safety equipment and reliable safety services in the oil and gas industry was not being met. After studying the market, United Safety realized the oil and gas industry was in need of a comprehensive solution, from wellhead to retail, and positioned its service offerings to include gas explorers, producers and process operators, thus providing a single standard of safety for all personnel on a given site. Since then, our strong customer relationships and word-of-mouth references allowed us to grow in Canada. With a stable presence in our country of origin, leadership saw room for geographical expansion since most challenges in oil and gas safety are common across borders. With an eye on market growth and the careful consideration of the particularities and cultural differences in each country, we were able to achieve sustainable growth. This strategy led to an impressive presence in 21 countries in the course of our 28 years.

*In what areas is United Safety the busiest?*

Our industrial and upstream safety services have seen a steady increase of loyal customers through the years.

In the industrial sector, we currently execute around 70 turnarounds a year worldwide. Several of these are recurrent business, plants in which we have been the turnaround safety partner for years. This is only possible because of the attention we pay to continuous improvement, through our knowledge transfer process, and our constant introduction of innovations to the market, that help us run safety services more efficiently.

In the upstream sector we oversee the safety services of approximately 160 rigs, and are also the partner of choice for several operators when it comes to their well maintenance and workover operations.

*What attracted the founders to find a niche in oilfield safety?*

The story of United Safety is a story about the passion and the commitment of people who go beyond their call of duty to ensure that everything and everyone at the worksite stays safe. Our founders were valued for their out-of-the-box thinking and willingness to go the extra mile for the customer. This is why they started this company and this is why we continue to grow. We have come a long way as a company, and while a lot has changed, our commitment to safety, our respect for the customer and our need to consistently exceed expectations stays the same.

*What are the key services offered by United Safety?*

United Safety brings in an unrivalled package that consists of an elite team of EH&S specialists who will promote and strengthen your worksite safety culture, pioneering processes with a proven track record of increasing productivity, and reducing costs and an extensive state of the art, innovative safety equipment for a safer worksite. We work in three distinct service lines:

**Industrial:** With a focus on achieving zero incidents and building value through improved productivity, we have provided safety services and rental equipment for thousands of turnarounds and shutdowns.

**Upstream:** We specialize in protecting personnel and nearby communities from

Immediately Dangerous to Life and Health (IDLH) atmospheres, caused by toxic gases such as H<sub>2</sub>S, CO<sub>2</sub> and others. We are backed by decades of experience in supporting and ensuring safety of upstream operations, from drilling inception to final well completion, on some of the most toxic fields around the world.

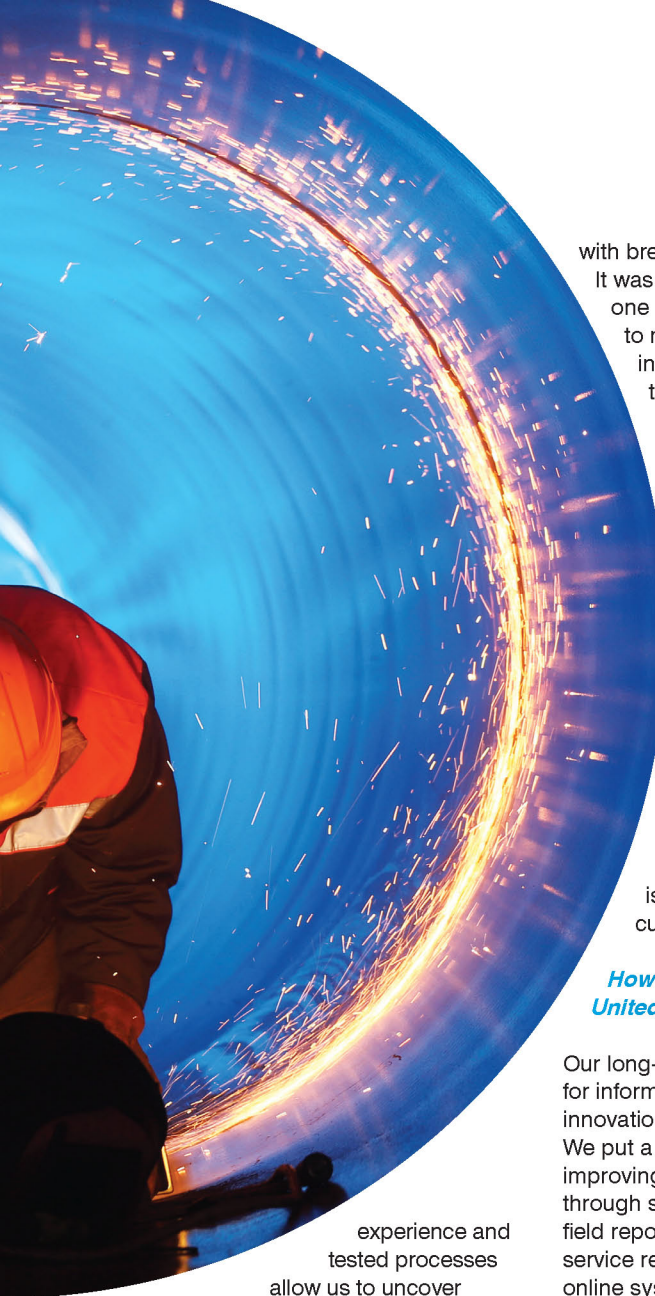
**Operational Safety & Integrity Management Services:** Through our OSIMS™ service line, United Safety offers customized HSE and risk management services including contingency plans, HSE audits and management, risk assessment and more.

