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Message from the editor
SHAYNA WIWIERSKI

It hasn't been business as usual for those working in the Bakken.

The COVID-19 pandemic hit oil producers hard earlier this year with the global demand for oil projected to fall by a record amount, according to the International Energy Agency. Although it meant good things for those filling up their tanks at the pump, producers will soon be struggling, which could lead to a whirlwind effect landing in bankruptcy. In fact, on April 20, 2020, U.S. oil futures dropped into the negatives for the first time.

Of course, the Coronavirus isn't fully to blame for the dip in oil prices, as the prices were already starting to drop at the beginning of the year thanks to disagreements between Saudi Arabia and Russia.

Although COVID-19 has certainly put a damper on not only the oil industry, but pretty much all industries, there is still news to report. In this issue of the *Bakken Oil Report*, we take a look at the Bakken Development and Working Lands Program and what the fund is doing for organizations throughout the state, how Montana's petroleum industry is supporting stewardship and the outdoor economy, how to take control of your business finances with factoring, and much more. Of course we also take a look at how COVID-19 is affecting the industry both locally, nationally, and internationally, as well as the supplier features we know you, dear readers, have come to love.

I hope you enjoy this issue of the *Bakken Oil Report*, and as always, if you have any comments, story ideas, or questions, please feel free to send them my way.

Strike oil!

Shayna Wiwierski

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Message from North Dakota Senator
JOHN HOEVEN

Supporting our domestic energy producers through the challenges of COVID-19 and the global oil price war

Our domestic energy industry is critical to our national and economic security. The shale oil revolution, which the Williston Basin plays an important role in, has made us a global energy leader, providing good jobs, a stronger economy and helping to insulate us against instability overseas. With the historic challenges facing our energy producers, we are taking action to maintain our nation's capacity for oil and gas production. We've been working closely with the administration and senate leadership to provide the assistance our energy industry needs to keep their operations going while also addressing the supply and demand impacts from the COVID-19 pandemic and the oil price war.

In fact, we recently made an important step in these efforts to end the oil price war, with OPEC+ nations announcing that they would cut oil production by nearly 10 million barrels per day. This is a positive development that will help provide stability in the global energy markets, and we appreciate President Trump, Energy Secretary Dan Brouillette and Secretary of State Mike Pompeo for working with us to secure this agreement. At the same time, we repeatedly pressed Saudi leadership, including the Saudi Crown Prince, the Saudi Ambassador to the U.S. and the Saudi Energy Minister, to stop flooding the market and bring an end to the oil price war.

While this is welcome progress, there is more to be done. That's why I've authored bipartisan, bicameral legislation to provide \$3 billion to purchase U.S.-produced oil for the Strategic Petroleum Reserve (SPR). As we work to advance and pass this bill, we have also continued our efforts with Secretary Brouillette to open the SPR to American producers for leased storage and to encourage "Buy American" efforts.

In order to deal with the impacts of COVID-19, the senate has now passed three pieces of legislation to help businesses cover their expenses, provide paid sick leave, and keep employees on payroll. I've held multiple meetings with North Dakota's oil producers and administration officials, including from the Department of Energy and the Small Business Administration, to ensure our businesses are best able to use the available assistance, like the Paycheck Protection Program (PPP), the Emergency Economic Injury Disaster Loan (EIDL) Program, and the Employee Retention Tax Credit.

These discussions provide valuable input to the administration as it implements these programs and are useful as we continue working in Congress on the next phases of assistance. We will beat COVID-19, and once it is safe to do so, we need our economy to get moving again as quickly as possible. That's exactly what these efforts are about – keeping this essential industry intact as we combat this disease, so we protect our energy independence and our producers can get right back to providing the energy our nation needs. ■



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North Dakota forced to rethink Legacy Fund due to economic impact of Coronavirus



It was only a couple months ago that North Dakota legislative leaders were soliciting input from citizens about the best use of the millions in earnings generated by the state's Legacy Fund, but with the onset of the Coronavirus pandemic and an oil price war, "all bets are off."

That's the assessment of House Majority Leader Chet Pollert, R-Carrington, who chairs an interim legislative committee charged with coming up with ways to either spend the earnings or reinvest them.

"Things can turn around quickly, but I'm not counting on it," Pollert said. "We may have to again look at plugging holes in the state budget with those dollars."

North Dakota voters in 2010 established the Legacy Fund, the state's oil tax trust fund. Thirty percent of all oil tax revenue collected by the state is deposited in the Legacy Fund, and prior to the economic downturn, the fund's investments had been generating hundreds of millions of dollars of earnings. The ballot measure that established the fund required all earnings to be reinvested the first seven



years of its existence. But for the first time at the end of the 2017-19 biennium, the Legacy Fund's earnings for the two years – a total of \$454 million – were transferred to the state general fund.

The 2019 Legislature devoted most of the cash to patching up the state's budget and replenishing the Budget Stabilization Fund, the state's "rainy day" fund which was depleted during the 2017 session following the slump in oil prices. But with the state restored to relatively good financial shape, citizens and policy makers had begun to debate how to use the earnings from the now nearly \$7 billion fund.

Among possible uses, the language that established the study committee suggested members consider tax relief, reinvestment, research and technology, and promoting workforce development and career and technical education. The spread of the virus has put those wish lists on hold for now, but one day conditions will improve, so conversations will continue behind the scenes.

Several ideas for use of the earnings were floated during the 2019 session,

Far left: Chet Pollert chairing a Legacy Fund Earnings Committee meeting in Fargo.

Left: Senator Rich Wardner pitching his ideas at the North Dakota Association of Counties meeting in October 2019.

but all were rejected. One plan would have reinvested the earnings. Figures presented by Rep. Corey Mock, D-Grand Forks, showed that if all earnings were reinvested for the next 40 years, the Legacy Fund would grow to \$143 billion. Also rejected was an idea proposed by Rep. Craig Headland, R-Montpelier, that would have used Legacy Fund earnings to reduce personal and corporate income taxes, possibly eliminating them altogether within 10 years.

Senate Majority Leader Rich Wardner, R-Dickinson, has pitched several ideas. Wardner would like to devote 25 percent of Legacy earnings to the state's Highway Trust Fund, which he said would fend off a need to raise the state's motor fuel tax.

"It's going to keep taxes down and we're going to raise the quality of life because we won't kill as many people on the highways," he said.

Wardner would also like to see earnings used to help meet school construction needs. He said his priority is schools in the oil patch that are struggling to cope with enrollment increases attributable to growth in the oil industry.

The Legacy Fund Earnings Committee will meet twice more prior to the 2021 legislative session. Chairman Pollert expects the next meeting will occur in late June or early July. ■

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Supporting the Bakken

Update on the Bakken Development and Working Lands Program (BDWLP)

To say that North Dakota is going through changes in 2020 would be an understatement. And while it is a desperate time for some, it is good to know that we have the ability to support farmers and ranchers and increase cattle production and acres of grasslands in the Bakken.

Since its inception in 2013, the North Dakota Outdoor Heritage Fund (OHF) has provided funding to organizations throughout the state to increase soil health, restore grasslands and wildlife habitat, and enhance farming and ranching in North Dakota. The OHF, overseen by the North Dakota Industrial Commission, plays a key role in providing opportunities for landowners and supporting innovative approaches to land management.

In 2018, OHF funded the Bakken Development and Working Lands Program (BDWLP). It was developed to: create and enhance working agricultural lands and wildlife habitat near energy sites, as well as throughout the broader landscape; create urban nature/interpretive sites, and coordinate and facilitate energy site reclamation where no current responsible party exists. The BDWLP has exploded in popularity. Currently, over 17,000 acres have been or are under agreements to be enhanced through improved management practices. This includes the establishment of 1,250 acres of new native grasslands, 670 acres of tame grass seeding, and over 800 acres of cover crops to improve soil health. Establishment of cross fence and water developments, such as tanks and

The Bakken Development and Working Lands Program was developed to create and enhance working agricultural lands and wildlife habitat near energy sites, as well as throughout the broader landscape; create urban nature/interpretive sites, and coordinate and facilitate energy site reclamation where no current responsible party exists.

pipelines, has also been very popular with landowners wanting to implement a rotational grazing system. Local NRCS/SCD and conservation offices have provided the technical support to design these development projects and provided their expertise on seed mixes and grazing management plans.

The BDWLP is truly a team effort and would not be as successful as it is without organizations and agencies working together. The NRCS and SCDs provide valuable coordination and technical expertise for landowners. Thank you to our conservation partners and ranchers who are working through these times of uncertainty. The OHF provides funds to support agriculture, public access, and community improvement.

If you have questions on the Bakken Development and Working Lands Program, please contact your local NRCS/SCD office, or call Jesse at the North Dakota Natural Resources Trust at 701-223-8501. ▀



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Bakken 3.0

By Bette Grande

At current prices and with the sharp drop in demand caused by the COVID-19 pandemic, the daily production of oil in the United States will drop significantly.

Where do we go from here? The challenges facing the oil and gas industry in North Dakota are far greater than those faced five years ago. Flint Hills Resources priced North Dakota Light Sweet at \$13.75 on April 9, 2020. A report published by RBN Energy on April 7, 2020 analyzed the cost structure of 30 shale E&Ps, and not surprisingly found that current prices cannot cover the cost of operation.

Five years ago, when OPEC forced oil prices lower, E&Ps quickly responded by cutting costs and improving efficiencies, techniques and tools. Further cost cutting and improvements in operations will be needed, but observers say that these steps will not be as effective this time.

Consumers, at least those who are still driving around, benefit from today's low gas prices. But, producers, state government, and certainly mineral owners do not benefit from oil production at these prices. Managing cash flow requirements with the prudent

management of the resource will require creativity from the private sector and the cooperation of state regulators.

Challenging times to be sure. A reset.

PRODUCTION CUTS

At current prices and with the sharp drop in demand caused by the COVID-19 pandemic, the daily production of oil in the United States will drop significantly. But, slowing production raises regulatory, contractual and resource issues for producers.

