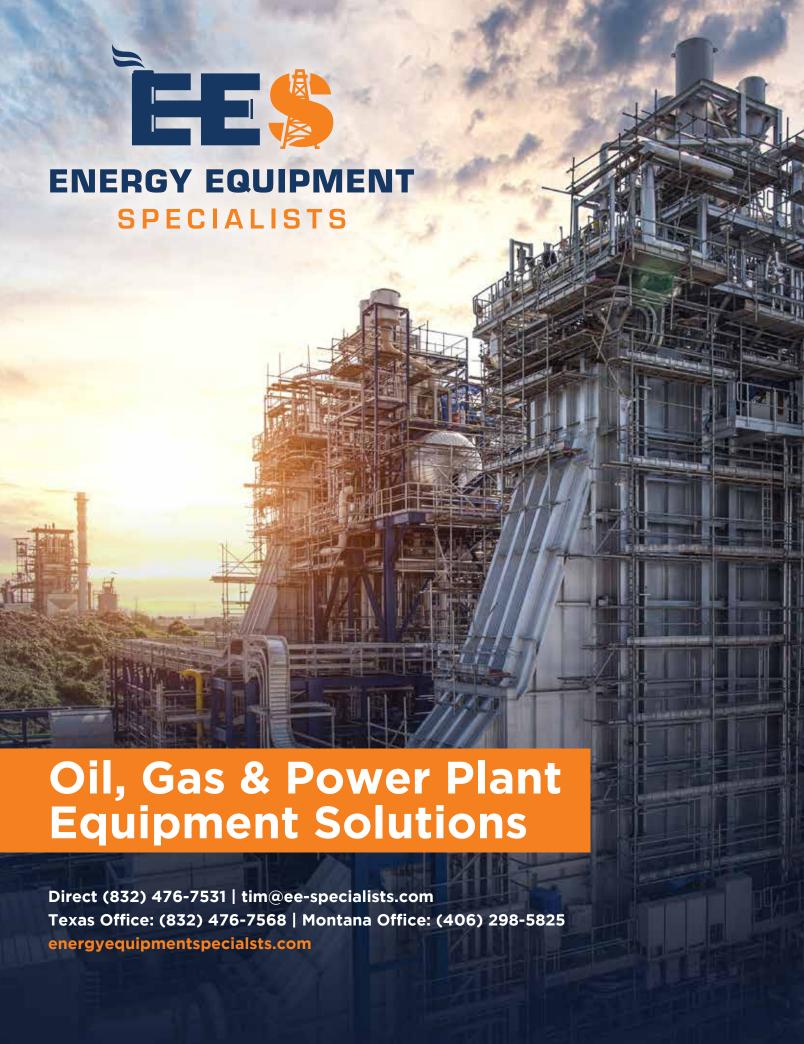


Future-proofing your facility for EPA's methane rules

Continuing uncertainty for oil and gas pipelines under nationwide permits

MPA members connect to communities in many ways



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MESSAGE FROM THE MONTANA PETROLEUM ASSOCIATION PRESIDENT

Mac McDermott, MCR, LLC



MARK TWAIN ONCE WROTE to the New York Journal to tell the publication and its readers that, "the reports of his death were greatly exaggerated?" While there may have been more to the story, the quote seems to fit with the state of the oil and gas industry in the last two years. We lived through a global pandemic that occurred simultaneously with a price war between Russia and OPEC producers that literally made our commodity worth less than zero for several days in April 2020. It was the perfect storm that put many of our domestic producers on life support.

If we are honest with ourselves, we would have to admit that our industry had issues long before the COVID-19 pandemic. 'Zombie companies' is a term that was used to describe our industry. Production treadmills described our decline profiles. We all knew what needed to be done, but nobody wanted to be first to slow down.

The pandemic forced us to slow down simultaneously. The obvious result has been improved financial viability and profitability. The less obvious result has been the revelation that the fine line between an over-supplied and under-supplied market can have devastating effects our economy and on national and world security.

Parts of Europe experienced a minienergy crisis when the wind suddenly stopped this past winter, which drastically increased their demand for natural gas. The problem has been compounded with sanctions against Russia for their attack against Ukraine. Consumers all over the world are feeling the strain of higher fuel prices, and the world leaders are left with no choice but to somehow negotiate with the lesser of the evil-doers in the world. I will give you one guess who the focal point of their frustration will be.

