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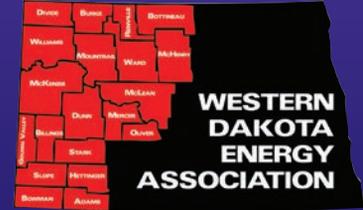
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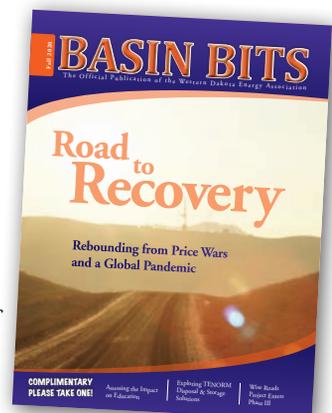
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On the cover: *On this issue's cover, the morning sun shines on this drilling rig that survives southeast of Watford City during the headwinds of the last market downturn. Photo credit: Rob Lindberg.*

Disclaimer: The articles presented in this publication represent the opinions of the authors and the interviewees. Their inclusion does not directly or implicitly denote concurrence or support by the Western Dakota Energy Association. Articles were reviewed by WDEA staff and selected for inclusion as they represent issues of interest to professionals in our industry.

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From the Desk of the Western Dakota Energy Association's President



Shannon Holter
 President
 Western Dakota Energy Association
 Production Foreman, Murex Petroleum
 Member, Bowbells City Council

Boom or Bust: If It Isn't One, It's the Other

below negative in trading for a few days was heart-breaking. I couldn't help wondering how many people would be affected by this; how many people would lose their jobs; how many companies would go under. We all expected prices would rebound—but when? We know the longer it lasts, the more painful the impact will be.

Most companies had a decision to make: furlough employees, or simply lay them off and hope that when conditions improved, they could find able bodies as companies get fired back up. Companies that were able to furlough have the best chance at a quicker recovery, I think. In my company, we were able to slowly bring back furloughed people as the price of crude crept upward and more wells reached the break-even point to return to production. The sudden crash required companies to adjust on-the-fly and shuffle people into job assignments they'd never performed—or hadn't in years. Superintendents, foremen, and mechanics were all pitching in and pumping wells, spraying weeds, mowing leased land, and whatever else was needed.

But then, just as prices finally got to the point where more and more wells were being re-started, we were hit with another potential whammy: a federal judge ordered the

shutdown of the Dakota Access Pipeline, which has been operating safely for more than three years. Stopping the flow in DAPL would have instantly meant some newly-started wells would go back on the shutdown list. The extra \$5.00 transportation cost to move oil by rail would have meant that a lot of wells would simply not be economical to operate. There is no safer or more efficient way to move oil than in a pipeline under the ground out of sight. Although the battle for DAPL pipeline is not over, we are hopeful we will be victorious in our fight to keep it in operation.

One thing we've clearly seen with the oil price collapse is the country revolves around the petroleum industry. When oil is struggling, the whole country seems to suffer. In North Dakota, we're very fortunate to have agriculture, oil, and coal; three essential industries we need to survive. With the ongoing attempt to shut down coal in our state, we need to push back and do what we can to keep the coal industry going. Because if opponents are successful in shutting down coal, their next step will be to try shutting down the oil industry. Here's hoping by the end of the year we'll be back on track to return to normal and move forward with the coal and oil industries. 

Boom or bust? How many times have I heard that saying in my 30-plus years in the oilfield? It seems like we're always talking about, or worrying about, one or the other. As oil prices slowly climb higher—or at least remain steady—operations in the oilfield are beginning to change.

The latest downturn had a different wrinkle than the usual OPEC or political reasons, with demand destruction related to the COVID-19 pandemic. To watch oil contract prices drop

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From the Desk of the Western Dakota Energy Association's Executive Director



Geoff Simon
Executive Director
Western Dakota Energy Association

America Needs a Class in Energy Reality

We're victims of our own success. I heard that statement many times during my days working in the utility sector. The point was that electricity had become so dependable and affordable, people took it for granted, which allowed politicians to meddle with markets and regulations that could jeopardize that reliability and cause the price to "necessarily skyrocket."