The North Dakota Industrial Commission, which regulates oil and gas activity, acted quickly to give some flexibility to shale operators. The commission directed the Department of Mineral Resources to reinstate Well Waivers, expanding the time limits for non-completed wells (DUCS) and inactive wells.

This action will give operators some additional flexibility going forward and also benefit the mineral owners over the long-term by preventing waste of the

resource. With that being said, producers are still bound by the contractual terms of their oil and gas leases, and placing wells on inactive status can in some circumstances trigger a termination of the lease. Producers and mineral owners both want to avoid producing and selling oil at current prices, but these contractual obligations must be addressed.

Finally, with regard to curtailing production, the impact underground must be considered. Reservoir engineers across our domestic shale plays are studying the impacts of taking a well offline and from periodically restarting a well from time to time. No one knows how long we will be in this low-price low-demand situation and the impacts of manipulating wells over months (years?) are vital. The risk is that pressure and other factors for a shut-in well can crush the sand over time and stop the flow of oil.

There is some good news here for the Bakken. Based on discussions with

There is some good news here for the Bakken. Based on discussions with industry, early indications are that the rocks in the Bakken can handle shutdowns better than some of the other tight oil formations.

industry, early indications are that the rocks in the Bakken can handle shutdowns better than some of the other tight oil formations. Of course, this can also be bad news for short-term production in North Dakota because operators may choose to cut back production further in the state with the confidence that the wells will not be damaged and keep production flowing in areas where the wells face higher risks from being shut in.

POSITIVES

Despite the challenges, there are some positives from this reset if you look for them. Importantly, the resource is still

there, the oil and gas are not going anywhere. While mineral owners would prefer higher prices and production, their resource remains.

At current prices, the ratio of natural gas to oil is returning closer to historical averages. The Director's Cut put out by North Dakota's Department of Mineral Resources in February showed an oil/gas price ratio of 32 to one, but by March the ratio had dropped to 18 to one. Prior to 2009 the average price ratio was closer to 10 to one.

Many would prefer that a reduction of the ratio come from an increase in the price for natural gas rather than a sharp drop in oil prices, but natural gas in the

Bakken will now be considered a valuable commodity rather than a nuisance. This should lead to an expansion of petrochemical facilities and a focus on value-added industry.

This reset should help meet the challenge of flared gas in North Dakota and lead to the prudent development of the natural gas resource in the state to the benefit of producers, mineral owners and consumers.

The full legacy of the Bakken is not yet known, but this reset will mean that development of the resource will be prudently managed, and production will likely be extended for decades. ▀

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Montana's petroleum industry supports stewardship and the outdoor economy

By Alan Olson, executive director of the Montana Petroleum Association



Montana currently has a robust sage grouse management program.

In a rush to judgment, some conservation groups place blame for every conceivable environmental malady on the development of Montana's natural resources, because, well, fear sells. Fear sells newspapers and organizational memberships. Fear sells political agendas and is used to pit different segments of society against each other using nothing more than misleading information or, more often than not, totally false statements.

A recent op-ed penned by a board member and former president of the Montana Wildlife Federation laments that the idea of leasing public lands for possible oil and gas development is a threat to sportsmen and even more so, precious wildlife. In this particular instance, the greater sage grouse.

I want to address the sportsmen issue first. The people that work in natural resource extraction are also sportsmen and women. We hunt big game and birds and try and get in our share of fishing. We too appreciate an environment that is suited for these activities. We hike and

camp in Montana's great outdoors and enjoy the time away from our busy work schedules. We hire hunting and fishing guides, purchase hunting and fishing gear, and support the activities of the Montana Department of Fish, Wildlife and Parks through purchases of the appropriate licenses. So, stop the "us versus them" rhetoric because we live here too. We all value conservation and protecting the place we call home.

I agree Montana's economic livelihood is tied to our lands, waters, wildlife and natural resources. BLM lands are public lands, they belong to everyone, not just members of the Wildlife Federation or other individuals or groups that oppose multiple use. The revenue from oil and gas leasing and potential production is split with the State of Montana. For calendar year 2019, total payments to the BLM from Montana oil and gas activities, oil and gas leases, bonus payments and royalty payments was approximately \$24.5 million. About half of the amount paid to the federal government comes back to

the state, with a quarter of that payment sent back to the county where the public land is located. In 2016, Montana received over \$246 million in tax revenue and other fees from natural resources above what was received from the BLM. These numbers are just the tax and royalty dollars paid to the government and do not even come close to industry wages, equipment purchases, and private royalty payments and their associated tax payments. This is money that funds education, human services, and other essential programs.

Let's talk about sage grouse for a moment. The sage grouse is under state management, not federal management. Montana currently has a robust sage grouse management program. A directive from former Secretary of the Interior Ryan Zinke instructed the BLM to adhere to an individual state's sage grouse program. It is not an easy process to permit an exploratory well in sage grouse habitat. Along with seasonal stipulations, the fees for compensatory mitigation (money paid into the sage grouse program) can be quite steep, in some instances approaching \$150,000 for a drilling location. That's on top of the cost of drilling, associated labor and environmental costs, and permitting fees.

If you were to drive through existing areas with oil and gas production, you would see sage grouse, mule deer and antelope. In some areas you will see elk, pheasants, and sharp-tail grouse. You'd also see coyotes, fox, eagles, hawks, ravens, and badgers that all prey on sage grouse. A 2018 scientific

paper, Smith et al. Livestock Grazing and Nesting Sage-Grouse, published in the *Journal of Wildlife Management and Wildlife Monographs* shows the impact to the bird by those predators. Of the 495 sage grouse nests monitored for that study, 51.3 percent were destroyed by predators, not oil and gas development.

Montana's oil and gas industry has worked hard to ensure the success of the greater sage grouse. We have a vested interest in the bird's survival and have shown time after time that our support of the stewardship program keeps the program funded and staffed. We believe public lands are open to multiple use and are not just reserved for the benefit of select groups. We participate in and support outdoor recreation. We are a part of the success of the outdoor recreation industry. We too have a large impact on personal wealth through employment and payments to land and mineral owners. We are an integral part of all of Montana's economic sectors. ▀



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Stability may be just 'downstream'

By Lance Medlin, EVP and chief operating officer at Meridian Energy Group, Inc.



When I was a child growing up in Washington state, my brother and I would spend each summer with our father hiking through the base of Mt. Baker through the North Cascades National Park, just east of our home in Burlington. Amongst many of the survival skills I learned on those trips, which included how to start a fire, how to forage for food, and how to construct a shelter, the survival skill that comes to mind now is one called orienteering: "if you become lost, follow the river downstream." Those words have a way of finding their way back into my mind as we traverse what is once again a difficult energy landscape. The all-out crash of the domestic crude market will inevitably impact jobs throughout the entire exploration and production market – perhaps none as immediately and directly as those in North Dakota, given the near shut-in of Bakken production.

KEYS TO SURVIVAL WHEN YOU'RE FEELING LOST

Assess the situation. In our case, the 'crude situation.' There's no illusion as to what led us down the path of a <\$30/bbl oil. OPEC+'s decision to crash the global crude market with an all-out price war is directly to blame. Getting off this path is where the next decisions have to be made, and with great care.

Stay or try to hike out? Staying means hunkering down and riding it out. Cut back or completely delay all new exploration. Reduce current production volumes. Postpone or cancel any new Capex work, such as new pipeline projects

or new production facilities. The impact is immediate, and it comes at the cost of exploration, production, and construction jobs in North Dakota and the greater Bakken region. Sadly though, even if you choose to hike out, you have to bring all the baggage of 'staying' with you. The current price of crude just doesn't support the aggressive exploration and production profile we have enjoyed for so many years. We'll see it again in the future, but not next week and not next month. It is not likely that 2020 will be the year of exploration. So collectively, we need to decide to hike out.

Hike out and "Follow the River Downstream." So, you decide to self-rescue because staying and hoping for the best rarely, if ever, actually works. So how do we in the Bakken hike out of the current crude downturn we have found ourselves in? The answer is in the survival skills I learned as a kid and still carry with me today, "move (to) downstream." The upstream exploration and production market in the Bakken is the primary provider of energy jobs in the region, yet by its nature is very susceptible to unpredictable international supply and demand fluctuations, specifically like those currently being imposed by the crude market. The downstream industry, however, not so much. While crude prices set by international factors determine the steadiness of exploration and production jobs in the Bakken, the jobs created by the downstream industry are driven by much more local and regional factors, mainly the demand for refined products such as diesel and gasoline. While the upstream

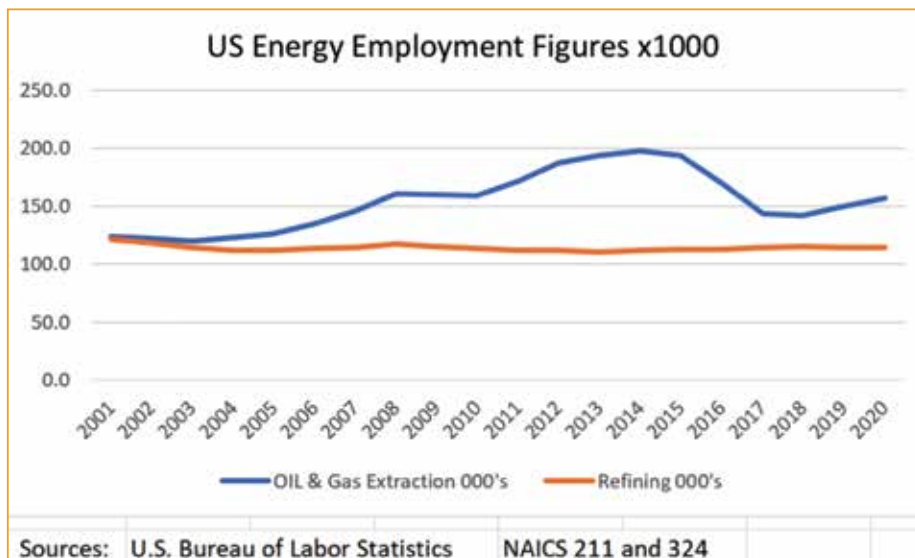
market offers troubled and white waters, the downstream market offers consistent and smooth sailing. Unfortunately, there's currently a disproportionate lack of smooth sailing opportunities being offered to the residents of North Dakota and the entire Bakken formation.