Don't let them saddle you with this cri-

sis. As an industry we need to remind both the consumer and our elected officials of the facts. The current administration canceled the Keystone XL pipeline and has yet to hold a federal onshore lease sale. Our country's largest lending institutions are being discouraged from lending to energy companies. When the finger gets pointed at you, and it will, make sure you fight back. This is our opportunity to demonstrate to the consumer that the issues we are experiencing are a direct result of the people they elect. We don't make the rules, we just play by them.

Thank you for your diligent efforts to provide the state of Montana, the United States, and the world with the energy they desperately need. MPA will continue to work with our local, state, and federal leaders to help them shape the regulatory and policy future that works for the benefit of the great state of Montana.







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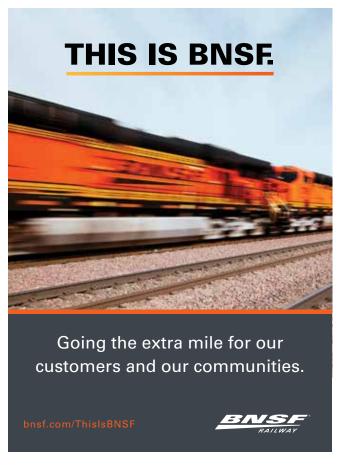
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MESSAGE FROM THE MONTANA PETROLEUM ASSOCIATION EXECUTIVE DIRECTOR

Alan Olson

THE PETROLEUM INDUSTRY TODAY is certainly different than it was only two short years ago in 2020.

On the production side, Montana crude oil pricing has gone from a negative \$43.92 per barrel on April 20, 2020, to \$97.62 one year later. As of the writing of this piece on June 10, the price is standing at \$115.52. Immediately following the crash in 2020, three of Montana's biggest oil producers filed for bankruptcy and reorganized through their creditors. Numerous oilfield service companies went out of business

and thousands of jobs were lost. Even today we have not seen production numbers witnessed at the peak in January of 2020 when the U.S. was producing 12.9 million barrels per day. As we recover from the production losses in 2020 and 2021, we are still producing one million fewer barrels per day than at the peak.

2020 was also a devastating year for refiners nationwide as historical overcapacity was accompanied by a drop in global fuel demand, slashing margins and forcing many already struggling refineries into



early retirement. In 2020, 28 refineries were closed. An analysis showed that permanent capacity reductions in 2020 surpassed 1.0 million barrels per day (bpd) in the United States, while more closures may materialize given the additional idled refining capacity of approximately 408,000 bpd awaits a final decision.

As an example, a Texas petroleum refinery operated by LyondellBasell Industries, built in 1918, is scheduled to permanently close by the end of 2023 but could shut down earlier if a "major equipment failure" spreads to major units as reported by Reuters. This refinery processes 268,000 bpd of oil and produces 92,600 bpd of diesel fuel, 89,000 bpd of gasoline, and 44,500 bpd of jet fuel. An untimely shutdown of this refinery will add additional pressure on domestic fuel supplies.

Global refining, which is vital for producing fuels like gasoline and diesel decreased refinery through-put by 1.4 million bpd between 2019 and the first quarter of 2022, according to the International Energy Agency. Data shows most of the refinery closures occurred in western countries. However Chinese refining capacity is expected to see substantial growth over the next few years but very little of that growth will be available for export.

Across the board, the continued decline in domestic and international refining capacity could signal long-term domestic fuel supply shortfalls. Diesel fuel supplies have hit all-time lows on the east coast and gasoline prices have surged to multiple records in recent weeks. Currently distil-



late inventories, diesel, jet fuel, and home heating oil are sitting at approximately 105 million barrels down from a five-year average of 135 million barrels while gasoline inventories are sitting at 225 million barrels well below the five-year average of 240 million barrels. Along with the distillate and gasoline deficits, crude oil in storage is at 419 million barrels, down approximately 40 million barrels from the five-year average.

Major refinery operators have largely opted to upgrade facilities rather than construct new greenfield plants because of projected future declines in fuel demand and lengthy regulatory process required for such projects. Additional emissions requirements in the Clean Air Act, permitting through the National Environmental Policy Act, along with increasing legal challenges continually add to costs or contribute to shutdowns. Since 2000, the Environmental Protection Agency has entered into 37 settlement agreements with

112 refineries in 32 states that control 95 percent of the total reefing capacity in the United States, according to an EPA database. Both permitting and litigation affect the cost borne by the consumer.