*Working in the oilfield, on any location, presents many challenges. How does United Safety tackle those challenges?*

One thing we learned along the way is to never shy away from challenging the status quo and to always look for new and better ways to do things. Our collective safety







with breathing air and gas detection. It was developed to fill a safety gap one of our customers identified: how to move personnel through their incredibly large plant and evacuate them fast in case sour gas was detected. Prior to this, the Vehicle Gas Protection System did not exist. Today, we have a complete range of products equipped with the Air Qruise™ technology, and we can easily incorporate it into different types of vehicles.

However, it is not innovation itself that is the differentiator; innovation for the sake of innovation not always finds success in the market. It is the ability to listen to our customers and develop innovations that provide real value to them that is our differentiator; we call it customer-driven innovation.

#### ***How has customer feedback helped United Safety to make improvements?***

Our long-term, comprehensive strategy for information flow and technology innovation is driven by customer feedback. We put a lot of effort into capturing and improving our services and products through systematic and active listening, field reporting, and more recently, service reviews using our service quality online system, the ServQual. As part of our internal program to measure our performance against the expectations of our customers, the ServQual survey is conducted at the start and completion of a project. This clearly identifies customer expectations at the start of a project and demonstrates how we have performed against it at the end of the project.

#### ***The work United Safety does on shutdowns and turnarounds is very impressive. How much planning and preparation goes into getting ready for such extensive projects?***

The planning and preparation for a turnaround can range from three months to six months depending on the scale of the project. Prior to the turnaround, we conduct a Needs Assessment where we review the scope of work with key stakeholders, from the customer as well as other contractors. For us, it's important that we build confidence and

trust prior to, and during the turnaround. Throughout this process, we identify all the opportunities where United Safety can help ensure turnaround safety. We also identify areas that are likely to generate unplanned work before they become an issue or a source of delay and extra cost. If we have supported previous turnarounds for the same customer, we also review the Stewardship Report produced. By looking at lessons learned from past turnarounds we prevent recurring issues.

#### ***Confined space work is a very challenging aspect faced in the industry. How does United Safety combat confined space work, and can you describe the TeQ Shield?***

Confined space work is one of the most challenging aspects of a maintenance project. Accidents can occur if potential hazards such as fire, elevated temperatures, gas, fumes, vapour, lack of oxygen or limitations to movement are not properly managed. The current practice is for a safety watch to monitor the entry and maintain communication with the workers inside. However, if an accident occurs, the safety watch does not have a visual or the benefit of communicating with the workers inside the vessel. The attendant then radios for a rescue team who arrives at the scene deprived of any advance information on the issue, delaying emergency response.

The TeQ Shield™ was designed to fill this safety gap in confined space work. It combines gas detection, video surveillance inside and in the surroundings of the vessel, two-way communication and access control, all monitored from a command center. With this innovation, confined space safety watch attendants are no longer necessary. The safety operators in the command center can correct safety practices remotely, and in the event of an accident, they can communicate directly with the personnel inside the confined space and then with first responders or rescue team, providing them with vital information before their arrival at the location. Video and gas detection logs are stored, and can be utilized in trainings or investigations.

The TeQ™ Shield allows for centralized safety operations, improves efficiency and reduces manpower costs. We believe it is the first step on the road to a digital turnaround.

experience and tested processes allow us to uncover customer pain points, while our in house R&D capabilities provide cutting-edge solutions to tackle them.

Through innovation, we constantly improve and develop new systems and processes. It is our drive to do things better, faster and safer that has helped us transform safety from a cost center to an efficiency driver.

#### ***Innovation and technology often set companies apart from their competition. In what ways has United Safety used those resources to set them apart from other companies in their niche?***

United Safety has always been known as an innovative company. If you look at our portfolio of proprietary products, you will see that our innovations not only improve safety and efficiency, they also establish new benchmarks for safety within the industry. Take the Air Qruise™ Trooper for example; it consists of a vehicle equipped





# Improving HSE Performance

## MOVING FROM REACTIVE TO PREDICTIVE

*By KC Yap, Senior Managing Consultant, IBM's Chemicals and Petroleum Centre of Competence*

**F**or companies across the global oil and gas industry, accident prevention is a top priority. Ask any decision maker and they will say that employees are the lifeblood of their organization. Ensuring that they are working safely and under the right conditions is of paramount importance.

Equally important, accident prevention is also about protecting the communities in which employees live, work and play. So we strive to find smarter accident prevention strategies that can prevent the dire consequences of an incidents – namely loss of life and environmental damage.

We know that communities are paying attention, keenly aware of environmental issues and rightly expect us to operate safely and responsibly. And regulators are committed to ensuring that operations keep the public at large safe.