It's time to pull out the compass and look at where we're headed. Waiting for Saudi Arabia and Russia to make peace and cut production is no form of self-rescue, it's surrender. Hoping for higher crude prices without doing anything to adjust the energy profile of the Bakken isn't a plan, it's basic desperation arising from having no plan at all. North Dakota needs to move downstream, it needs manufacturing jobs, refining jobs, and fundamental factory jobs that act as the backbone for skilled workers in the region. This will serve to counterbalance the highs and lows of the exploration and production market that historically have impacted the entire Bakken region, both positively and negatively. There is no better region individually equipped to make this change than the Bakken, with its high volume of skilled workers, its already established industrial footprint between agriculture and energy, and its proven toughness to outlast even the worst economic downturns. To all the residents and workers in the Bakken, I invite you to explore the waters downstream!

Lance Medlin, a veteran of the United States Marine Corps, has an extensive background in the oil and gas industry, having led successful projects for Shell, BP, Exxon, Petrofac, KBR, and Pemex.

It's time to pull out the compass and look at where we're headed. Waiting for Saudi Arabia and Russia to make peace and cut production is no form of self-rescue, it's surrender.

In such roles, he has served as a vice president of engineering and projects, project executive, project director, and commissioning and start-up manager. Medlin is an engineer with degrees in mechanical engineering and organizational management, bringing with him over 20 years of industry experience in project management in chemical, petrochemical, oil and gas facilities design, construction and operations. Medlin has led the management, planning and direct supervision of day-to-day civil, mechanical, industrial construction and process engineering. ▶





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A comparison on new oil and gas pipelines

Submitted by the Canada Energy Centre

This fact sheet compares Canada and the United States on pipelines built from 2014 to 2020 and offers an international comparison on pipelines under construction as of early 2020. In both comparisons, the data are clear: development in Canada has stagnated while the rest of the world expands.

This lack of new capacity growth in Canada not only has dampened the benefits of investment in pipelines (creating jobs and incomes), but it also restricts both the volume of exports and the price Canadian-based companies receive for oil and gas exports. In addition, the stagnation of pipeline construction has led to foregone government revenues in the tens of billions of dollars. Meanwhile, other countries have continued to see significant investment in pipeline construction, with a concurrent rise in oil and gas exports.

BACKGROUND: THE CORONAVIRUS, CURRENT DEMAND DESTRUCTION, AND FORECASTS

The Coronavirus pandemic has affected worldwide demand for oil and natural gas. However, historical trends are useful to place the current demand downturn in perspective. Data available

back to the early 1970s for oil (Table 1) show that world oil consumption initially slumped in periods of recession, but post-recession resumed and increased even higher.

For natural gas (with data available since 2000), world consumption declined only during the 2008/09 recession, and then resumed its upward trajectory.

There is no guarantee that past demand trends for oil and natural gas will repeat themselves in the future. Current estimates from the International Energy Agency (IEA) are that worldwide petroleum consumption could decline by nine percent in 2020 (by 9.3 million barrels per day) compared with 2019 levels. The IEA expects oil demand to recover gradually in the second half of the year, nearing pre-pandemic levels by December. The IEA notes that natural gas demand could decline year-over-year by five percent or just 2.7 percent should the Coronavirus lockdowns end earlier than expected.

In its recent forecast, the IEA did not offer a 2021 demand outlook for oil or natural gas. However, the U.S. Energy Information Administration currently forecasts a recovery in oil demand worldwide of 6.4 million barrels in 2021, or a 6.7 percent increase

Table 1

Worldwide oil consumption: Past trends

Year decline/ increase began	Consumption	Decline/increase from previous peak/low	
	Millions of barrels per day		% change
1973	57.2		
1975	56.2	-1.0	-1.7%
1979	65.2	9.0	16.0%
1983	58.8	-6.4	-9.8%
1992	67.2	8.4	14.3%
1993	67.0	-0.2	-0.3%
2007	87.1	20.1	30.0%
2009	85.8	-1.3	-1.5%
2017	98.8	13.0	15.2%

Source: U.S. Energy Information Administration, International Statistics, Crude Oil Consumption.

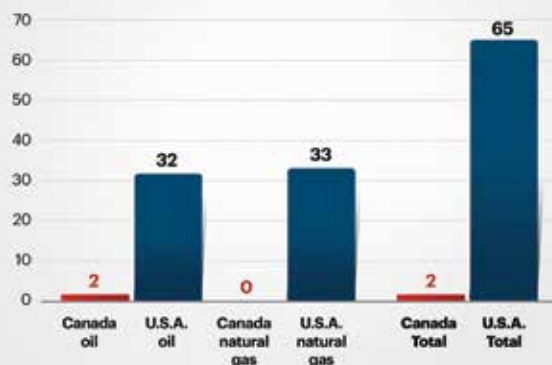
Canadian Energy Centre

Figure 1

A Canada-U.S. comparison of new oil and gas pipelines 2014 to 2020

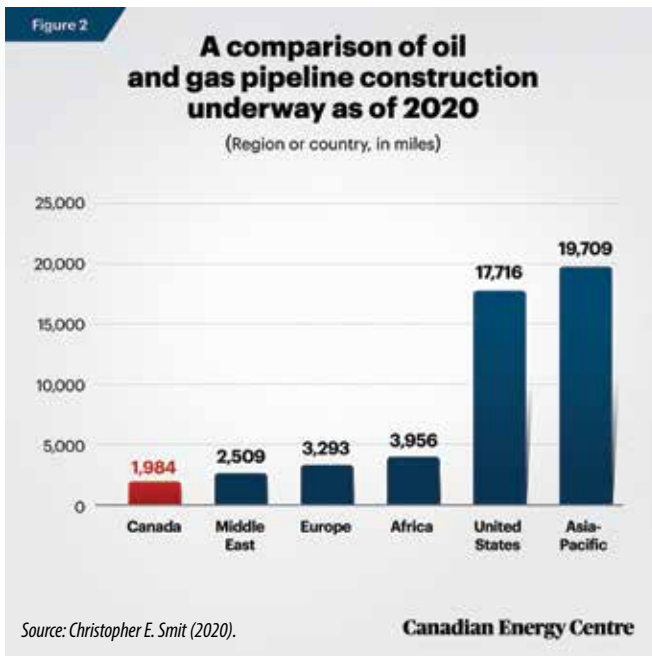
New pipelines completed as of April 2020

New pipelines only. Data does not include replacement, expansion, or facility pipelines.



Source: CAPP; International Energy Agency. New pipelines only. Data does not include replacement, expansion, or facility pipelines.

Canadian Energy Centre



relative to 2020. On natural gas, the U.S. Energy Information Administration does not offer a worldwide forecast for 2021, but it expects domestic natural gas consumption to fall further, with a total decline from 2019 to 2021 of 3.7 percent.

Figure 1: Oil and natural gas pipelines built between 2014 to 2020 in Canada and the United States

With that context in mind, Figure 1 shows data on pipeline completion from 2014 to 2020 in Canada and the United States. (Data on total pipeline construction completed worldwide for those years is not available.)¹

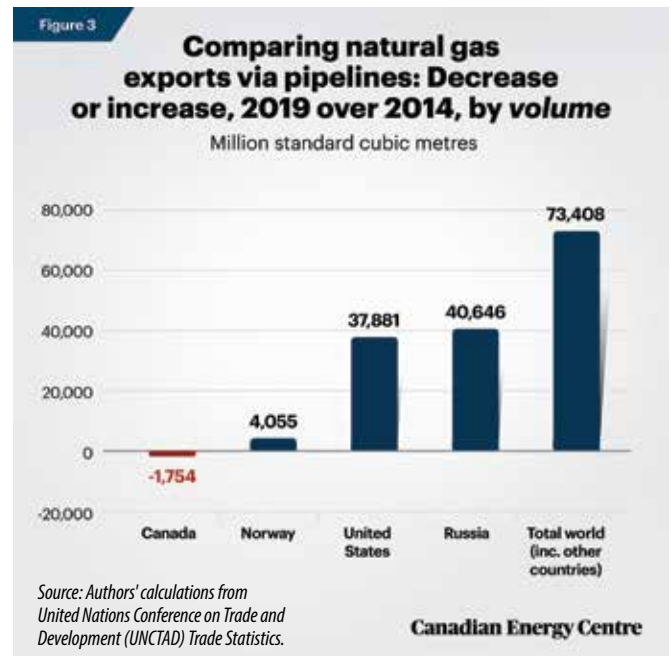
- Oil: In Canada, just two oil pipelines were completed between 2014 and 2020, compared to 32 oil pipelines completed in the United States over the same period.
- Natural gas: No new natural gas pipelines were built in Canada in those years, while 33 natural gas pipelines were completed in the United States.

Figure 2: Oil and natural gas pipelines under construction in early 2020

Similar to the Canada-U.S. comparison, the rest of the world has continued to plan and construct oil and natural gas pipelines while activity in Canada has stagnated. As of February 2020, there were nearly 50,000 miles of oil and natural gas pipelines under construction worldwide: Canada's share was just under 2,000 miles or four percent, compared with more than 37,000 miles, or over 75 percent of activity, in the United States and Asia-Pacific region combined.