In addition to challenging market conditions and the regulatory climate, increasing market interest in renewable diesel production and pre-existing plans to scale down or reconfigure petroleum refineries all contributed to the closing of a handful of refineries in 2020. Additionally, increases in the renewable volume obligation (RVO) mandated by the Renewable Fuel Standard (RFS) forcing purchase of renewable identification numbers (RIN) is an additional cost of hundreds of millions of dollars, adding not only costs to refiners but also the consumer. One Montana refinery has determined that their second highest cost of operation is the mandated purchase of RINs.

The U.S. and European nations have sped up the scheme for a global green en-

ergy transition away from fossil fuels even as green energy prices have skyrocketed to record levels this year. We would do well to learn from Europe's mistaken reliance on a dictatorship to supply needed and secure energy sources. While politicians wring their hands while trying to decide whether to support domestic production and refining, we can't be asking hostile foreign countries to increase their production and try to decide which dictator we should be beholden to for our energy security.

Many industry groups have urged the Biden administration to focus on long-term solutions, like boosting domestic oil production and shoring up refining capacity amid the current energy crisis. In rushing toward the "great energy transformation," we need to stop the opposition to the energy we need today. There is no replacement for crude oil and natural gas in the foreseeable future without the tremendous negative economic effects that we are seeing today.

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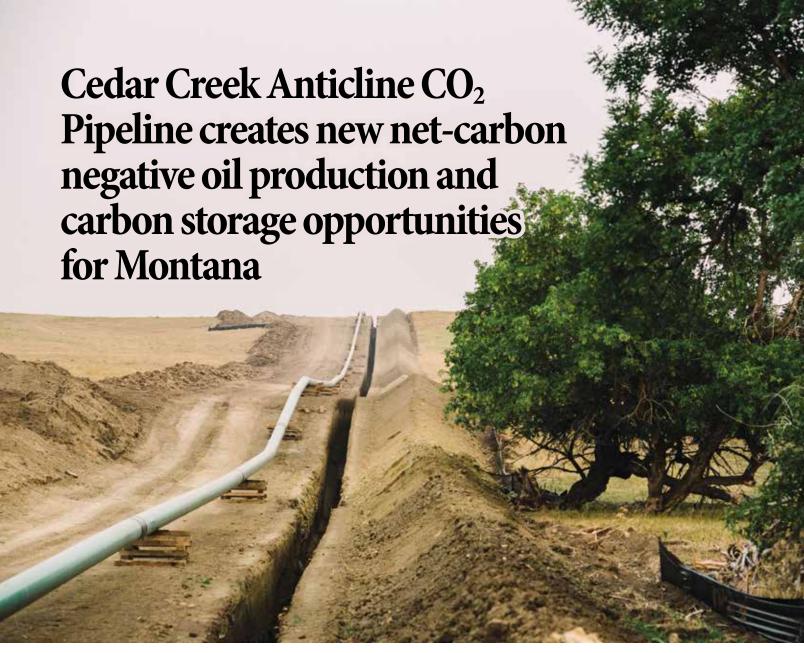
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By Denbury Inc.

MPA MEMBER DENBURY INC. has completed the 16-inch, 105-mile Cedar Creek Anticline (CCA) carbon dioxide (CO₂) pipeline extension from Bell Creek Field in Powder River County to Fallon County near Baker, Montana in late 2021 and has also added a 12-inch, 17-mile lateral CO2 line to Bowman county, North Dakota. The first CO₂ injection was commenced in early 2022 in Cedar Hills South Unit (ND) "CHSU" and East Lookout Butte Unit (MT) "ELOB". The CCA project catapults Denbury as the owner and operator of the largest CO2 pipeline network in the United States. The multimillion-dollar project transports CO₂ to

the CCA, whose estimated cumulative recoverable reserves from enhanced oil recovery (EOR) exceed 400 million barrels. Because these reserves will be exclusively produced by using captured industrially sourced CO₂, the project will produce Scope 1, 2, and 3 carbon negative emissions oil – also known as "Blue Oil".