I recently came across an excellent opinion piece written by Steve Milloy, author of several books, including one entitled *Green Hell: How Environmentalists Plan to Control Your Life and What You Can Do to Stop Them*. Milloy's latest op-ed explains the fallacy of Joe Biden's campaign promise that we can somehow affordably decarbonize the U.S. electric sector. The article correctly points out that "...every single part of life depends on fossil fuels, from wind turbines and solar panels, to electric cars and bicycles, to organic foods, the job you have, or where you live, nothing happens without fossil fuels." Milloy is right. Try to construct and install a wind turbine or build an electric car without using fossil fuels. Try to grow food commercially without using fossil fuels. It's pretty clear it can't be done.

The statistics back it up. According to the Energy Information Administration, fully 80 percent of energy used in the U.S. in 2019 was provided by petroleum, natural gas, or coal. On any given day, coal and natural gas are generating over 80 percent of the electricity on the grid. When it comes to transportation, petroleum is even more dominant, with gasoline, diesel, and jet fuel delivering 91 percent of the power we need to move people and commerce.

Society is spoiled. Too many people take affordable, reliable energy for granted. Imagine what life would be like if the "keep-it-in-the-ground" campaign succeeded. Let's just say modern society would cease to exist without petroleum products. The same is true for electricity. Disaster planners have described what would happen if a sudden cosmic event wiped out the electric grid. Cities would become snarled without traffic lights. Food would spoil without refrigeration. Running water would be unavailable without pumps to get it the consumer. Sewer systems would fail and back-ups would occur with lift stations offline. Crime would explode when neighborhoods went dark. And, of course, the cellular network and other communications systems would cease to function. Bottom line, chaos and anarchy would ensue. We should be thankful for dependable electricity.

Yet, some spoiled people seem oblivious to the danger. Consider Greta Thunberg, a Swedish teenager who's developed a cult-like following for promoting the claim we're

facing an "existential climate crisis." Greta has four million followers on Twitter, most of whom are young people like her. They've probably never heard the statistics I've cited, and even if they did, they'd presume we'll somehow magically develop a substitute for fossil fuels. It's a serious problem because these misinformed youth are eligible to vote, or soon will be, and they're likely to support candidates who endorse renewable fantasies like the Green New Deal.

People who promote the idea we can decarbonize the U.S. and power the grid with 100 percent renewables shouldn't be taken seriously. But that brings us to another problem in America. We have a largely dysfunctional news media that fails to question politicians who promote such wildly unrealistic policy ideas, so millions of people continue to believe they're possible.

That leaves it up to sensible people who understand energy reality to have the courage to call out silly ideas and take a stand for essential, dependable, affordable fossil fuels. 🇺🇸



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State's Largest Power Plant to Close Unless New Operator Steps in

By Paul Adair

Back in early May, Great River Energy (a Minnesota-based generation and transmission cooperative serving 28 distribution cooperatives in that state) announced its plans to prematurely retire North Dakota's Coal Creek Station by the end of 2022. The company said this decision was the culmination of years of careful, thoughtful analysis that determined the plant is no longer economical and has lost its value compared to alternative power sources.

"For years, Coal Creek Station has provided Great River Energy with an excellent hedge against energy market prices," says Lyndon Anderson, spokesperson for Great River Energy. "However, persistently low natural gas prices and other factors have driven down the market price of electricity. As a result, we analyzed the value of Coal Creek Station and compared those costs with other generation options. Great River Energy's recently announced energy portfolio changes will significantly reduce power supply costs for our member-owner cooperatives."