Companies in the chemicals and petroleum sector are moving beyond programs that take a reactive approach to accident prevention - responding to events and then managing these events through reporting. They are increasing their technical capacity to proactively identify trends through business intelligence tools that allow them to manage risk through key performance indicators (KPIs).

Now, organizations are taking a much more holistic view of their operations and applying techniques that allow


them to be more predictive in their assessment of risk and more prescriptive in managing the relationship between operational safety and operational risk. These changes are resulting in improved performance management at the plant and enterprise levels. The use of predictive analytics is now emerging as an important technique to identify organizational, operational and safety risk factors and is becoming core to performance management programs.

**Here are the five key steps companies are using to exploit the information shift and move from reactive to proactive and predictive behaviour:**

### **1 Providing a Single View of The Truth by using a trusted global knowledge management process**

A well-built knowledge base helps an organization meet compliance requirements and move to building improved reporting and analysis capabilities faster and more efficiently. An integrated approach to data, where





across the business, information is handled in the same format, ensures that the same piece of information is viewed in the same way and understood universally. Thanks to the speed of outputs, organizations are better enabled to form collaborative processes on critical documents, mitigate the effects of an ageing workforce, protect retiring knowledge, and improve employee training.

## 2 Deriving insights with content analysis

Content analytics ensures that HSE issues will continuously improve so companies can better anticipate and plan for future risks. Analytics are used on incidents to point out general causes and near misses are used to predict certain asset failures. Process historians are connected to the HAZOP knowledge base and used to identify deviations

in specific process parameters and evolution of safety incident chains.

## 3 Forming a single truth in incident management

Advanced incident management introduces a 360 view of incidents to derive only one truth of each case that is accessible in one single system. With cross incident analytical capabilities it goes beyond reporting. It reveals best practices, improves decision making while ensuring excellent outcomes.

## 4 Linking predictive safety and asset maintenance with knowledge management

Predictive safety and asset management helps organizations work smarter by optimizing the scheduling of disruptive maintenance to minimize downtime and safety risks. If there is an emergency shutdown it incorporates impending maintenance which would need similar shutdown in the near future. It provides instructions on how to undertake designated maintenance tasks and procedures identified by predictive asset management including online training, health and safety, supplier maintenance bulletins. Automatic documents and approval workflows can be introduced where required for audit trail and approval of completed procedures.

## 5 Turning environmental awareness data from various sensors into intelligent actions driven by safety analytics

Sensory information is captured by various devices, which can include video and mobile phones. Safety analytics can collect information about all events and store, correlate, index and using statistical methods discern pattern and trends for fast decision making. Operational dashboards provide command centres with real time alerts and drive outcomes for decision

making. Decisions may result in a proactive rapid response to developing event or long term reactive investigative analysis.

We know workers in this industry are exposed to harsh environments that, despite their best efforts, can be unpredictable. Companies who invest in advanced information management techniques that mine and analyze data across multiple plant and enterprise sources, are establishing the conditions and processes that reduce risk and optimize worker safety. Organizations are planning better by analyzing current and historical facts to make predictions about future events. These techniques exploit patterns found in historical and transactional data to identify risks, help assess these risks and then guide decision making for opportunities of improvement.

The amount of data and information available to decision makers in this industry is vast. It represents an incredible opportunity, however, for management to take a more complete view of their organizations so they can make smarter decisions focused on keeping their workers safe.

“

...accident prevention is also about protecting the communities in which employees live, work and play. So we strive to find smarter accident prevention strategies that can prevent the dire consequences of an incidents – namely loss of life and environmental damage.

”





# Compact Compression

## *No Hassle Compression*

Natural gas compression has long been an integral part of the Western Canadian oil and gas landscape. The historical focus has been on moving natural gas from the reservoir to market, but lately there has been an increased focus on the reduction of vapour emissions from oil and gas production activities.

Compact Compression Inc. (CCI) based out of Calgary, Alta., is a privately owned company engaged in the design, manufacture, and service of low horsepower gas compressors. CCI, which began operations in 2002, delivers technical and commercial advantages to their clients through the development of innovative natural gas enhanced recovery equipment. In June 2003, their first product, the CC40 trailer mounted unit, was brought to market, and they now offer five trailer type wellhead booster compressors under 100 hp. The company has a complete product line that is inexpensive to transport and can be installed and running in a few hours with no special site preparation.

In an interview, Chris Blundell, President, he explained that CCI is busier than many other companies in the industry as they have adapted to the changing circumstances by diversifying their product line. He also said that the company has changed quite a bit since its inception.

"We've changed quite radically. Our initial mission was to develop equipment for depleted gas wells. We developed the trailer line with some unique features that optimized the compressor to maximise production over a wide range of suction and discharge pressures. When gas prices crashed and the market for our trailer line disappeared, we diversified into conventional casing gas compression

with some success," he said, adding that they operate predominantly in Western Canada, from Manitoba to Northern B.C.