Denbury, the largest crude oil producer in Montana, has been planning the CCA pipeline and EOR field development for several years. The project will be conducted in "Phases", with Phases 1 in development and Phase 2 being planned. Phase 1 targets an estimated 30 million barrels of recoverable oil in the Red River

formation in ELOB and CHSU. Phase 2 targets approximately 100 million barrels of recoverable oil in the Cabin Creek area from the Stony Mountain and Red River formations. Future phases in the remainder of the CCA will require years to develop and target multiple formations. The CCA is considered one of the larger U.S. oil-bearing structures with an estimated five billion barrels of original oil in place (OOIP) spanning nearly 100 miles in length, yet only a few miles in width. Future state and local revenue from expanded tax base - severance, ad valorem - will likely total millions of dollars over many years.



Denbury ⁸

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The pipeline was constructed mostly adjacent to existing pipeline right-of-way, limiting surface impact and was the culmination of a coordinated effort between landowners, federal, state, and local governments, as well as tribal interests. Denbury's close collaboration with the State of Montana in the development of a workable Greater Sage Grouse habitat conservation plan was an important aspect of the successful completion of the CCA pipeline. Habitat avoidance, conservation, and mitigation strategies were all successfully employed in the shared effort to protect the species. Denbury's commitment to comprehensive reclamation of the area of disturbance along the pipeline route remains a critical aspect of successful project execution.

CO₂ pipelines enjoy a long record of safe operations with no fatalities or serious injuries reported. The pipeline was designed, constructed, and will be operated in accordance with the U.S. Department of Transportation pipeline safety

requirements of 49 CFR Part 195, as well as is compliant with all applicable local, state and federal safety regulations. The project was completed without any recordable U.S. Occupational Safety and Health Administration (OSHA) incidents – truly an accomplishment for a project that had hundreds of individuals working over 500,000 hours.

Development highlights include converting multiple water injection wells to CO_2 injectors to increase CO_2 injection volume; installation of infield CO_2 injection and oil production flowlines; and construction of six CO_2 recycle facilities total with one to be completed this year.

Carbon Negative Oil and Opportunities for Dedicated Carbon Storage

The CCA CO₂ pipeline also brings new and exciting opportunities to Montana for the development of ultra-low carbon intensity oil production (Blue Oil) and dedicated carbon storage sites to sup-

port CO_2 emissions reduction projects by industry. Expanded federal policy in the form of tax credits aimed at reducing the cost of industrial CO_2 capture have resulted in state and federal efforts to locate and develop safe and secure deep underground sites for dedicated carbon storage. Nationwide, U.S. industry is entering into a broad new phase of investment and innovation seeking to reduce carbon emissions to meet consumer, governmental and financial institution calls for additional measures.

As an outgrowth of policies designed to demonstrate and document carbon emissions reduction, the decades-old technique of carbon dioxide injection for enhanced oil recovery has found itself near the center of fresh attention as also achieving meaningful associated CO₂ storage through production operations. First used in the west Texas oilfields in the 1970s, CO₂ injected into older, depleting legacy oilfields not only proved to liberate substantial quantities of otherwise





stranded oil, the process also inherently resulted in CO₂ remaining trapped - or sequestered - in the hydrocarbon bearing formations. The EOR industry nationwide is annually injecting approximately 70 million metric tons of CO₂ for use in producing low carbon intensity oil. That is roughly equivalent to the CO2 emissions from over 20 power plants or approximately 15 million cars. It has been estimated that if U.S. EOR production was increased to approximately four million barrels per day, annual U.S. CO₂ emissions could be reduced by one billion metric tons per year - about 40 percent of current U.S. CO₂ emissions.

Today, industry is using the International Greenhouse Gas Protocol to measure direct emissions (Scope 1), Indirect Emissions (Scope 2), and emissions that occur in the value chain including from the ultimate product itself (Scope 3). Industry is adhering to this protocol to calculate CO₂ emissions reductions in a

broad drive to become carbon neutral. Independent third-party review of select CO₂ EOR projects has shown that utilizing captured CO₂ for EOR production results in net negative carbon emissions per barrel of oil produced. Stated another way: it takes more CO₂ to produce a barrel of oil than the oil emits when combusted. Under this accepted Protocol, 100 percent of CCA's future incremental EOR production will be net carbon negative or Blue Oil.