IMPLICATIONS FOR CANADA: FOREGONE TAX REVENUES AND SHRINKING MARKET SHARE

Oil: While Canadian oil exports have risen in recent years, the lack of increased pipeline capacity has exacerbated "differentials"

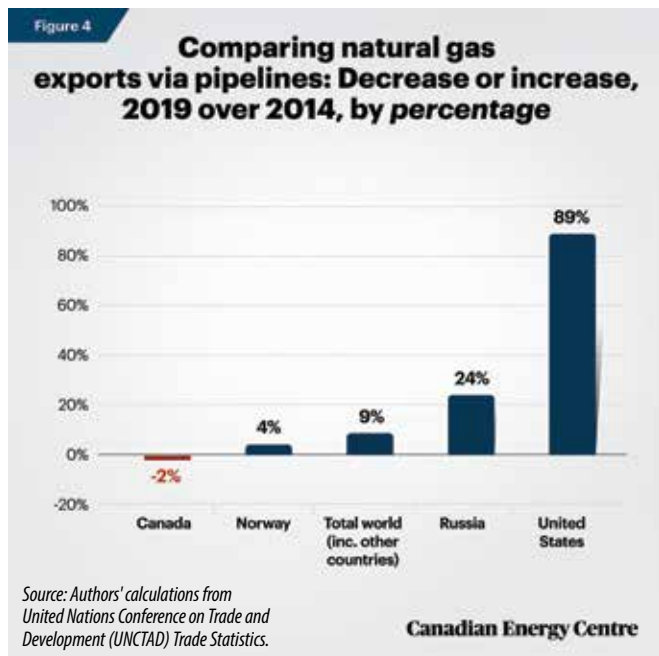


in pricing, i.e., a lower price for Western Canadian Select (WCS) compared to West Texas Intermediate (WTI). The difference in price reflects the heavier quality of WCS relative to WTI, and the additional costs associated with transportation to U.S. refining hubs. Wider discounts have occurred in recent years as pipeline constraints have prevented Canada from transporting additional oil to markets in the United States and Asia.

In a 2019 policy brief from the University of Calgary's School of Public Policy, authors Tim Hearn and Robert Mansell estimated that Alberta alone lost \$40 billion in revenue since 2013 due to the pipeline challenge. The Government of Alberta estimates that without new pipeline export capacity—some of which is now underway, but could yet be stalled—Canadian producers and governments would forego more than \$43 billion in lost income by 2023, or almost \$9 billion per year. The lost income would translate into the loss of about 35,000 jobs per year across Canada.

Natural gas: Canada's natural gas producers are highly dependent on exports to the American market. U.S. domestic natural gas production has soared in recent years, leading to reduced requirements for Canadian production. The result has been weakened prices and revenue for Canadian producers and governments.

Pipeline capacity to the west coast to access new markets such as the high demand-growth Asia-Pacific region would have enabled increased Canadian natural gas exports, fetching higher prices and providing greater returns. Instead, Figures 3 and 4 show the decline in natural gas exports through pipelines from Canada between 2014 and 2019. While Canada's exports through pipelines declined, other major natural gas producing countries saw their natural gas exports through pipelines soar.



Finally, as Figure 5 shows, Canada has been losing market share in global natural gas production that is exported through pipelines, down to 8.4 percent in 2019 from 9.3 percent in 2014. Norway's market share also declined slightly, to 11.6 percent from 12.2 percent. Russia and the United States have both seen a significant rise in their share of natural gas exports through pipelines, rising to 8.8 percent for the United States in 2019 from 5.1 percent in 2015, while Russia's share increased to 23.2 percent from 20.4 percent.

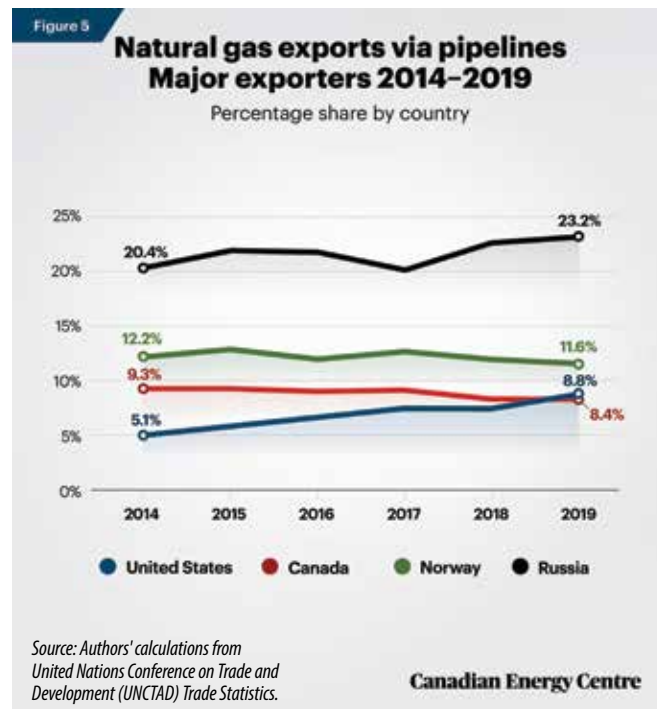
THE TAKEAWAY: 35,000 JOBS AT STAKE

While few Canadian-origin pipelines have been built in recent years, a significant number of new oil and natural gas pipelines have continued to be built in other countries, including one of Canada's main competitors for energy investment, the United States. Alberta alone has lost an estimated \$40 billion in revenue since 2013 due to a lack of new and expanded pipelines.

More positively, and "flipping" the caution against sacrificing new pipeline capacity in the future with the benefits of new pipeline export capacity, Canadian producers and governments stand to gain more than \$43 billion in income by 2023, or almost \$9 billion per year. The potential for job growth is about 35,000 new jobs per year across Canada.

NOTES

This CEC Fact Sheet was compiled by Ven Venkatachalam and Mark Milke at the Canadian Energy Centre: www.canadianenergycentre.ca. The authors and the Canadian Energy Centre would like to thank and acknowledge the assistance of Philip Cross and an anonymous reviewer for their review of the data and research for this fact sheet.



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¹ As an example of one completed pipeline in another part of the world, the Power of Siberia pipeline, a US\$55 billion, 3,000-kilometre natural gas pipeline project that runs from Siberia to northeast China, was placed into service as of December 2019. ■



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ENGINEERING, REIMAGINED

Carbon Engineering – Pioneering direct air capture of CO₂

Rendering of CE's air contactor design. This unit would be one of several that would collectively capture one million tons of CO₂ per year.

ALL PHOTOS COURTESY OF CARBON ENGINEERING LTD.

The transportation sector of 2050 will run on an energy mix unlike that of today. Operators are demanding increasing quantities of low-carbon energy sources and renewable fuels, and the sector is searching for next-generation technologies that will enable compliance with emissions reduction targets. Carbon Engineering Ltd. (CE) is a Canadian-based clean energy company that has developed a technology that can help address these growing needs. CE's Direct Air Capture (DAC) technology enables CO₂ to be pulled out of the atmosphere at large scale and then permanently stored underground or used to manufacture fuels and other products. This technology provides a market-based solution that can meet the demands of existing industries, while simultaneously decarbonizing the economy.

CE was founded in 2009 by Professor David Keith, who raised seed capital from a small group of investors, including Bill Gates. Since inception, CE's mission has been to develop and engineer a system that could be brought to market affordably and at industrial scale, so it could play a mainstream role in cutting

emissions and producing clean energy. In 2015, CE built a proof of concept pilot plant in Squamish, British Columbia that is capable of capturing one ton of CO₂ per day. Today, CE is progressing the engineering for commercial-scale DAC facilities that can be built to capture one million tons of CO₂ per year at levelized costs of approximately US\$100 per ton of CO₂. At that scale, one facility is capturing a quantity of CO₂ equivalent to the emissions from 250,000 cars.

DAC offers a range of opportunities to create environmental benefits and to manufacture products. To date, CE has developed technology for two main uses: permanently storing the captured atmospheric CO₂ underground, and utilizing the CO₂ to produce synthetic transportation fuels.

In the former case, DAC is used to permanently store atmospheric CO₂ in geologic reservoirs, creating what is known as negative emissions, or permanent carbon dioxide removal. As companies and nations tackle commitments to reduce emissions, the ability to remove CO₂ directly

from the atmosphere is a powerful new tool to include in sustainability toolkits. Additionally, DAC plants can be built adjacent to existing pipelines and oilfields to deliver CO₂ at point of demand for enhanced oil recovery (EOR). When atmospheric CO₂ is used and stored permanently underground during the process, it can partially or completely counteract the emissions from the oil produced.

Atmospheric CO₂ can also be used in the production of clean transportation fuels using CE's AIR TO FUELS™ technology. This process combines renewable hydrogen with atmospheric CO₂ to produce ultra-low carbon intensity synthetic crude. This 'syncrude' can then be processed into gasoline, diesel, and jet fuel that is drop-in compatible with existing refineries and engines. Due to an unlimited feedstock – atmospheric CO₂ – CE's AIR TO FUELS™ technology can provide global-scale quantities of clean fuels to meet growing market demand.

In partnership with Oxy Low Carbon Ventures, LLC, a subsidiary of Occidental Petroleum, CE is currently engineering



CE's pilot plant Direct Air Capture system.



CE's pilot plant pellet reactor and associated equipment.

the world's largest DAC project – a facility that will capture one million tons of CO₂ directly from the atmosphere each year to be stored underground permanently in the Permian Basin, U.S. This project is running in parallel to the work CE is conducting in other markets, and the company continues to develop project opportunities in locations where CO₂ can be permanently and safely stored

underground, and where markets are demanding increasing quantities of low-carbon fuels.