Built in the late-1970s, the two-unit, 1,151-megawatt coal power station is located about 50 miles north of Bismarck, near Underwood, and is the largest power plant in the state, using approximately 22,000 tons of lignite each day. North Dakota is responsible for four percent of total coal production in

the U.S. and is home to the world's largest known deposit of lignite.

"I don't dispute that coal is under challenge from outside sources, but our lignite is also indispensable because any alternative sources of energy are, at this time, intermittent," says McLean County State's Attorney Ladd Erickson. "Without the lignite power plants and coal mines in North Dakota, there is the potential of significant risk to the security of the state's electricity supply. It is certainly a concerning situation."

It's difficult to overstate the economic impact a short- or long-term closure of Coal Creek Station could have on the entire surrounding region. In addition to the loss of the approximately 260 employees at Coal Creek Station, the closure will surely spell the end for the nearby Falkirk Mine, whose sole customer is the power plant. Falkirk Mine provided 7.4 million tons of coal to Coal Creek Station last year and employs 480 workers.

"Add both of these facilities together, plus all of the businesses that serve and support the plant and mine, and that will mean the loss of hundreds and hundreds of high-paying jobs throughout the entire region," says Erickson. "This will have a measurable effect on everything, from housing markets and businesses, to the funding of our schools. It's difficult to put an exact dollar figure to the impact of the closure, but it's fair to say the total economic value lost to the region will be huge."

Great River Energy understands the significant effect closing the plant will have on its employees, their families, and nearby communities across central North Dakota. The company says it plans to help ease the two-and-a-half-year transition period by providing its employees increased pay, enhanced severance packages, and access to outplacement and job training services.

In addition, the company says it will continue supporting North Dakota communities through a \$3-million annual payment in lieu of taxes for the next five years and will fulfill its commitments to ongoing donations and sponsorships.

Looking ahead, Great River Energy plans to invest more than \$1.2 billion to purchase over 1,100 megawatts from new wind energy projects in Minnesota by late 2023 and is planning to modify the Spiritwood Station power plant in Jamestown, so it can be solely fueled by natural gas. The company is also open to the idea of exploring opportunities to sell Coal Creek Station. That being said, Great River Energy has not yet received any formal proposals to purchase the facility.

"Great River Energy has offered to sell Coal Creek Station for \$1 but would need to receive reasonable value for the high-voltage direct current (HVDC) line that runs from Coal Creek to Minnesota in such a transaction," says Anderson. "There are limited potential buyers of Coal Creek Station because of the plant's large size and location in central North Dakota. Great River Energy



will evaluate any offer to purchase the plant and will compare that offer to the alternative of retiring the plant and deriving value from the HVDC line. We will make the decision that's best for our member cooperatives."

Although there haven't been any offers to purchase Coal Creek Station thus far, there's been a small amount of tire-kicking on the power plant. Shortly after Great River Energy's closure announcement, North American Coal came out publicly to say it had interest in being part of the ownership solution going forward.

"We believe Coal Creek Station is an efficient, economic, and attractive generation and capacity asset, and the continued long-term operation of the facility is in the best interest of our employees, the local community, the region, and the state," said J.C. Butler, president and CEO of NACCO and North American Coal in a press release. "As Great River Energy is willing to consider opportunities to sell Coal Creek Station, we're actively engaged in the exploration of options to allow for the transfer of the plant to one or more third-parties, which would preserve jobs at both Coal Creek Station and the Falkirk Mine."

Behind the scenes, efforts are underway to find an answer for Coal Creek Station's ultimate fate. One of the major challenges facing those looking to save the power plant is ensuring the

Coal Creek Station, the largest power plant in the state, is in danger of closing. The two-unit, 1151-megawatt coal power station is located about 50 miles north of Bismarck.



public receives accurate information on the importance of Coal Creek Station, not only for the people of North Dakota and the state's critical lignite industry, but also for the national security of the entire Upper Midwest.