The CCA pipeline has also underscored a strategic advantage for Montana in that it is located proximate to large deep underground geologic storage areas that are controlled by the State of Montana and the federal government. Utilizing these sites serve both existing industry in need of carbon transport and storage services, but also represent opportunities to recruit new industry to Montana that bring good paying jobs and new tax base to remote areas. These sites will also generate

revenue from injection fees that will help the state financially. Because CO₂ pipelines are currently limited to three areas of the country (Rockies/Gulf Coast/West Texas) for the foreseeable future, existing infrastructure paired with identifiable secure geological storage sites will have a significant economic development advantage over other areas of the country where no infrastructure exists today.

Montana is on the leading edge of carbon capture utilization and storage (CCUS). The anchor provided by the CCA pipeline and the steady, long-term development of the CCA will make Montana a nationally recognized leader in the production of ultra-low carbon intensity Blue Oil. In the fast-evolving world of creating cleaner fossil fuels, derivative products using captured CO₂ and through the development of large-scale geological storage opportunities, Montana's treasure will grow well into the 21st century. ■



By Jon Healy, Commercial Products Manager, Millborn Seeds Inc.

WHETHER IT BE A pipeline, drill pad, laydown yard, or haul road, regaining a hearty stand of vegetation after work completion is typically both a requirement and a measure of project success. What constitutes success is going to mean different things to different stakeholders. Typically restoring the land to "the way it was before" is the goal. Restoration can mean many things, but revegetation is often at the top of the list. There are many factors that can determine the success or failure of revegetation efforts. Selecting a mixture of plants that are likely to grow well in a given location or climate is a great first step towards success.

Elevation, climate, soil conditions, and stakeholder expectations are a few of the many factors that can define successful revegetation. It is important to focus on the factors that can be controlled and adjust accordingly based on site conditions. We may not be able to force Mother Nature to provide more rain, but we can select species that can thrive with less moisture. We may not be able to turn sand, clay, and rock into fertile soil, but we can select plant species that can tolerate the conditions. In some situations, it may also be worth considering a commercially available biotic soil amendment to retain moisture and simulate fertile soil to improve odds of success.

The first step in achieving successful revegetation is species selection. Determining which species are growing in the area is often a good indicator of which species will do well. It is also important to consider speed of establishment. If a species is proven to do well in your location but may take years to become prolific it is a species that could be included in the seeding plan but not relied upon to be the backbone of the plan. The use of quick-growing plants with good probability of success should always be the backbone of

any seeding plan with more challenging or ecologically significant plants added as needed to meet project requirements. Annual or short-lived perennial plants used as a nurse crop are an inexpensive option that should be considered.

Project location is a primary factor in determining which species may be suitable for use. There is no one-size-fits-all solution for seed selection, but there are families of plants that are known to be relatively easy to grow in a variety of climates. For example, wheatgrass is a family of hearty grasses that are relatively easy to grow in most locations across North America. There are native wheatgrasses such as Western and Slender. There are also introduced species such as Intermediate and Crested. They each have their preferred growing environments and have their individual characteristics but in general, wheatgrasses are hearty grasses that do well in dry conditions and can tolerate light soils. In cases of revegetating rangeland, wheatgrasses can also provide good forage production.

On the other end of the spectrum, plants such as Sage, Saltbrush, and Winterfat can be challenging to grow and often can take years to fully establish. Including these and other challenging species is often a project requirement. Using challenging species in addition to easier to establish species provides the early growth necessary to stabilize the site, appease landowners, and close permits, while the slower establishing or ecologically significant species go through their natural processes and begin to grow when conditions are right.

The inclusion of nurse crops, short-lived perennial, or annual plants provide quick growth to minimize erosion, help soil hold moisture, and provide shade to keep seed and small plants from



overheating. Nurse crops are generally inexpensive and can be incorporated into the permanent seed mix to reduce the costs by applying both permanent seed and nurse crop in one pass. The most commonly used species for nurse crops are annual grasses such as Annual Ryegrass and small grains such as barley, wheat, rye, and oats. On rangeland plants like short-lived alfalfa and annual clovers can provide quality feed and cover and will provide nutrients to adjacent plants.