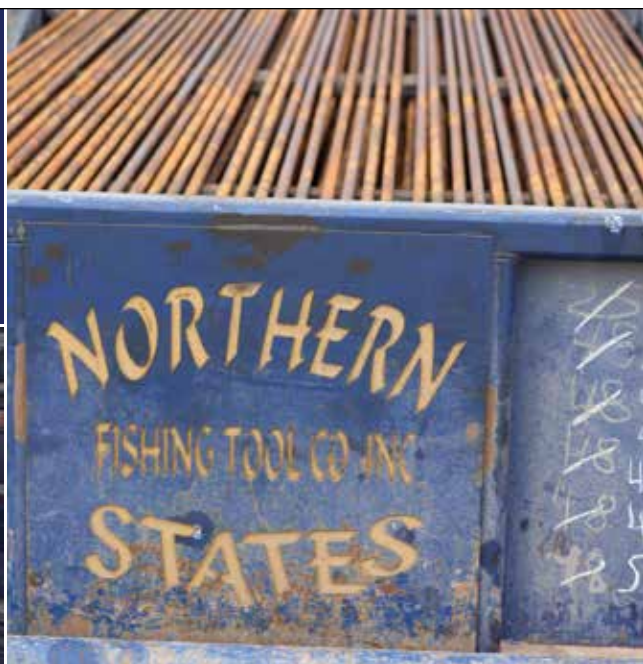
ABOUT CARBON ENGINEERING (CE)

Founded in 2009, CE is a Canadian-based clean energy company leading the commercialization of groundbreaking

technology that captures CO₂ directly from the atmosphere so it can be stored permanently underground or synthesized into clean, affordable transportation fuels. From a pilot plant in Squamish, B.C., CE has been removing CO₂ from the atmosphere since 2015 and converting it into fuels since 2017. Learn more at www.carbonengineering.com. ■

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Coating pipelines in cold weather

*By John Strong, Technical Field Specialist, NACE Senior Corrosion Technologist No. 24198;
Richard Norsworthy, NACE Corrosion Specialist No. 4037; Dave D'Ambrosio, NACE CP-3 No. 7043*



Heated tent in cold-environment coating applications.



Applying two-part epoxy in cold-weather environment.

Coating underground pipelines in cold weather is a common occurrence for most pipeline operators in the Bakken region. For the pipeline industry as it relates to field-applied buried coatings, we typically define a project as cold weather application if temperatures dip below 40°F (4°C). There are many ways to address the cold temperatures and successfully apply a coating in the field. These methods can be expensive and time consuming, but must be followed if the coating is to perform as intended.

Another issue is choosing the proper coating for cold weather application. Mesh-back coatings provide many benefits over other types of materials. This coating allow applicators to use less heating, faster application time, and once applied, needs no further heat or cure time.

COLD WEATHER ISSUES

Most pipeline coatings are not well adapted to cold weather because the cure mechanisms require a minimum temperature for a certain duration to complete the cure. Snow (cold), freezing rain (cold plus liquid moisture), frost (cold plus solid moisture), and other issues contaminate the surface and lower temperatures.

Not only does the ambient temperature have to be correct to avoid problems with dewpoint, the substrate or pipe itself must be kept within the temperature range specified by the coating manufacturer. To overcome these issues, pipeline companies use

various techniques such as tenting combined with heating (see above left photo).

Storage of the coating materials prior to and during application is also a critical component. The coating products must be stored in a warm environment, as per manufacturer's recommendations, before and during the application process.

Preheating the pipe is a critical step in the process and should be carefully performed by experienced applicators. Preheating the pipe must keep the pipe in the proper curing range for the required time without causing damage to plant-applied coating or the pipe itself. Excessive preheating can cause coatings to cure too quickly. If snow or ice is inside the pipe, it will act as a heat sink and cool the area not allowing proper cure. In-service pipeline product temperature and flow rates must also be considered.

COATING CHOICES

Two-part epoxies and other liquid coatings:

Most liquid applied coatings cure rate will be negatively affected by cold temperatures. If the temperature on the pipe and atmosphere are not held in the correct range for the proper time there may be only partial cure. This can lead to coating failure.

At this low temperature point, the coating applicator will need to employ expensive pre-heat, tenting, and/or encapsulation to



Application of Polyguard RD-6 with wrapster.

ensure a proper cure. If these methods are not used, most liquid coating are susceptible to damage from remaining viscous on the pipe (see previous page right photo). Holidays, drips and sags are common imperfections that may result from incomplete cure due to the ambient and/or substrate temperature being below the acceptable low temperature application limit. If the liquid coating does not cure properly, the first coat will have to be removed and pipe recoated.

There are two-part liquid coatings formulated for cold weather application. This means the formulation has been changed from the ones used at normal ambient temperatures. If these are used, they should be subjected to the same testing as the others, but testing should be performed on samples that were coated and cured at the lower application temperatures.

SOLID FILM-BACKED TAPES

Solid film-backed tapes have been used for many years to coat pipelines around the world. They are relatively easy to apply and are ready for holiday detection and backfill almost immediately. Entire lengths of pipe, field joints and repairs have been completed using solid film tapes. A primer coat is required for most of these products.

Solid film-backed tapes stretch much easier than mesh-back coatings. This allows soil stress and other mechanical damage to cause the solid film backing to stretch causing wrinkling of the tape. This has been and will always be a major problem for solid films. Once the backing stretches and wrinkles, water can penetrate these void areas. Disbonded solid film can exhibit Cathodic protection (CP) shielding which allows external corrosion to form on those pipelines. CP shielding with solid film-backed tape has caused many companies to discontinue use.

VISCOELASTIC

Viscoelastic tape coatings can be used in cold weather. These coatings remain relatively soft in cold weather but do require all the same efforts to keep the material and pipe surfaces warm as with other systems. They are easily applied and can be used on somewhat irregular shapes.

Since these coatings are relatively soft, damage by rocks and other hard objects in the backfill is possible. CP shielding can be a problem if disbondments occur and electrolyte penetrates due to the solid film backings.

MESH-BACKED COATINGS

Mesh-backed coatings (MBC) are a proven option to address cold weather application on field joints or repairs. The MBC can be applied in low temperatures by storing the materials in a temperature-controlled environment of 70 to 100°F (21 to 38°C). At these storage temperatures the MBC can be applied to the blasted and primed pipe surface at much lower temperatures than other products. If the material is stored below the above temperature range, the pipe can be pre-heated to 70 to 100°F (21 to 38°C), primed and coated.

Once the coating has been properly applied, additional heat is not required. The coating system will “wet” the surface on contact and remain bonded when applied within the acceptable temperature range. The bond to the surface will also be dependent upon correct tension during application. A company-approved manual-operated machine for proper tension during application is strongly recommended for a MBC system (see above photo). In special circumstances, as with all coatings, contact the manufacturer for guidance.

Once the application of MBC is complete, the coating may immediately be inspected for holidays and backfilled. The MBC coating will not require continued monitoring, heating or encapsulation.

A successful application of an MBC in cold weather is not a difficult task when using the methods recommended by the manufacturer. The project will be complete the first time and not require a re-application to correct any problems due to the low temperatures. The last thing most of us want to do in the cold is repeat something we’ve already done.

CONCLUSION

Coating field joints or replacing coatings during rehabilitation in cold weather is always challenging and more expensive. The use of heated tents, encapsulation and heating the pipe to provide an environment conducive for proper curing of the coating is always required. All coating materials must be kept in properly heated containers and kept in the proper temperature range until applied.

Unlike liquid coating, the Polyguard RD-6 coating system is easier to apply in cold weather, requires less overall heating, does not require lengthy cure times, and can be inspected, holiday detected, and buried soon after application. Combined with over 30 years of excellent field performance and proven non-shielding to CP currents (if adhesion failure were to occur), this coating provides an excellent alternative to liquid and other coating types to be applied in cold weather. ▀

New trailer metering system helps oilfield transportation company save time, improve safety and increase revenue

Quicker, more accurate and safer solution for custody transfer metering

By Jerry Thompson, President of Connected Energy Inc.

North Dakota-based oilfield hauling company Prairie Field Services (PFS) was looking for a quicker, more accurate and safer solution for custody transfer metering of crude oil loading and unloading of tanker trailers. After investigating several possible solutions, they selected a system developed by Connected Energy Inc. (CEI), which uses Coriolis mass flowmeter technology with large internals and a small footprint that makes it easily truck-mountable. The four-inch meter was integrated into an overall metering system that reduces the time needed to load/unload a truck, resulting in an estimated 10 to 15 percent increase in revenue. Not only did the system improve the safety of PFS's workers, but the system's capabilities catapulted them into the Internet of Things (IoT).

THE NEXT GENERATION OF OILFIELD HAULING

PFS, a member of the Prairie Companies, is the leader in oilfield hauling and logistics throughout the Bakken and Powder River Basins. Located in Watford City, North Dakota, PFS hauls crude oil from individual well sites to midstream distribution facilities. Jeff Wright, PFS's director of operations, was instrumental in the success of this project.

During the crude oil loading and unloading process, the tanker trailer/semi-trailer pulls up to the well site, where crude oil is normally stored in large tanks. The driver connects the hose to the tank and then loads the oil into the tanker trailer.

The company typically used positive displacement (PD) meters for loading the truck from the well sites but tended not to measure the oil again when they offloaded at the distribution facility. They would typically use a TANK-TEL tank monitoring system with telemetry capability to measure the volume of oil, or might possibly use weigh scales. Both these alternatives can be inaccurate, and do not provide information on densities or other characteristics.

After loading, the oil must be tested to determine if it is "merchantable" – containing under the prescribed limits of basic sediment and water (BS&W). Using a centrifuge, tank truck operators take a sample from the top, middle, and bottom of the tank and two temperature samples from the middle. They then read out the results to determine if it meets the requirements.

The entire manual process takes about 30 minutes per load, and PFS was looking for a more automated truck metering solution that would reduce the amount of hands-on "tank work" on the well site. In addition to improving efficiency, they were also interested in the safety benefits of not having drivers climb up on tanks. Reducing exposure to slips, trips and falls, and volatile organic compounds (VOCs) was also desirable.

METER SOLUTIONS

Working with CEI, a system integration company with 10 years of experience solving problems in the Bakken, PFS evaluated several available options. They began by conducting trials with three different meters, including two Coriolis meters and one completely different differential pressure (DP) meter technology.

The requirements of the sanctioning bodies (Bureau of Land Management (BLM) and the State of North Dakota) stipulate that there can only be one way on and off the trailer. This meant that flowrate could be a potential problem, due to the low head pressure when unloading. It wasn't until CEI reached out to KROHNE and discussed its line of Coriolis meters that they found a good solution.