Today, CCI is focused on casing pressure in oil wells, which can increase oil production. As oil flow from the high pressure of the formation to the lower pressure at the bottom of a well, natural gas comes out of solution and collects in the casing. If this gas is allowed to build up in the casing it will create pressure in the well, inhibiting oil production. Before greenhouse gases were a concern, it was rarely economic to capture and sell these vapours so they were vented to the atmosphere. Methane, the primary component of natural gas, is considered to be 10 to 100 times worse than carbon dioxide as a greenhouse gas, so venting is no longer an option. Standard practice today to eliminate venting is to plumb the casing vent line into the flow line, which increases casing pressure to flow line pressure (the pressure required to move the oil from the well to the battery). Casing gas compressors are used to reduce the casing pressure, thus increasing oil production.

CCI's newly developed Hydraulic Casing Gas (HCG) compressor is a product that Mr. Blundell is very proud of. "Taking a good look at the market, we made an observation that the penetration rate of casing gas compression was extremely low, and the question was why. The technology (ours included) has not changed significantly for decades and is a long way from what would be considered an ideal solution to the problem. We went back to the drawing board and came up with a new and novel compression element that eliminated the issues with present technology," he said.

CCI has been working on the HCG for a little over two years with commercial production starting six months ago. Initial customer feedback has been quite positive.



***“Taking a good look at the market, we made an observation that the penetration rate of casing gas compression was extremely low, and the question was why. The technology (ours included) has not changed significantly for decades and is a long way from what would be considered an ideal solution to the problem.”***

.....

Mr. Blundell detailed some of the features of the HCG. “Most significantly, we designed the compression element to pump liquid, thus eliminating the liquid separation and pumping equipment that leads to many of the service issues with conventional compressors. We have a satellite call-up system that sends us an email if something happens which takes the management load off the operator. In order to inexpensively test wells (eliminating a significant risk as not all wells

respond to casing gas compression), we developed a trailer-mounted version of the HCG. As the HCG is completely independent of the artificial lift system employed, it is managed to optimize flow into the well while the artificial lift system is optimized to pump oil.”

Mr. Blundell hopes that the work CCI has done in removing barriers to casing gas compression will result in a larger market. He said “there are a few producers that are committed

to casing gas compression and have budgeted programs for testing and purchase, but the majority of companies do not use casing gas compression as one of their production enhancing tools.” Mr. Blundell went on to say that “the timing is pretty good for introducing the HCG. At \$100 plus oil, the focus was on drilling and completion wells. Today, drilling has slowed dramatically, so there is time and motivation to look for inexpensive methods of increasing production.”







# WAVEFRONT

## Technology Solutions

### *Using Downturn as an Opportunity*

Coming up with good ideas is hard enough, but convincing others to do something with them is even harder. In many fields, the task of bringing an idea to someone with the power to do something with it is called a pitch.

Although the fields or industries may differ, the basic skill of pitching ideas is largely the same. Ideas demand change – something that is hard to implement in the oil and gas industry, which has typically been a hard industry to crack. Since many people do not like change, and fear change, the qualities of your idea that you find so appealing may be precisely what make your idea so difficult for people to accept. It can be hard at times to get people to try new things.

Wavefront Technology Solutions knows that all too well and experienced it in the early stages of the company's development. The Edmonton-based company specializes in designing leading-edge solutions for oil well stimulation, secondary oil recovery, and environmental groundwater remediation. Although the oil and gas industry is in tumultuous and uncertain times, Wavefront is looking at the current environment as an opportunity, both internally and from a market perspective. In an interview with Brad Paterson, CFO, Wavefront Technology Solutions, we attempted to glean information about the company's technology, and how they're keeping afloat in today's economy.

"For us, we've streamlined some operations and are getting better systemically, which will facilitate growth. It's cyclical, and it's just a matter of when it comes back. There are still opportunities abound. Our President, Brett Davidson, has recently been in the Middle East. We started doing some work there about three years ago. We see potential uptake for business for ourselves there. We've always taken more of a global approach. We look at it as a global technology," Mr. Paterson explained.

Mr. Davidson and two other partners started testing the cause and effect of earthquakes in the ground and the mechanics of what happened after the earthquakes. They discovered the use

of fluid pulse. It's very similar to a heartbeat, and it moves fluid in the ground. What they were after was a method of replicating the earthquake. Through a good chunk of the early 2000s, it was about building tools to create this waveform in the ground. It's not like a one tool fits all situations. If you think about a highly fluid reservoir, the fluid flows rapidly, so you would have to have a large pulse with a big injection of fluid.

As opposed to a tight reservoir, you're going to have very small pulses, rapid, injecting small amount of fluid. What they saw, and this was replicated in nature, in a waterflood pattern, Wavefront's clients can expect an increase in production. "What we've seen, is between a 2-10 per cent potential increase in ultimate recovery factor. Part of that is because you're not producing as much water, and getting more of the original oil in place out of the ground. For us, it's not about 'does it work?' It's about getting customer acceptance. Everybody in industry is sitting there saying 'is it a black box? Or does it work?'"

"The oil and gas industry is a really hard industry to crack. It has long adaptation rates, but you'll also find that Western Canada has had the most new technology come out of the industry," Mr. Paterson alluded, adding "companies and entrepreneurs had to be creative on how they produce. The technology is applicable for heavy and light oil. We've used it on chemical EOR, CO<sub>2</sub> injections, polymer, and water flooding."