When selecting seed for revegetation, there are too many variables for a one-size-fits-all seed mix. However, using the same process for selecting seed can be used for any project. First, include the species that are required by the landowner or permit. Once the requirements have been met, evaluate existing vegetation to determine the species that have been successful and incorporate those species as the backbone of the mix. Then supplement with other species that are well suited to the site. If requirements or regulations allow, add one or more nurse crops to the mix to provide quick growth and soil stabilization.

Weed pressure is one environmental concern that can be controlled to some extent by planning and taking appropriate steps. Project schedules rarely allow time for pre-seeding weed control but is a valuable step that can pay off big in reduced maintenance and landowner frustration. The best approach to any seeding project is to start with a clean slate. There are a wide variety of options for controlling weeds prior to seeding. After seeding, depending on which species have been planted, you may have limited options. After finish grading is complete, allow two to three weeks for weeds to emerge and spray with a non-selective herbicide. If weed pressure is heavy repeat the process two to three times. After the recommended waiting period plant the permanent seed mixture. The clean slate approach gives the permanent vegetation the best chance of success and will significantly reduce the amount of

follow up maintenance required and minimize landowner frustra-

Experts are available through seed companies, environmental consultants, and local NRCS offices. These experts can help with seed selection, application rate, weed control, and application methods. When selecting seed for a revegetation project, stick to the basics to improve your chance of success!





Unmanned aerial vehicle use in the oil and gas industry

By Tim Uribe, Oil & Gas Market Delivery Director, KLJ

THE GLOBAL UNMANNED AERIAL vehicle (UAV) market size is expected to reach \$36 billion by 2030 according to the 2021 UAV market study by Precedence Research.

UAV technology helps the oil and gas industry gain precise, cost-efficient information to help with project siting, construction, inspections, and asset management. With UAV use, employee safety

and well-being have improved while operational down time and high costs related to manual inspections and analyses have reduced.

KLJ's Unmanned Aerial Vehicle (UAV) program was established in 2015 and serves Montana, North Dakota, Wyoming, Colorado, South Dakota, Minnesota, New Mexico, and Texas. With cutting-edge UAV technology, KLJ's UAV pilots effi-

ciently gather, analyze, and communicate customized and routine data to clients.

"With our software, we transmit data quickly and directly to the client, allowing the project team to make sound realignment decisions. Utilizing this data as our base map, we can then continue to fly the project on a regular basis for updated mapping and progress into project completion and reclamation, showing clients and the community a sense of how well the land was reclaimed with a great before and after map," said Andrew Coleman, UAV pilot.

KLJ utilizes UAVs with multispectral sensors and red-green-blue imagery. Applying this technology allows sensitive areas within the project area to be identified. Sensitive zones that need a closer look before construction can be closely evaluated. This project team can then monitor the health of reclaimed native landscape, allowing timely remedy of any issues that may arise.



As UAV technology continues to evolve, KLJ finds additional applications for the oil and gas industry.

Flare gas recovery can also be verified with UAV technology. Flare gas emissions are visually monitored to illustrate environmental compliance and depict regional emissions reduction trends as flaring is extinguished with gathering lines and other wellhead technologies.

UAVs with interchangeable payloads have a variety of sensors that can identify temperature differentials, detect leaks, and portray reflect spillage paths. In the event of an emergency, UAV technology enhances emergency response efforts to help ensure resources are swiftly deployed efficiently and accurately.

As UAV technology continues to evolve, KLJ finds additional applications for the oil and gas industry. The Montana Petroleum Association recognizes the importance of UAV technology to the oil and gas industry and promotes workforce-training opportunities to bring new people into the profession.

"MPA members continually seek technology solutions to drive performance, streamline business operations, and improve the bottom line," said Alan Olson, executive director of the Montana Petroleum Association.

UAV training is available and affordable. "The University of Montana offers UAV pilot training courses once a quarter to introduce students to the fundamental concepts of being a remote pilot. The course is \$740 and includes simulator time and training aircraft for actual flight time," noted Olson.



Continuing uncertainty for oil and gas pipelines under nationwide permits

By Samantha E. Hawe and Lisa A. Kirschner, Parsons Behle & Latimer





Lisa Kirschner.

Samantha Hawe.