After discussions with KROHNE's engineering staff, CEI decided to try an OPTIMASS 6400 Coriolis mass flowmeter with an optional remote meter head. This four-inch meter not only has the flow rate capacity to meet the requirements, but also has a patented Entrained Gas Management (EGM™) technology that detects and signals gas entrainment. The meter maintains the active

measurement in all measuring conditions with gas content from zero to 100 percent by volume. It can report the two-phase status and output a preconfigured alarm, in accordance with NAMUR NE 107 requirements. The meter has a signal converter with digital signal processing that provides dynamic density measurement, as well as enhanced diagnostic and status indications.

The minute oil was pushed through the KROHNE OPTIMASS 6400, CEI knew they had found exactly what they were looking for. The footprint was good, the accuracy was fantastic, and the flow rate far exceeded expectations.

CONNECTING THE DATA

In conjunction with finding the best Coriolis meter, CEI developed an integration package that is easy to operate and follows the IoT concept by storing data in the cloud and offering real-time mobile applications. The patent-pending system offers an auto-load feature that allows the operator to load by volume or mass. Once the preset limits chosen by the operator are met, the system turns off, reducing the number of spills from overloading. If desired, a dispatcher can enter the desired volume/mass of each load for a trailer, even further reducing human error.

In terms of load accuracy, the system calculates average temperature, average American Petroleum Institute gravity (API gravity), gross observed volume (GOV), gross standard volume (GSV), net standard volume (NSV), and basic sediment and water (BS&W). This wealth of information is delivered on a printed ticket from the user interface or an e-ticket.

MEETING THE REQUIREMENTS

During the system development, CEI, KROHNE, and PFS's Jeff Wright had to solve a variety of truck configuration challenges, including placement and footprint. Also, the system had to meet the separate requirements of both the BLM and the state of North Dakota. The system was approved by North Dakota and meets all current BLM requirements.

Based on the results of a successful pilot program, PFS purchased five systems, which are currently in operation. They are looking to outfit more trailers in the near future. To date, there have been zero failures or issues with any of the installed systems.

SAFETY, TIME AND INCREASED REVENUE

With the new system, the metered trucks simply pull up, hook up the hose and start pumping. The meter tells the driver if the oil is merchantable. In addition, there may be potential savings on insurance and workers compensation once PFS can show they are using metering trucks, and workers are not being exposed to hydrogen sulfide.

From a fleet perspective, if all trucks use the metering system, the 30-minute time savings gained from not having to conduct the manual tank work would be equivalent to an increase of .33 loads per shift. This equates to a 10 to 15 percent increase in revenue generation per shift, thus creating a return on investment (ROI) of six months. ■



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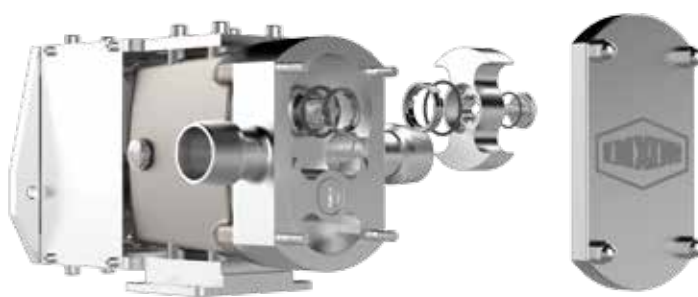
One pump serves multiple applications

By James Henderson, upstream energy specialist for Dixon Valve



Left: The Dixon JRZL 115 series pump is one pump that can be adjusted to meet a variety of flow requirements.

Right: The JRZL frac pump parts are interchangeable with all other JRZL pumps and eliminate stocking parts specific to different pumps.



A variety of equipment is used during the well fracking process. In this article, we will focus on the positive displacement (PD) pumps used to add chemicals to the slurry being pumped downhole.

During fracking operations, water, sand, and chemicals are blended and pumped down the wellbore at high pressure and volume. A blender combines water and sand, and, in most cases, chemicals into the slurry. There are applications where a chemical additive unit adds chemicals to the slurry and other cases where chemicals are pumped into the discharge manifold of the blender. Either way, the slurry is pumped to the missile trailer and to the pressure pumper on the low-pressure side and then into the wellbore.

A PD pump transports the chemicals specified in this process. There are many PD pump styles, and factors such as chemicals, flow rates, pumping products, shear, weight, maintenance and durability are important to consider during pump selection.

DIXON FRAC PUMPS AS A SOLUTION

Typically, on a blender or additive unit, there are six to 10 PD pumps installed because chemicals are specified to be added to the slurry at a percentage of the rate being pumped downhole. Multiple,

various sized pumps are usually required since the amount of each chemical can vary from 0.25 to 18 GPM based on the specified blend percentage.

Flow rates and pump performance are critical elements in the process, and variable flow rates are common with the ranges in viscosity of product mixtures. The Dixon JRZL 115 series pump is one pump that can be adjusted to meet a variety of flow requirements. With the JRZL, flow is adjusted by the speed of the pump drive motor. It is not a case of one size fits all, but rather one pump being adaptable to many applications.

DESIGN SIMPLICITY EQUALS LESS INVENTORY AND MAINTENANCE

What are the advantages of using one pump vs. multiple pumps? One pump eliminates stocking multiple sizes of pumps and parts. The JRZL frac pump parts are interchangeable with all other JRZL pumps and eliminate stocking parts specific to different pumps.

Maintenance is simple with Dixon's JRZL frac pump. Front-loaded tungsten carbide by tungsten carbide mechanical seals are standard, and they do not require removing the pump from the blender or additive unit to perform maintenance. You simply remove the front cover from the pump to access all wetted parts. In

fact, all seals are replaceable through the front cover, enabling on-site technicians to easily repair the pump and quickly return it to service.

The hydraulic motor adapter is directly mounted to the pump and manufactured in direct alignment with the pump input shaft, eliminating the need to align the hydraulic motor to the pump. This also prevents any premature bearing failures of the motor or pump due to misalignments. The pump is easily configurable for many installation requirements. The motor adapter, mounting, and base plates can be adjusted since they are not an integral part of the gearbox. Dixon can supply adapter plates matching existing bolt patterns to eliminate re-drilling.

Dixon developed an optional pick-up coil system for the measurement of gross volume or RPM of the pump and hydraulic motor. PD pumps produce the same flow at a given speed no matter the discharge pressure, allowing the pick-up coil to provide a gross volume pulse input to the human machine interface.

The Dixon JRZL Series frac pump is designed to meet your requirements, whether installed on a blender or chemical additive unit. Visit dixonvalve.com to learn more, or call 443-480-3890 to schedule a demonstration. ▀

Working together

Pembina Pipeline Corporation is one of North America's largest and most diversified energy infrastructure companies.

Recently, Pembina has experienced rapid growth and diversification. From the coast of British Columbia to Ontario, and from North Dakota to Illinois, our pipelines, facilities and people can be found across Canada and the United States.

In the last several years, through a series of acquisitions and joint venture partnerships, Pembina has extended its operations into the U.S. Bakken Basin.

Pembina has a highly skilled and diverse workforce of approximately 3,000 employees and contractors, one of which is Casey Miller, an operator on the Vantage Pipeline U.S. system in North Dakota.

The pipeline links the Bakken Formation to Alberta's petrochemical industry.

Miller's primary role is to keep the 128-mile U.S. pipeline operating safely and reliably. He's also an advocate of safe digging practices within the North Dakota excavator community.

"Our biggest threats to pipeline safety come from the digging community," he said. "Excavators operate heavy machinery that can cause major damage to pipelines, so it's crucial we work together to ensure they understand their role in preventing damage and keeping our communities safe. This includes reinforcing the need to call the local One-Call center each and every time before the ground is disturbed, participating in outreach educational opportunities, and sending Pembina representatives to the work site."

The safety and integrity of Pembina's operating systems and facilities are key business drivers.

"Our success depends on ensuring the safety of the public and our people throughout the communities where we operate," adds Miller. "I'm proud to say Pembina has become one of the top pipeline companies in North America because we keep the products in the pipe."

The success of our business also extends to the support of our neighbors. Pembina works together with local non-profit and

charitable organizations that improve access to education, protect or preserve the environment, promote safety, create community space and encourage wellness. In 2019, Pembina invested \$10 million in communities where we operate. Our employees are also very active – volunteering more than 8,000 hours last year alone.

"It's great to work for a company that actively encourages employees to give back," Miller says. "Pembina employees are proud to give back to the communities where we live, work, and play." ▮

Call Before You Dig




To prevent damage to our pipelines and to keep product in the pipe, we depend on excavators to call 8-1-1 before doing any digging activity.



Know what's below.
Call before you dig.

If you accidentally damage a pipeline:

1. Stop all excavation and construction work and move away from the area on foot; let others know to do the same
2. Shut off all equipment and machinery
3. Call 9-1-1 as soon as you are in a safe location
4. Call Pembina's emergency number 1-800-265-6000 and explain the situation
5. Do NOT attempt to operate any valves



Maximize your oilfield storage and handling with Meridian



Industrial Frac Sand Smooth Wall.



Meridian's Bolt Together Silos (BTS Series) offer mammoth capacities and remote assembly.

Safe storage and efficient handling are critical to a successful oilfield resource operation. Bulk storage ensures supply of commodities vital to your operation and reduces downtime with effective handling and increased productivity. When you need durable, proven solutions for your oilfield storage and handling, you can rely on Meridian Manufacturing. Meridian has a long history of offering quality products to the energy sector and continues to develop new solutions as the industry evolves.

Meridian's all-welded SmoothWall Silos are built with industrial-gauge steel and engineered for loading and discharging many flowable products including frac sand. Meridian's SmoothWall Silos feature welded seams, a high slip factor, are bolt free and without hang ups, and are engineered for 95 lbs./ cubic feet. Meridian will custom build any size to meet your specific needs, with common portable sizes ranging from 150-MT to 350-MT.