"Coal Creek is as important to our national security interests as any other piece of energy infrastructure in this region, and it will only become more valuable over time as

other baseload plants in the rest of the grid are programmed to be decommissioned as they are old and out-of-date," says Erickson. "It would be one thing if we were talking about an out-of-date and inefficient coal plant, but Coal Creek Station is a modern and environmentally friendly source of baseload for the entire grid—one that North Dakota will surely miss if it were gone." 

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The Comeback Kid:

Rebounding from Price Wars and a Global Pandemic

By Paul Adair

By the end of 2019, the Bakken had pretty much settled back into a regular pace and seemed to have put the tribulations of the previous year behind it. Then, 2020 kicked off with Russia / OPEC infighting and the sudden arrival of a global pandemic. Like the rest of the world, the Bakken stumbled, seriously testing the resiliency of North Dakota's oil and gas industry.

"The last year put everyone in the industry back on their heels, and it's forced us to figure out what the best path forward looks like," says Blu Hulsey, senior vice-president for HSE and Government and Regulatory Affairs at Continental Resources. "It made us think about how to slow or shut down production and take a deep breath while we get the economy back moving. Eventually, we're going to come out of this; the virus will get solved and the demand will return. We're not where we were in 2019—and may not be for some time—but there are signs we're past the point of major volatility and just need to hit our stride again."

Oil and gas activity routinely rise and fall with the price of oil, and industry veterans understand how to best shelter through the downturns to prepare for the eventual upswing. However, COVID-19 presented producers with a situation unique from any that have come before. Unlike earlier slumps, global supply and demand came under tremendous pressure, while there's still an inventory of uncompleted shale wells across North Dakota. In addition, the

Bakken is facing a high degree of apprehension in regard to the future of its oil and gas pipelines and some uncertainty over the upcoming presidential election.

Looking ahead, it seems the world will remain on hold throughout 2020 as a result of COVID-19. This will certainly delay both the recovery of North Dakota's oil and gas activities and any significant re-investment into the Bakken.

"Uncertainty is the enemy of capital investment," says Lynn Helms, North Dakota's mineral resources director. "If we aren't able to settle any of the significant challenges facing our industry until after the November election, the 2021 capital budgets will be impacted and things won't change until the following year. So, we believe 2020 is finished, likely resulting in low capital investment through 2021, and we will be looking to 2022 and beyond to see the return of investment in well completions and drilling."

Yet, there's still plenty of reason for optimism in the Bakken. As bad as things seem in 2020, with over 7,500 wells shut-in, an 80 percent drop in drilling rigs, and more than 10,000 layoffs, North Dakota has worked its way back to producing more over one million barrels of oil daily. Maintaining this level of production still requires a significant amount of people and inputs and will help keep the industry moving forward until demand outpaces supply and prices recover.

"As we get to the end of 2020, I expect we'll start to see what the world will be like moving forward and the beginning of the recovery trends," says Helms. "Our resource has not

diminished in any significant way, in terms of its size and ultimate potential for production; it's just a matter of waiting for the world's economies to recover. Only then will we be able to chart a course for what demand is going to look like in late 2021 and beyond."

In the meantime, the Bakken Restart Task Force has just received \$66 million of *Coronavirus Aid, Relief, and Economic Security (CARES) Act* funding, which will be used to create numerous jobs plugging, and later reclaiming, the approximately 400 orphaned wells and sites across the state. Like the Paycheck Protection Program before it, the *CARES Act* has been a vital lifeline for the oil and gas sector, and the recently announced funding is expected to sustain over 600 oil and gas service sector jobs, with up to 500 additional jobs managing reclamation of the sites.

"We know that keeping the service industry and maintaining a workforce that's able to be reactivated when oil operators decide to increase their activity is essential to the recovery," says Ron Ness, president of the North Dakota Petroleum Council.

"As North Dakotans, our ancestors had to plan for storms, droughts, and long, hard winters, and we will have to reclaim that perseverance and recognize we must work together to grow our economy," Ness continues. "This will ensure North Dakota has the jobs and careers that allow our young people to make North Dakota their home. We've been very blessed over the last decade-plus, and we must work to keep it going." 