"If you look at the U.S. Department of Energy, they estimate between 370-400 billion barrels of oil stranded in the ground, so if you can get between the 2-10 per cent increase in recovery, that's a huge economic boost for the industry," he mentioned.

"It's non destructive and environmentally friendly. Getting into the current environment where companies are trying to cut costs, your pattern doesn't have to have as many injectors. Companies today, if they can increase cash flow, it's a savings. Overall, we help them be more efficient in their operations. It's exactly like Moneyball. Have to get industry acceptance, which



ties in with Moneyball and getting people to accept new ideas and thoughts. You step outside of the norm, people look at you differently if you're successful, you may not get credit, and if you are not successful you'll be held accountable," Mr. Paterson said. Producers are trying to streamline their processes, and focus on core operations.

What's important is the process the tools are creating. Wavefront has a variety of tools all creating the same process and it's what tool matches the reservoir characteristics. They have some tools that work mechanically, and some off of a computer. In the well's stimulation, some tools that are more suited to do work overs, where it's rapid pulse, and companies can also use one that's better for chemicals, gels, and surfactants.

"In the space that we're at, there haven't been many changes in the methodology, in regards to water flooding

like them before. Producers don't want to be pulling tools after six months. We've had tools offshore, on shore, deep and shallow wells, etc."



Mr. Paterson hopes Wavefront's efforts put them on the cusp of the way things are done in industry, and are hoping to obtain their objective of getting increased customer acceptance. "Have to find guys willing to think out of the box. An old school guy will be resistant. It offers new opportunities. If you understand what their drivers are, you'll benefit. When the market turns, we'll be in a good position. The real benefit is from the tool's process of continuing to inject the fluid at a certain rate and frequency given the reservoir, and that's how the client benefits," Mr. Paterson concluded.

or stimulations. We're trailblazers in that regards. Our engineers have designed tools that have never been developed

and frequency given the reservoir, and that's how the client benefits," Mr. Paterson concluded.

*"If you look at the U.S. Department of Energy, they estimate between 370-400 billion barrels of oil stranded in the ground, so if you can get between the 2-10 per cent increase in recovery, that's a huge economic boost for the industry."*





# CENOZON

## Turn on Innovation

**Zero incidents.** That's the goal of the pipeline industry. Numbers have shown that moving liquid products moved by pipeline are safer than moving those products via rail. The priority of the pipeline industry in North America is to eliminate these low frequency, high-risk incidents. Regulators across North America believe building pervasive safety cultures and strong safety management systems are integral to eliminating pipeline incidents.

Pipeline leaks, ruptures, or spills are on the short list of worst-case scenarios to occur in the oil and gas industry. There are numerous and various systems of leak detection, but for many, speed and accuracy of locating a leak are vital in creating an effective response.

As the Alberta and Canadian governments move ahead with the increase in pipelines across North America, many are looking to learn more about the initiatives companies are taking to mitigate risks to the environment and the communities close by. Some of the ways companies are making pipelines safer is through innovations such as in-line inspection tools, leak detection sensors, and predictive analytics.

One of these initiatives is Cenozon's pipeline risk modelling tool, which offers a predictive, and preventative look at pipeline integrity in real time, something its competitors can take months to assess. Cenozon's software shows where leaks may occur in the future, offering the opportunity to repair long before damage occurs.

We interviewed Rui Wang, Vice President, Cenozon Inc., in an effort to glean the company's impressive technology and software, and how they help companies mitigate potential disasters, with the hopes of cleaning up the public's perception of pipelines. He believes their client's success is Cenozon's success. Cenozon is a technology-driven software company who quickly adapts to challenges faced by their customers in operations and management.

"The big moment for our company was three years ago. We moved from Red Deer to Calgary, basically to be in a better position, and we had new investors into the company that believed in the technology and they saw a big market for it. From there, we doubled revenue, tripled the amount of employees, and right now in terms of market share, 18 per cent of all pipelines in Western Canada are managed through our software. In terms of what we

do, we develop a software platform for oil and gas companies managing their pipeline integrity operations to reduce the risks of failure and make sure their operations are more reliable."

The technology is quite straightforward. It's essentially software as a service. Really, the clients don't need to install anything on their end. They access Cenozon's software through the Internet, dramatically reducing their hardware and infrastructure. There are thousands of kilometres of pipelines buried underneath the ground. Many of them are managed in spreadsheet, which is Cenozon's biggest competitor. At the implementation phase, Cenozon efficiently connects all the pipelines for the producers. "Once we build a live pipeline network you can do many analytic and technical things with the software. We are able to predict corrosion and assess risk to make decisions on how companies want to schedule their maintenance, inspection, and monitoring," Mr. Wang added, "for the customers using our product for five years, the average incident rate is 47 per cent lower than the average industry group." For every 10,000 kilometres of upstream pipeline, Cenozon helps customers save up to \$3 million annually in leak remedy costs, compliance costs, and chemical usage.