Meridian's Bolt Together Silos (BTS Series) offer mammoth capacities and remote assembly. These large silos are available in both standard hopper bottom and drive-thru options, and are custom designed specifically to your site. Meridian BTS series bins are available in diameters up to 38 feet and up to 68,000-cubic-feet capacities.

In addition to frac sand silos, Meridian offers corrugated water tanks, secondary containment systems, stainless-steel flat-bottom tanks, double-wall fuel tanks and archwall steel buildings.

Meridian is also proud to manufacture Convey-All Sand Series Conveyors. Unlike other conveyors with reliability and service issues designed for other applications, Convey-All Sand Series Conveyors are engineered specifically for handling frac sand. Sand Series Conveyors are built to withstand the high demands of the oil and gas industry. Sand Series Conveyors feature heavy-duty belts with Super Screw® lacing, sealed Dodge bearings and robust hydraulic drive systems.

Convey-All Sand Series Conveyors are available in Rail Car, Truck Load, Silo Fill and Drive Over models. Rail Car conveyors are ideal for quick maneuvering and emptying rail cars or hoppers on site and can move up to 8,000 lbs. of sand/minute. The Truck Load series are self-contained, self-propelled and offer capacities up to 12,000 lbs./minute. The 90-foot Silo Fill Conveyor is ideal for loading bins or tanks, and can fill up to 7,000 lbs./minute. The FSDO (Frac Sand Drive Over) is a heavy-duty workhorse that is capable of moving up to 22,000 lbs./minute. The FSDO has an extra-wide, 12-foot drive-over deck that fits perfectly



The FSDO (Frac Sand Drive Over) is a heavy-duty workhorse that is capable of moving up to 22,000 lbs./minute.



Meridian Manufacturing offers comprehensive custom engineering and site design, along with structures such as drive-throughs, ladders, platforms, staircases, towers, and walkways to make your site as efficient and safe as possible.

under trucks and trailers. The ramps raise quickly into transport position to easily move from site to site.

Meridian Manufacturing offers comprehensive custom engineering and site design, along with structures such as drive-throughs, ladders, platforms, staircases, towers, and walkways to make your site as efficient and safe as possible. All structures are designed and built to national building codes and local OSHA/ OH&S regulations.

Contact our team today to learn more and make the most of your oilfield storage and handling.

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Take control of your business finances with factoring



Invoice factoring is a dependable cash-flow solution.

Oilfield services companies need cash to operate. Meeting payroll, purchasing supplies and ordinary business expenses all require having money available. Having cash consistently available is tricky when working for companies with extended payment terms.

There are two types of financing used by most oilfield contractors: bank loans and invoice factoring.

BUSINESS LOANS

Business loans are the source of financing for many companies. To obtain a business loan through a bank, you will need to apply, qualify and get approved for a specific amount. The process can take weeks or months before you get the capital from the bank. This wait can be too long for many companies, especially if the need for money is immediate.

Banks are the first choice of most companies looking for financing. The cost of funding is low and there is comfort in the familiar. However, not all companies qualify, so an alternative must be found. That is where invoice factoring becomes an option.

INVOICE FACTORING

Invoice factoring is a type of business financing that has been available for many

By Glen Herrig, TCI Business Capital

years. Companies in the trucking industry, manufacturing and construction use factoring regularly.

The process is very straightforward. A business provides work, services or products to their customers. When the customer is billed, the unpaid invoice is sent to the factoring company first. The factoring company advances the business, a percentage of the value of the invoice, generally 90 percent, that same day.

The invoice is then sent on to the customer, who processes and pays it in their regular terms. The customer then pays the factor. Once the invoice payment has processed, the remaining balance of the invoice, less a factoring fee, is remitted to the business.

HOW OILFIELD COMPANIES BENEFIT BY FACTORING

Instead of waiting for 30 days, 60 days, or even 90 days on a customer payment, factoring provides immediate cash on your receivables. Factoring will help you bridge the gap from the time when you need to pay your employees and bills, and when your customers pay you.

Factoring your accounts receivables will give you a consistent supply of cash that grows as your oilfield service company grows. When you get a new client or contract, more working capital becomes available.

WHAT TO LOOK FOR IN A FACTORING COMPANY

All factoring companies supply cash to their clients. What separates one from another



Oilfield companies choose to factor for a variety of reasons, but there's one thing they all have in common – they need working capital, and they need it quickly.

is the advances, factoring rates, contracts and services each offer. When choosing a factoring company, here are some considerations to keep in mind.

- **Industry experience:** First, make sure the factoring company has a record of serving other businesses in your industry.
- **Advance rate:** Advance rates range from 80 percent to 90 percent, depending on the industry and payment terms.
- **Factoring fees:** This is the cost of factoring. Monthly volume, payment terms and length of contract are used to determine factoring fees.
- **Contract length:** Factors offer contracts for month-to-month funding or longer-term agreements. Select the type of deal that fits your long-term needs.
- **Additional services:** Some factors provide other services to clients, including credit review of potential customers, AR management, online reporting and more.

Oilfield companies choose to factor for a variety of reasons, but there's one thing they all have in common – they need working capital, and they need it quickly. No matter what situation or circumstances a business is in, factoring is a dependable cash flow solution. ▀

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The power of magnets

Patented technology produces intense heat without flames or liquids

By Precision Equipment Manufacturing, maker of MagFan flameless heaters



MagFan heaters are unlike any other heater on the market. The simplicity of this patented technology results in the easiest-to-operate and most reliable heater available.



Since MagFan heaters don't use flames or liquids and have very few moving parts, maintenance is limited to the lubrication of three easily accessible grease points and oil changes every 500 to 1,000 hours.

Keeping moisture-rich well heads from freezing in cold climates is a tough enough battle as it is. Now try introducing additional moisture from propane, dealing with the maintenance headaches of liquid heat-transfer agents, or worrying about the unsafe conditions presented by using flames, and you have a recipe for a long, stressful and expensive winter.

A new technology that uses magnets instead of flames or liquids recently hit the market and allows oil and construction companies to produce 5,000 to 8,400 cubic feet per minute (CFM) of clean, dry heat using magnets and a direct-drive diesel engine that burns as little as one gallon per hour. The minimum-maintenance industrial heaters are fully automatic and can be monitored and controlled remotely through a secure cellular connection.

MagFan heaters are unlike any other heater on the market. The simplicity of this patented technology results in the easiest-to-operate and most reliable heater available. And the per-hour cost to operate is lower than anything else on the market.

Picture trying to push two magnets together when the opposing forces are facing each other. As you push the magnets closer, the force gets stronger. MagFan heaters use this concept on a larger scale by moving aluminum arms past powerful magnets and creating heat, which is then blown out of the unit by an axial-flow fan. As the speed of the spinning aluminum arms is increased or decreased, the heat generated is controlled proportionately.

The result is super-heated air coming out of the trailer-mounted MagFan, while the

interior of the heater remains relatively cool. Magnets don't wear out, leak, make loud noises or pollute, and since MagFan heaters don't use flames or liquids and have very few moving parts, maintenance is limited to the lubrication of three easily accessible grease points and oil changes every 500 to 1,000 hours. Scheduled maintenance can be performed in about 30 minutes, meaning the area being heated barely has time to cool down, even in sub-zero temperatures.

MagFan heaters also feature an optional cellular-connected Netbiter system that allows the heater to be monitored and controlled from any location. Output temperature is measured by an onboard temperature probe and site temperatures can be monitored remotely with external temperature probes. When combined with engine performance data, the system has

We're not only providing companies with consistently safe, reliable and dry heat, we're also giving them access to data that will ensure they are operating at peak efficiency even when there aren't personnel on site.



Precision Equipment Manufacturing is rapidly expanding its MagFan distribution network.



Precision Equipment Manufacturing's line of patented MagFan heaters use magnets and an axial-flow fan to generate a 200-degree temperature rise heat at up to 8,400 cubic feet per minute, without sparks, flames, friction, or liquids.

the information it needs for automated control and will notify users if performance isn't ideal. Users can remotely login to the web-based portal to view real-time performance, or use a number of analytics tools to analyze past use and GPS-tracked locations.

When combined with the safety of flameless heat, the ability to monitor and control MagFan heaters remotely is a game changer. Businesses don't need on-site personnel once the heater is running, and rental companies can keep tabs on what their customers are doing with rented equipment.

Precision Equipment Manufacturing is rapidly expanding its MagFan distribution network. The ability to sell flameless, non-liquid heat that comes from a fully automated, minimum-maintenance and trailer-mounted platform gives MagFan users significant advantage over their competition and the ability to promote an exciting new technology that will draw attention to their businesses.

We're not only providing companies with consistently safe, reliable and dry heat, we're also giving them access to data that will ensure they are operating at peak efficiency even when there aren't personnel on site. The powerful combination of magnets and technology is incredible.

Precision Equipment Manufacturing is a leading manufacturer of flameless heaters for the construction, oil and gas, commercial painting, pest control, agriculture, and rental industries. The company's line of patented MagFan heaters use magnets and an axial-flow fan to generate a 200-degree temperature rise heat at up to 8,400 cubic feet per minute, without sparks, flames, friction, or liquids.

For more information, visit magfanheat.com, or call Terry at (218) 851-3766. ■

When one size doesn't fit all

At Gateway Domestic Violence Services, our caring and experienced advocates work with survivors of domestic violence and abuse.



We see it advertised on signs and clothing tags everywhere – “One Size Fits All”. But what happens when one size doesn’t fit all?

At Gateway Domestic Violence Services, our caring and experienced advocates work with survivors, who on the surface appear to be all the same. They are all victims of domestic violence. They have experienced someone who chooses to exert power over them and take away any control they have over their life, all while claiming to love them. They appear to be “one size fits all”.