As the Industry Recovers: Coping with the Loss of Oil Tax Revenue

By Paul Adair

The one-two punch of the COVID-19 pandemic and the Russia / Saudi dust-up has tremendously depressed North Dakota's oil and gas sector.

The resulting economic crisis the Bakken is facing will surely rank as one of its most historic downturns. But how bad it will get depends on the duration and extent of the eventual price recovery, the perseverance of North Dakota, and the steps being taken to mitigate the impact of these coinciding hits to the industry.

When 12,000 people are suddenly put out of work, it's considered bad news, no matter where you live. But when it happens in a fairly small geographic area, like western North Dakota, the effect tends to be oversized and brings into question the region's ability to meet workforce demand through the immediate crisis and beyond.

"At this point, we don't know if the current workforce will stick around while we wait for everything to come back, or if they will leave to find opportunities elsewhere," says Brent Bogar, founder of Jadestone Consulting. "And this is important because when things start to equalize in regard to commodity supply, demand, and price, we'll need these workers to help pull the industry back up to where it was."

The steep drop in the price of oil has created significant challenges for communities across North Dakota. Because of the immediate impact to the state Gross Production Tax—the mechanism with which North Dakota communities receive oil funding—counties, communities, and schools are seeing a considerable drop in tax revenue (of up to 80 percent), which will undoubtedly create fiscal headaches for years to come.

"Communities that rely on gross production tax in lieu of property tax saw substantial revenue drops in response to April and May oil demand destruction," says Vawnita Best, community development director with Watford City. "While waiting for recovery, communities will need to focus on essential services and operations and pause projects that aren't needed immediately."

The drop in oil prices, combined with the impacts of COVID-19, has put a sustained slowdown on infrastructure spending throughout the Bakken, at least until oil prices bounce



back and oil activity returns. Williston Economic Development has temporarily shelved a number of large and impactful announcements because of the current economic environment, including its plans for the recently vacated Williston Square, which would have seen a major box retail development built, its discussions concerning a new hotel and convention center complex, and the addition of a third air carrier to Williston's new airport. And while these projects—and other similar projects across the Bakken—will likely still happen, the timeline forward is anyone's guess.

"The oil and gas industry is cyclical by nature and not for the weak-hearted," says Shawn Wenko, executive director at Williston Economic Development. "You can never be fully prepared for what may come at you, and you have to be able to shift on the fly in this region at any given moment, adjusting plans to find another path forward."

North Dakota's school districts will feel the pinch in the years ahead, as the reduced oil tax revenue from this fiscal year won't be compensated for in the upcoming year's funding formula distribution. Essentially, the higher revenues experienced in 2019 will count against North Dakota school districts, in terms of state funding, until the formula catches up in 2021-2022.

"We were projected to have more than 300 additional students within our

district this year compared to last, but, with COVID-19, we now anticipate having much lower enrollment, and this is going to wreak havoc with our budget going forward," says Tom Kalil, president of the School Board of Williston Public School District #1. "So, while we may have funding for fewer kids this year, should the pandemic be over and student enrollment numbers trend upward next year, we'll be hurt two-fold, with more kids and less money. It just creates this roller coaster situation, where we'll always be a year behind and get caught scrambling."

In addition to state funding (or the lack thereof), education has been challenged by the transition to e-learning through the pandemic. And while e-learning has provided a good alternative to maintaining some levels of education, not having students in schools with face-to-face delivery has been difficult, and the impacts on students in regard to social, emotional, and mental health have yet to be determined.

"School plays a significant role in families and their well-being as members of the community and workforce," says Steve Holen, superintendent at McKenzie County Public School District #1. "But better times are ahead, and we remind our students and adults of this mindset amidst the challenges at the present time. There are teachable moments to be found in all situations." 