SECTION 404 OF THE federal Clean Water Act (CWA) governs, among other things, the discharge of fill material into waters of the United States (WOTUS). The U.S. Army Corps of Engineers (Corps) administers most permitting under Section 404 (with oversight from the Environmental Protection Agency (EPA)). Those permits can include the Corps' issuance of general permits for categories of activities provided those activities have minimal cumulative adverse effects on the environment. 33 U.S.C. § 1344(e). Nationwide Permit 12 (NWP 12) is one such general permit authorizing discharges into WOTUS for work on oil and gas pipeline-related activities. NWP 12 has been as controversial as the activities it governs, having been the subject of litigation associated with multiple challenges. Today is no exception; the permit is currently under challenge in Montana federal court. NWP 12 is also being further assessed by the Corps. It is now the subject of an agency-initiated evaluation

that has included stakeholder outreach focusing on possible concerns that the permit does not provide adequate opportunity for notice to affected communities. The outcome of the ongoing NWP 12 scrutiny could impact the future permitting of pipelines and related projects.

NWP 12 Overview

As renewed on March 15, 2021, NWP 12 authorizes fill in WOTUS associated with oil and gas pipeline construction, maintenance, repair and other work. 86 Fed. Reg. 2744. Proposed activities for a single and complete project must not result in the loss of greater than onehalf acre of waters. The permit retains the long-standing approach to WOTUS crossings. For linear projects, each water crossing is considered an individual 'single and complete project.' In other words, pipelines that cross multiple drainages or other areas characterized as WOTUS may still be eligible for NWP coverage since those crossings are assessed on a crossingby-crossing basis (provided those crossings are separate and distant).

NWP 12 requires submission of a preconstruction notice (PCN) to the Corps under many conditions. PCNs are required for activities triggering a Section 10 permit, discharges resulting in the loss of more than one-tenth of an acre of wetlands, or a new pipeline greater than 250 miles in length. A PCN must include information documenting compliance with the National Historic Preservation Act and the Endangered Species Act (ESA). Additionally, Corps' regions often identify supplemental NWP conditions. For example, the Montana office of the Corps (which is in the Omaha District) has issued specific conditions including those associated with PCN obligations for particular project locations. States or tribes must also certify that the NWPs comply with applicable water quality standards. The CWA 401 water quality certification can trigger additional NWP conditions.

NWP 12 has been controversial. It was the subject of litigation in Montana by environmental groups seeking to invalidate the Keystone XL Pipeline's use of the permit. N. Plains Res. Council v. U.S. Army Corps of Engineers, CV-19-44-GF-BMM. In April 2020, Judge Brian Morris of the United States District of Montana vacated the entirety of NWP 12 (which at that time governed multiple types of pipeline project-related activities beyond those associated with oil and gas pipelines), finding that the Corps was obligated to consult with the U.S. Fish and Wildlife Service (USFWS) under the ESA.

A month later, Judge Morris narrowed the holding to apply only to oil and gas pipelines. In July 2020, the U.S. Supreme Court further limited the ruling to apply only to the Keystone XL Pipeline.

NWP 12, as reissued in 2021, includes changes from previous versions. For example, NWP 12 no longer covers multiple types of pipelines - it is limited to oil and gas pipeline-related activities. During the 2021 reissuance process, the Corps promulgated two other nationwide permits to cover utility line activities other than oil and gas pipelines. In turn, NWP 12 includes some additional conditions; for example, PCNs for pipeline projects that exceed 250 miles in length must reference all crossings including those that would not otherwise trigger a notification requirement. The reissued NWP 12 retains the definition of a "single and complete" project.

Renewed Litigation

Shortly after NWP 12 was finalized, it was challenged in court (again). Non-governmental organizations (NGOs) including the Center for Biological Diversity, Sierra Club, Montana Environmental Information Center, Friends of the Earth, and Waterkeeper Alliance sued the Corps in the Montana District Court (again), seeking to invalidate the permit. Center for Biological Diversity, et al. v. Spellmon, 4:21-cv-00047-BMM. Other stakeholders, such as the state of Montana and industry groups, have intervened.

The NGOs seek to invalidate NWP 12, arguing that "nothing has changed." Specifically, they argue that the Corps issued NWP 12 without properly consulting with the USFWS under the ESA, as the permit is an 'agency action' that 'may affect' listed species, and improperly delegates ESA functions to permittees. The NGOs also argue that the Corps failed to adequately evaluate the cumulative, large-scale environmental effects of pipelines and the elimination of some PCN requirements. The NGOs allege that many activities covered by NWP 12 will have more than minimal effects on WOTUS.