Survivors comprise of every race, gender expression, color, religion, national origin, financial status, education level, and any other consideration you can name. Survivors can have visible, throbbing bruises. Others cradle their invisible wounds inside their soul for no one to see. But the pain is there and it is dehumanizing. Definitely not a “one size fits all” scenario.

Regardless of who the client is, Gateway is committed to meeting the brave and strong survivors that seek our services where they are. The courage it takes for someone to pick up the phone and tell a stranger about the most intimate part of their life is not lost on Gateway staff. Therefore, it is imperative that we are committed to taking the time to listen and offer appropriate resources for everyone’s situation.



Survivors endure unimaginable threats, physical attacks, and emotional assaults in a place most of us equate with love and safety – their home.

Just as there is no “one size fits all” treatment plan for victims, there is no “one size fits all” way a victim should act. No “one size fits all” decision that a victim should make. No “one size fits all” way the community should judge how a victim acts or reacts.

When bystanders make judgements and attempt to tell victims what they should or should not do, they are acting like an abuser – trying to take the power away from the victim and control them. Gateway employs the philosophy that every survivor is the expert on their life. We respect and honor their decisions and know when they are ready, they will take action.

It can be hard to hear stories of others’ pain and suffering. At times we try to avoid the truth and pretend that it is not that bad. Or worse, we blame the victim. We ask, “Why does she stay?” When all that does is perpetuate the violence. The more appropriate questions are, “Why does the abuser hit to resolve conflict?” or “What is the abuser threatening them with to make them stay?”

So what can you do? You might ask, “Isn’t this a private affair? Shouldn’t I just mind my own business?” Silence breeds violence. When we are silent, it gives a nod of acceptance to the abuser. We all need to speak out and get involved in whatever way we can. We can host a drive for hygiene items, attend Gateway’s fundraising events, become a volunteer, donate money, or simply educate ourselves on available resources to be ready to help someone in need. Everyone has a place in this fight. Stand with us. We need everyone. Victims need everyone. You are everyone.

Support, understanding and kindness are all a “one size fits all” effort. Addressing specific individuals’ needs is not. Support looks different for everyone. We assure you that Gateway will be here for each and every person that reaches out to us and we will rise to meet them where they stand and support them in the way that best fits their situation. ▀



Serving the workplace of North Dakota

Introducing CHI Health Company Care: A tool box for better business

Why not go beyond treating and preventing workplace illness and injuries, when a little education can go a long way? Fostering employee health and wellbeing to create healthier work environments is the goal of Company Care.

Company Care helps safeguard and manage the health and safety of workers and companies across North Dakota. We work with each individual to prevent injuries from happening in the first place.

Company Care partners with companies and their employees throughout North Dakota, giving access to high-quality, personalized and easily accessible workplace medical care. It gives employees a highly valued benefit that clearly shows them that employers care for their well-being, increases morale, lowers absenteeism, while increasing the bottom line.

Company Care services include:

- Workplace Injury Management
- WSI Injured Worker Case Management
- Drug and Alcohol Screenings
- Occupational Medicine
- Ergonomics
- Health and Hearing Screenings
- Employee Assistance Programs
- Organization Health
- Leadership and Supervisory Training
- On-Site Health Fairs

And more....

Worker wellness and production are bottom-line issues for employers. Even incremental gains can translate into competitive success. As regulatory requirements increase and human resource costs continue to rise, our solutions and services can save organizations significant dollars.

Starting April 2020, Company Care is expanding across western N.D. and will now offer comprehensive services dedicated to serving business and industrial communities by focusing on each organizations individual needs.

Company Care professionals understand that losing an employee for an extended period of time due to physical injuries interferes with your ability to run the business as it needs to be. According to Adrienne Biles, clinical coordinator of occupational medicine, "Company Care nurse case management team is directly connected to medical providers across the state to help communicate the needs of the injured employee and the employer. We have found that this

is key to improving workplace injury management and reflects in our customers' outcomes."

Proper management of a physical injury requires a systematic team approach that is focused on quality care of the injury including and understanding of necessary paperwork, application of appropriate work restrictions, progressive therapies, and effective case management with the intent of reducing costly time loss.

"The medical system understands how to care for the injured employee, but rarely considers the effect on the employer. Company Care understands that the injured worker interferes with the companies' work flow and the stress it places on other workers and the business. Our intent is to effectively treat the injury in order to return the workflow back to normal as quickly as possible," said Myron Cullen, director of occupational medicine. ▀



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Environmental protection continues to be a hot topic, and helping to manage and minimize potential environmental risks is at the heart of what Titan Environmental Containment does.

Founded in 2006 in the Canadian prairies, Titan supplies, fabricates and installs high-quality geosynthetics, containment systems and specialty civil engineering products. Employing over 100 staff members, the company is headquartered just outside of Winnipeg, Manitoba and operates locations across Canada, in addition to a subsidiary company, Titan Environmental USA, based in Houston, Texas.

Today, Titan is proudly known as a leader in product innovation and selection with expertise that customers can rely on to help them save money, reduce risk and minimize their environmental impact. With product lines featuring geomembrane liners, geotextiles,

geogrids, containment systems, drainage solutions and erosion and sediment control products, Titan's geotechnical, containment and civil engineering solutions are used in a wide range of sectors such as road construction, water and waste management, mining, hydro-electric production, agriculture and oil and gas.

For example, one of Titan's leading solutions for oil sector construction projects is their proprietary TE-BXC30 composite geogrid featuring a biaxial polypropylene geogrid, heat bonded to a non-woven geotextile. This product's robust reinforcement properties make it ideal for combined soil stabilization/reinforcement applications while providing enhanced sub-base drainage, as well as soil separation and filtration performance. TE-BXC30 composite geogrid reduces excavation, backfilling and aggregate thickness, providing

significant construction cost savings. This geogrid is highly recommended in the design of lease construction, well pad and oil platform access roads projects.

Additionally, Titan's Specialty Containment line, which includes state-of-the-art secondary containment systems and custom-fabricated TITAN TRAP drive-on spill containment berms provide the necessary protection against soil contamination in the event of harmful oil leaks and spills on job sites. As a surrounding barrier to oil storage tanks on processing sites, Titan's secondary containment systems exceed environmental guidelines, offering maximum protection and are designed to withstand hearty climates. They have fewer parts than other systems for easier installation and are low maintenance. Major benefits to the Titan secondary containment systems are that they are easy to expand and contract or dismantle to move, and they are adaptable to existing systems.

The TITAN TRAP drive-on spill containment berms offer the ideal solution for soil contamination protection from hazardous oil and gas spills during heavy equipment servicing on construction job sites. Made of textured scrim-reinforced LLDPE geomembrane, the TITAN TRAP is designed for durability to withstand rugged job site terrain and hearty climates. Fabricated using the latest heat fusion technology, each TITAN TRAP meets ASTM D-443 industry standards and undergoes destructive



Left: Titan Trap Spill Containment Berms protect against soil contamination during on-site heavy equipment servicing.



Above: Site development project using TE-BXC geogrid for soil reinforcement.



Left: Geomembrane-lined secondary containment system for crude oil storage facility.

prefabricated geomembrane panels that act as soil contamination protection when incorporated in site base layers applications. These prefabricated geomembrane panels are also ideal for secondary containment system lining. All panels are fabricated in-house to required dimensions with the highest quality control standards in the industry. They are available in a range of highly durable, chemical-resistant materials, and come folded and packaged for easy installation.

Aside from a commitment to quality, engrained in Titan's business philosophy is also unparalleled safety standards and stringent environmental awareness. Titan is an ISNetworld Registered Contractor, a COR™ safety certified company, and its team of welding technicians are all certified through the Association of Geosynthetic Installers (IAGI).

With an understanding of industry needs that comes from extensive experience, a finger on the pulse of the latest technologies, and the expertise to provide reliable and cost-effective solutions, Titan prides itself on a high rate of repeat business earned by their

in-depth knowledge and high service standards.

"As experts in our field, we are routinely called upon for site-specific solutions," says CEO Brett Burkard. "We get a lot of phone calls asking for our advice on products for specific applications. We're not engineers, but we are honest, practical, with a lot of experience, and I attribute our successful track record to this."

Having worked on projects across Canada and beyond, Titan Environmental Containment has the skills, experienced staff and industry awareness to tackle any challenge. Always remaining true to their guiding principles – trust, quality, value – Titan puts relationships and value for money at the forefront of all its business practices, which truly distinguishes them from the competition. Clients that do business with Titan get more than a supplier and installer – they get a solutions provider that puts customer needs first.

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seam testing in our quality assurance lab to ensure optimal performance. They are custom-fabricated to size with turn-around time ranging from one to three days depending on order quantity. Various underlay options are also available which can help extend the berm life.

Last but not least, another solution that Titan offers to the oil sector is its

All-in-one inspection, drone, and safety solutions from Cenergy



Cenergy has a reliable presence in the Bakken, conducting various third-party inspections for numerous clients.

Cenergy provides a wide variety of inspections, support, and many other services to help customers achieve their goals and maintain them.

Cenergy is paving the way in universal services while tailoring services to the needs of clients. Their goal is to make it easier for clients, as opposed to having multiple companies on site, and as a result, it will allow clients to make one call to the company.

We all know the importance of maintaining a safe and secure workplace for employees, clients, the environment and everyone else that may be involved in the day-to-day procedures within work environments. Cenergy has a reliable presence in the Bakken, conducting various third-party inspections for numerous clients. With a 0.0 TRIR, you can always trust Cenergy to deliver quality inspections to fit your every need.

From final reports the same day to full communication throughout the job, Cenergy provides a wide variety of inspections, support, and many other services to help customers achieve their goals and maintain them. Cenergy strives for customer satisfaction while always putting safety and protocol first. They know how important it is to maintain good working relationships with clients as it is for you and your company.

We would love to discuss what Cenergy can do for you and how we can be a valuable contributor to your company and its future success. Unlike most inspection companies, Cenergy is able to provide a wide variety of services related to and beyond inspections that competitors don't offer. Everything is done with client satisfaction and priorities in mind, all while at very competitive rates. ►

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