Many School Funding Needs Exist, But Dollars Likely to be Scarce



By Geoff Simon

Shon Hocker, Dickinson school superintendent and WDEA board member, addressing members of the interim Education Funding Formula Review Committee.

Members of the North Dakota Legislature's interim Education Funding Formula Review Committee are trying to figure out ways to improve the fairness and adequacy of state K-12 funding. But because of the economic downturn and the loss of oil tax revenue, most school districts are just hoping to hold on to what they have.

Oil companies shut down nearly half the state's producing wells when crude prices plummeted in April and May. The curtailment area varied widely, with many Bakken wells shut in, while legacy wells continued to produce. The decision to shut down a well also depended on whether producers had hedged their production, meaning they would get a better price than the state's shockingly low average of just \$7.92 per barrel in May.

Due, in part, to quirks in the gross production tax (GPT) distribution formula, it meant some districts saw much steeper revenue losses than others. For example, the Billings County school district saw its GPT revenue fall from just under \$153,000 in March to about \$126,000 in July, less than a 20 percent decline. But during the same period, the McKenzie County district in Watford City saw its GPT revenue drop more than 80 percent, from \$327,000 in March to just \$60,000 in July.

It's uncertain how districts will respond to the drop in revenue. Some are less dependent on GPT revenue than others or have a greater ability to reduce costs. Most districts also had modest carryover reserves that should tide them over if oil prices and production

continue to improve. But the state Foundation Aid formula will not make adjustments for the lost oil tax revenue until next fall, so districts will have to do their best to get by in the 2020-21 school year.

INTERIM COMMITTEE EXPLORING OTHER ADJUSTMENTS

The interim legislative committee is considering ways to adjust weighting factors in the school funding formula to reduce "transition minimum" payments, which provide additional money to some districts above the standard per-student payment. Many districts are said to be "off the formula," meaning their state aid payment is higher or lower than the current \$10,036 per student. The 2019 Legislature approved a seven-year phase-out plan for the transition minimum and maximum payments, which takes effect in the current school year.

Other changes enacted in 2019 were aimed at helping western districts cope with growth. The state is moving toward "on-time funding," meaning the district's state aid payment will be based on the current year's enrollment rather than the previous year. The change covers 50 percent of enrollment growth and will move another 10 percent each of the next five years. The legislature also adopted a provision that adjusts the amount deducted from the formula for GPT and other "in-lieu-of" taxes if the money is used for construction or debt service. Traditionally, 75 percent of the revenue received by a school district is deducted from their state aid

the following year. The change helps districts forced to build new schools due to growing enrollment, but it still doesn't address the disparity in the formula.

"There is no equity in buildings," says Senator David Rust, R-Tioga, a former school superintendent. "I still think the state is going to have to look at some outright grants to school districts that are experiencing rapidly increasing enrollments and have to build buildings on top of buildings on top of buildings and have taxpayers that say, 'Enough, I'm not going to vote for them anymore,' and the kids keep coming and there's no more room."

Property tax inequities are another issue challenging the committee. State law requires districts to levy at least 60 mills to support the school's operation; those that don't will see a reduction in state aid. It's a problem for western school districts that have seen big increases in property values and a lot of new construction. Property tax increases are capped at no more than 12 percent per year, so several western districts have fallen well below the 60-mill threshold.

Senator Don Schaible, R-Mott, the committee chairman, says he wants to maintain the improvements enacted in 2019.

"My goal would be to hold harmless where we're at," says Schaible. "There certainly won't be any extra money, and that's why looking at these (weighting) factors, we're taking the transition minimum money and using that to improve things so it's neutral."

The interim committee includes several school administrators who serve as ex-officio members to provide legislators immediate feedback on ideas that are proposed. 

North Dakota to Consider TENORM Disposal Options

By Geoff Simon

Recommendations for the regulation and disposal of TENORM (technologically-enhanced naturally occurring radioactive material) will be released this fall as part of a study conducted on behalf of the Western Dakota Energy Association (WDEA).