"We have very good value proposition. Through our system, we can help operators to reduce or optimize their chemical cost for corrosion. Chemical cost is one of top five factors in oil and gas operations, and a tremendous amount of money is being spent to reduce corrosion. Most pipes are built with steel and are aging. Without this info, there is no way they can see the big picture clearly." Cenozon's analytics show that companies don't need to spend







large amounts of money, which is very important in today's economy. Doing more with less is of paramount importance.

"Right now for oil and gas companies, it doesn't make sense to spend more money drilling more wells. What we need to do is produce more with less, and produce more from current wells with fewer costs," Mr. Wang mentioned.

There are few companies out there using this information platform to manage pipelines. It takes months to calculate the risk of problems using a traditional ways of manual calculations or other companies do the work for them. "For us, once you finish implementing, it's a simple click of a button," Mr. Wang said, mentioning this is a better way for companies to mitigate incidents.

Another significant angle and pitch for Cenozon is the environmental impact that their software has. A lot of pipelines are crossing rivers and if they spill, it can have a huge impact on the landscape and environment, which is concerning. With their software, the producers can respond much faster with accurate information to minimize the impact.

Customer feedback has been very positive, as companies are seeing very real value in using Cenozon's software, the impact it has on the environment, and the money it helps them save. A year from now, Mr. Wang would like to see Cenozon's software being used in a higher percentage of pipelines, as well as making more progress in the U.S. and Chinese markets.

# TransCanada's Energy East Project to Create Up to 120 New Jobs in Québec

**T**ransCanada Corporation and ABB announced they have signed a major agreement that will see ABB deliver a number of multi-million dollar electrical houses to secure safe, reliable and energy efficient power distribution for the pump stations along the Energy East Pipeline.

At least 22 electrical houses are expected to be manufactured at a new production facility in the greater Montreal region. The agreement to manufacture the 'e-houses' will create up to 120 jobs in Québec and a further 90 spin-off jobs outside of the greater Montreal area. The order is conditional on TransCanada receiving regulatory approvals for the construction of the project.

"This agreement demonstrates our ongoing commitment to hire local suppliers to safely build this piece of national energy infrastructure and support job creation in Québec," said John Soini, President, Energy East Pipeline Project.

"ABB has a more than 60 year history of e-house innovation. We are pleased to have been able to work closely with TransCanada on an innovative, integrated e-house concept with a much smaller footprint," said Nathalie Pilon, Managing Director for ABB in Canada.

E-houses are prefabricated, modular, outdoor enclosures that house critical electrical and automation equipment required to power pump stations, ensuring safe and GHG-efficient operations. The e-houses have been custom-designed to TransCanada's requirements, with a compact design to minimize the impact on the local environment. The robust

e-houses have a lifetime of more than 30 years and they have been specified to withstand extreme cold and snow conditions. Pump stations produce the pressure needed to transport crude oil through pipelines.

"We are already very active in Québec, spending \$100 million in contracts with more than 250 suppliers over the last three years alone," added Mr. Soini. "This includes \$25 million in service contracts in preparation of the project. We look forward to continuing to work closely with Québec suppliers as we develop the project and will work to develop further opportunities."

As the Conference Board of Canada concluded, the multi-billion dollar Energy East project will create over 3,000 jobs each year in Québec during the nine years of planning and construction for the pipeline, along with \$972 million in tax revenue for the province. When the pipeline goes into service, total tax revenues for Québec will be \$1.2 billion for the first 20 years of its operation.

Mr. Soini points out that while the economic benefits of the project are important, TransCanada's main focus is ensuring that the Energy East pipeline will operate safely.

"Pipelines remain the safest way of transporting the oil Québec relies on every day," concluded Mr. Soini. "Pipelines use a lot less energy than diesel powered trains or trucks because they operate using electricity, creating a significantly lower carbon footprint. Energy East will create the capacity to displace the equivalent of 1,570 rail cars of crude oil per day to Eastern Canada."





# Canadian Crude Oil, Natural Gas, and NGL Businesses in a Low Price World

**T**he development of unconventional hydrocarbon resources has dominated the petroleum industry in Canada in recent years. From oil sands to tight oil to shale gas, Canada has become a world leader in responsible and cost effective development of our resources. We pat ourselves on the back for a job well done and the rest of the world says, "So what?" Supply is not an issue. The world has lots. If you can't get it to market, it might as well not exist. The sad truth is that if we don't develop new markets, the Canadian petroleum industry will wither and decline to just supplying a portion of our own domestic demand. Lack of market access is a chronic disease that is slowly killing our industry.

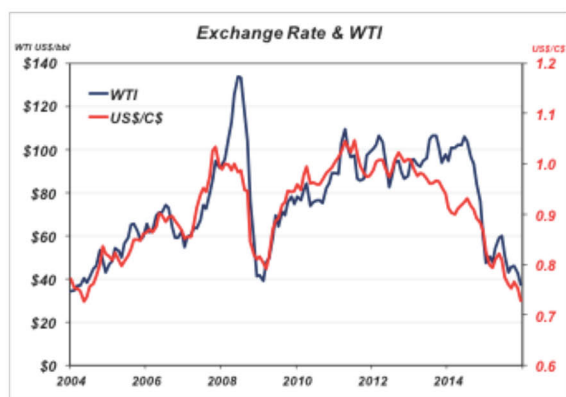
How did we get here and what can we do about it? Let's look at some history. In the late 1990s, the world experienced a very large crude oil glut. North American natural gas prices remained relatively strong while crude prices declined sharply. The oil/gas price ratio declined to the heat equivalent floor of six to seven and few forecasters even considered that it could ever exceed 10 again. The prevailing sentiment was captured in statements like "It's different this time" and "We'll never see \$20 crude again as long as we live." Perhaps the best lesson from that period is to "never say never!"

As prices rose steadily through the early to mid 2000s, the oil/gas price ratio remained relatively steady in the 10 to 12 range as gas crude and NGL prices all moved up more or less together. The world economic crash of 2008-09 coincided with the beginning of the large-scale development of unconventional gas resources throughout North America. In the 2010 to 2014 period, crude oil prices recovered while gas prices remained low. The oil/gas price ratio surged and peaked above 50. Propane prices initially retained their relationship to crude but as producers charged headlong into developing "rich" gas, propane fell to roughly gas value. Since the peak, the oil/gas price ratio declined steadily to

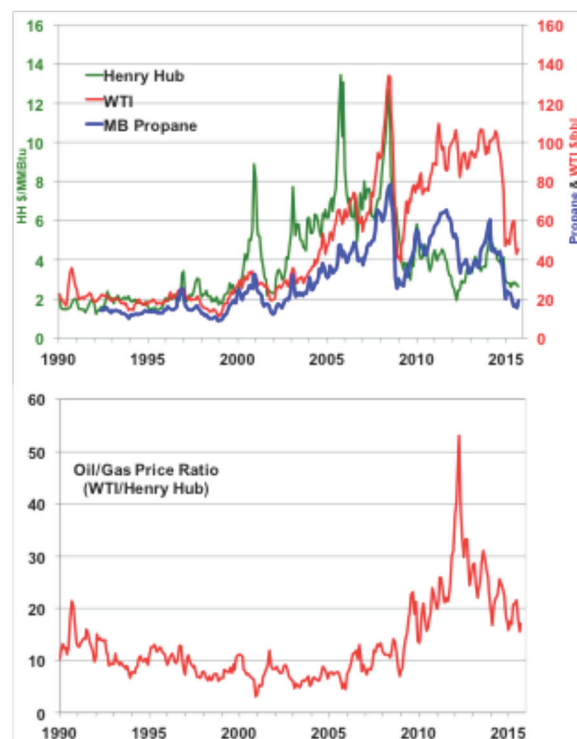
below 20 where it is today. Where will it go next? GPMi expects that the ratio will settle in the 15 range over the long term. But where are prices going in the near term, i.e., will crude prices increase and by how much?

Crude oil prices are influenced by a number of tangible factors including world supply and demand as well as intangible factors like geopolitical events. The current low price environment should spur demand. At the same time as OPEC countries have been flooding the market, OPEC spare capacity has been falling. While some may argue that the OPEC spare capacity metric is no longer important, the fact remains that OPEC is the world's swing supplier. North America is laying down rigs and mega-projects worldwide are being deferred or cancelled. It will take some time for the current large inventory to work its way through the system, but make no mistake; there is insufficient capacity to meet future demand. Prices are headed up sooner or later. The lower it falls today, the higher it will bounce in the future.

What does this mean for the Western Canadian petroleum industry? Several factors are important to note. First, we are a price taker because we sell our entire surplus to one market. And the prices we take are at a significant discount to world prices. Business 101 tells you that having one customer in a market with many suppliers is not a recipe for success. Based on NEB data,



Source: EIA and Bank of Canada Data  
Correlation Coefficient = 0.86





crude oil export volumes to the U.S. continued to increase above 3 million barrels per day in 2015 but revenues fell sharply from over \$90 billion to below \$60 billion. Canadian crude is cheap. Similarly, natural gas export volumes plateaued at about 7.4 Bcfd while revenues fell from over \$15 billion to below \$10 billion. Canadian gas is cheap. Finally, propane export volumes rose from 91 kbpd to 109 kbpd but revenues fell from \$1.8 billion to about \$1 billion. Canadian propane is really cheap, if you can get it.

Another factor is that the "Loonie" is a petrocurrency. While some politicians may argue against that proposition, the fact remains that the Canadian dollar is highly correlated to the price of oil.<sup>1</sup> Canadians are starting to realize that a strong petroleum industry is good for us all. The economic pain associated with a low Loonie will force some necessary policy reforms.

How does a struggling rich gas producer maximize operating income in this environment? Methane remains the largest revenue and margin component. Ethane and propane are worth more as gas.<sup>2</sup> Reject them now but be prepared to extract them in the future when prices recover. Produce all the butane and condensate that you can. In this environment, an alternative egress option for NGL would improve the entire basin's netbacks. The situation is analogous to when the Alliance Pipeline was developed in the late 1990s. Expect industry to pursue options that could upset the status quo (like Alliance did).