TENORM in the collective term for low-level radioactive materials that are concentrated through industrial processes. In the oil industry, the material is typically found in filter socks used at saltwater disposal wells, tank bottom sludge, and scale that forms inside well pipes and equipment.

The final report by AE2S Nexus, which is preparing the study, is expected to include a recommendation that siting and permitting of landfills for TENORM disposal be consolidated at the state level, with an opportunity for extensive local input similar to the manner in which oil and gas pipeline siting has been consolidated under the Public Service Commission. The report will also describe the potential for slurry wells to be part of the solution. The wells are capable of injecting pulverized TENORM deep underground into sandstone formations.

The WDEA executive committee received a preliminary report from AE2S earlier this year that suggested state regulatory agencies and oil-producing counties develop a consolidated process. The WDEA authorized the study in January, shortly after Williams County rejected an application for a landfill north of Williston and placed a one-year moratorium on any future applications for sites to dispose of the low-level waste. County commissioners were concerned that additional landfills may be needed in the future and, if any failed financially, the county would become liable for the facility. The county reached out to the WDEA, which contracted with AE2S to perform a regional study to get a better handle on the issue.

North Dakota is the only oil-producing state that doesn't have a permitted landfill or other licensed disposal facility for handling TENORM, according to Brent Bogar,

AE2S senior consultant. Bogar said the state generates an average of 92,000 tons of TENORM per year—the equivalent of about 2,300 truckloads. The material is currently hauled by truck out-of-state, with most going to a landfill just across the border near Lindsey, Montana. Based on information from the North Dakota Department of Mineral Resources, Bogar developed a map with locations of future drilling activity and infill drilling to show areas where TENORM is likely to be produced. He said the map will be used to guide future siting decisions.

Landfills are the primary means of TENORM disposal, but Bogar says slurry wells are another option being explored. Equipment on-site grinds the material into a powder that is injected underground in a slurry with produced water from drilling operations. The state of North Dakota has permitted three such wells, but none of the wells are in operation yet.

“The slurry well process has been in use for decades in other states and has been a proven method for the industry to properly dispose of TENORM,” says Bogar. “The wells allow for the disposal of the material in the region where it's produced and are also capable of handling higher radioactivity levels than a landfill, while still being

required to maintain proper safety protocols for the workers handling the material.”

Bogar says slurry wells have the potential to handle large volumes of material, potentially a significant portion of the TENORM produced currently in North Dakota.

“Based on the volume of TENORM produced, we expect the state would ultimately site and permit two or three landfills and a handful of slurry wells,” says Bogar. “The combination would be capable of handling virtually all of the material produced in North Dakota.”

A key component of the WDEA's study includes producing educational materials, so the public is aware there's very little public health risk from TENORM's low-level radioactivity.

“We want to make sure the public has a good understanding that low level amounts of radioactivity are all around us in things we see and use every day,” says Bogar. “It's found in bananas, coffee grounds, kitty litter, and granite countertops. The levels of radioactivity in TENORM are no different, but because its disposal is regulated, we have to provide a safe method to accomplish that.”

Additional information about TENORM can be found on the North DEQ website at deq.nd.gov/TENORM. 



The weather station set up at a site in Epping, Williams County, ND.



INSET: The roadbed soil water content reflectometers used for the Wise Roads project are multiparameter smart sensors that use innovative techniques to monitor soil volumetric-water content, bulk electrical conductivity, and temperature.

Road Management Project Proving to be a Wise Decision

By Jim Timlick

A first-of-its-kind research project is helping pave the way for counties in North Dakota to better understand how to build and maintain the gravel roadways that are lifelines for companies in the state's oil producing sector.