Looking to the future, it is clear that supply is no longer the driving force for the industry – market access is now the key to success. World crude oil prices will rise over the next several years while North American natural gas and NGL prices will remain weak. Western Canada is at the far end of the North American supply chain and we will continue to receive the

lowest prices unless and until we open up new export markets. The status quo is not an acceptable solution for Canada. How do we change the situation? Remember that if you are running away from a grizzly bear, you don't have to be the fastest, just not the slowest. Unfortunately, in the North American crude, gas and NGL races, Western Canada is a slow competitor. We have to run where we can be more competitive, i.e., waterborne exports to the Pacific or Atlantic basins.

The Canadian petroleum industry is leaving too much on the table. Numerous crude oil, LNG and LPG export projects have been proposed but Canada cannot seem to get anything developed – we are impotent. At the same time, our new Federal and Provincial Governments are getting an Economics 101 lesson about where the money comes from. The economic downturn will force some difficult decisions soon.

**What Needs to Happen Next?** Waterborne crude, LNG and LPG export projects to Pacific and Atlantic basin markets must succeed. We can deliver these products at costs that are competitive with the rest of the world. Construction costs are as low as they are going to get. The time to build infrastructure is now. This solution is difficult but doable and there is no other plausible alternative. It's not just a petroleum industry issue. It is the future of Canada at stake. Attitudes are changing. The public is getting fed up with interminable delays.

We have a large and growing surplus of low cost crude oil, natural gas and NGLs in Canada. Existing Canadian markets cannot consume it and the U.S. doesn't need it. Canada must develop alternative markets for its petroleum products. We are at the beginning of the upturn if only we have the leadership and courage to make it happen.



Calgary-headquartered Gas Processing Management Inc. has eleven principals, all with professional designations and more than 25 years of industry experience. **Back Row:** Terry Nazar, John Kingsbury, Gerry Goobie, Bart van Schaayk, Bob Child, Dave Tulk  
**Front Row:** Steven Wolfe, Tim Reimer, Dave Esau, Terry Joubert, Bill Armstrong.

<sup>1</sup>The correlation coefficient between monthly average WTI (EIA data) and the monthly average Canada/U.S. exchange rate (Bank of Canada data) from 2004 through 2015 is 0.866.  $r^2$  is 0.75. Correlations among economic data don't get any better than that. When crude prices eventually start to rise, sell your U.S. dollars and buy Canadian dollars.

<sup>2</sup>Propane has been below gas value since December 2014. Continued production is being driven by operating issues and sunk cost economics. Propane should recover to near gas value but not much more. For marketers, there is good margin if you can move propane to anywhere outside Alberta. These issues are covered in detail in GPMi's monthly NGL Report. Contact GPMi for a copy of a recent edition and subscription details.





# CALENDAR

- **March 13-17, 23rd Oilympics Charity Hockey Tournament.** *Flames Community Arena. Calgary, Alta.*
- **March 14-16, Canadian Petroleum Services Show.** *Edmonton Airport Renaissance Hotel. Edmonton, Alta.*
- **March 16-17, 16th Annual Arctic Oil & Gas Symposium.** *Delta Bow Valley Downtown. Calgary, Alta.*
- **March 17-20, Alberta Oilmen's Bonspiel 2016.** *Calgary, Alta.*
- **May 10-12, Canada LNG Export.** *Vancouver, B.C.*
- **June 1-2, Operational Excellence in Oil & Gas.** *Calgary, Alta.*
- **June 7-9, Global Petroleum Show.** *Calgary, Alta.*
- **June 22-23, Atlantic Canada Petroleum Show.** *St. John's, N.L.*
- **September 13-14, Oil Sands Trade Show 2016.** *Fort McMurray, Alta.*
- **September 14-15, 2016, Lloydminster Heavy Oil Show.** *Lloydminster, Alta.*
- **September 27-29, 2016. International Pipeline Exposition.** *Calgary Telus Convention Centre. Calgary, Alta.*



NEXT ISSUE MAY / JUNE 2016



GLOBAL PETROLEUM SHOW JUNE 7-9, 2016

This major international event is now a yearly show, and this edition of Energy Processing Canada will be the one that goes to the show. We've had a booth at the GPS for many years, and we will be your vehicle to get yourself noticed. It is almost impossible to secure a booth if you have not participated before, but we over-print and distribute thousands of this issue to your customers at the show.



REFINING

For the first time in years, grass-roots refineries are being built in Canada, lessening our dependence on foreign refiners, and securing a better price for our oil and gas resources. Refining the molecule at home makes sense for the producer and the country, and we are moving ahead. Along with proposed LNG facilities, this makes for a refining issue that you will want to participate in.



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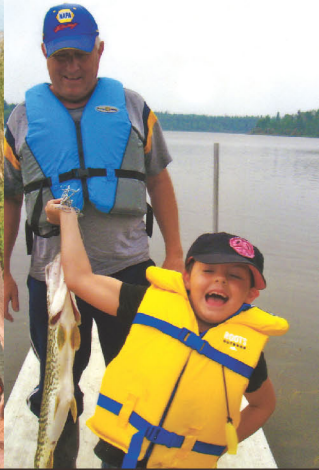


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