The Wise Roads project (The Weather Information System to Effectively Reduce Oilfield Delays & Disruptions) will see the installation of 50 research-grade weather stations in the oil-rich Bakken region. The purpose of the project is to provide county road managers with more consistent and localized weather data that will allow them to more accurately determine when temporary weight restrictions should be imposed on gravel roads following heavy rainfall.

It's an issue of particular concern to many in the oil sector. While weight restrictions help reduce damage to roads, oil operations are sometimes unnecessarily shut down for days as a result, which can cost companies millions of dollars in lost profits.

The problem in the past was information that counties relied on to make such decisions came from stations as far as 30 or 40 miles away and may not have been truly reflective of the road conditions of an area in question.

Wise Roads is looking to change all that by providing more accurate, up-to-the-minute information on rainfall and road conditions through its extensive network of weather stations.

"The purpose of the project is to ensure counties use the information and are able to better manage the nature of the restrictions, so they're not restricting those roads that don't need to be restricted," says Geoff Simon, executive director of the Western Dakota Energy Association (WDEA), the lead agency behind the project.

"With better information, they're able to be a little more precise and leave roads open that haven't been impaired by rainfall."

The project spun out of a roundtable discussion the WDEA hosted back in 2018, during which oil well operators and truckers voiced concerns about how unnecessary road closures were impacting them. It's a collaborative effort

between the WDEA, the North Dakota Agricultural Weather Network (NDAWN), and the Local Technical Assistance Program (LTAP) through the Upper Great Plains Transportation Institute. Funding has been provided by the WDEA and a grant from the North Dakota Oil & Gas Research Council.

As part of phase one of the project, 10 weather stations were installed in June 2019. Phase two was rolled out late last year and included the installation of 15 additional stations. Phase three began in July 2020 and will see 10 more stations installed. Another 15 stations are scheduled to be installed by next spring as part of the fourth and final stage of the project.

Simon says the project has already begun paying dividends. For example, Dunn County, at just over 2,000 square miles, is one the largest counties in the Bakken, and it has been divided into four quadrants, thanks to the addition of three new weather stations. In the past, weight restrictions would be put in place for the entire county whenever there was a heavy rainfall.

Although the weather stations aren't cheap—each one costs about \$10,000—that's a fraction

of the cost oil operations have to deal with whenever weight restrictions are imposed. It's a point that was driven home last September, Simon points out, when heavy rains washed across much of western North Dakota.

While phase three of Wise Roads will expand the breadth of the project's network of stations, it will also increase the scope of the information it will be able to provide. Sensors will be installed in gravel roadbeds at four locations (Dunn, McKenzie, Mountrail, and Williams counties) that will be able to provide precise information on moisture content in those roads and how the gravel performs in moist conditions.

"The sensors will show how the rain is infiltrating into the road and how it's impacting the structural integrity of the road, so we have a better idea of when the road needs to be shut down," says WDEA meteorologist Jonathan Rosencrans, adding it's the first time something like this has been done in North Dakota.

Additionally, the sensors will record temperature and provide information on when and how frost is coming out of the road in the spring.

"We'll be able to do a better job of predicting when the gravel roads start stabilizing due to temperature and moisture," explains Dale Heglund, LTAP's program director. "This will be the first time we'll be collecting this kind of sub-surface data on gravel roads. It's incredible."

The feedback project organizers have received from county administrators, oil producers, and truckers has been largely positive to-date. It's also gotten two thumbs up from agricultural producers who have been able to access the collected data on NDAWN's website, ndawn.ndsu.nodak.edu/current.html, for everything from filing drought-related insurance claims, to knowing when they can haul heavy equipment onto or off of their fields.

"One of the things I really like about the WDEA is their holistic approach," adds Heglund. "While their funding is generated in the western part of the state, their hope and drive is that the whole state grows." 

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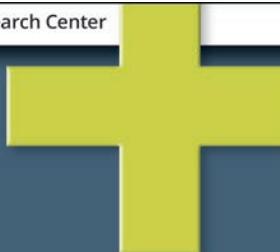
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