The plaintiffs' briefing also suggests that treating each water crossing as a single and complete project is an abuse of the Corps' discretion and that the Corps' determination to treat crossings as individual projects "lack[s] a substantial basis in fact." The NGOs argue that multiple crossings associated with linear pipeline projects often are not actually "separate and distinct" from one another because they can be clustered within the same water.

The defendants assert that the Corps properly complied with all applicable statutes before finalizing NWP 12, and that the NGOs' arguments are based on flawed interpretations of the relevant laws. The defendants urge the court to narrowly tailor any eventual remedy to avoid undue disruption to Corps' programs.

Currently, the case is at the summary judgment phase. Both sides have briefed and argued cross-motions for summary judgment on the claims. Assuming that summary judgment is not granted, the case may not be decided or resolved for some time, leaving NWP 12—and other NWPs implicated by plaintiffs' arguments—in an uncertain state.

Formal Rulemaking

At the same time as the Montana litigation ramps up, the Corps announced a formal review of NWP 12. Despite the fact that the permit does not expire until 2026, the Corps announced a reevaluation of the permit, motivated largely by President Biden's Executive Order 13990, which directed agencies to take a fresh look at environmental rules promulgated under the previous administration. 87 Fed. Reg. 17821. The current administration is keen to address issues associated with environmental justice and climate change. The notice of rulemaking sought input on questions concerning more stringent requirements to qualify for NWP 12, more local control of NWP 12 and PCN requirements, notice to potentially impacted communities, distinguishing oil and gas pipelines for new and existing

projects, and any others that stakeholders wished to address.

The Corps' request for information has included both hearings and written comments (which were submitted by a May 27, 2022 deadline). At the hearings, many attendees raised general objections to oil and gas pipelines under NWP 12, including criticism of the scope of coverage and the nature and extent of impacts associated with permit issuance for multiple WO-TUS crossings. Public Comments Hearing on Corps Proposed Rulemaking (May 12 and 17, 2022) (attended by authors). Some of the comments criticized pipeline proposals like Keystone XL and the Byhalia pipeline. Trade associations have raised issues such as the need for stability and speed in pipeline projects, particularly in light of the current administration's climate and energy goals. National Mining Association, Comments on the Corps' Solicitation (May 27, 2022).

The Corps' outreach is atypical and could result in programmatic changes. The outreach could identify issues that will prompt reconsideration of NWP conditions, like the definition of "single and complete project," which was debated not only in the ongoing litigation, but considered again in reissuance of NWP 12. 86 Fed. Reg. 2744, 2777-78. A change to the definition of "single and complete project" could drastically narrow the scope of NWP 12 and force linear pipeline projects to seek individual 404 discharge permits, delaying and complicating such work. Given the implications of possible permit changes, the regulated community may want to "stay tuned" to the evolution of the Corps' permit review process.

Conclusion

Administrative rulemaking and litigation continue to challenge current practices for authorizing oil and gas pipeline activities governed by NWP 12. The outcomes of these challenges may have lasting implications for Corps' CWA permitting of oil and gas pipeline-related projects.

Curiouser and curiouser



By Jessica Groth

THIS YEAR MARKED THE end of more than 30 years of service to Montana's Board of Oil and Gas Conservation for Jim Halvorson. And from the Rocky Mountain Front – where he grew up near Pendroy – to the Refining City, Jim has seen his fair share of change during his career.

"The Northern Rocky Mountain Front is a good example of the progression in thought about the environment and resource development," says Jim. "When I was growing up, land ownership was often in the hands of multi-generational farmers and ranchers, and resource development was viewed locally as economic opportunity. That changed with increased outside influences and changing demographics."

Indeed, many of the Treasure State's foremost industries have suffered at the

hands of the environmental movement, or more appropriately, the litigation movement. From shuttered sawmills and waylaid mining projects to pipeline protests and calls to public universities to divest from fossil fuels, activists are quite literally loving Montana to death.

The thought of drilling on the Rocky Mountain Front today seems nearly impossible, with the installment of restrictive land use designations like the Badger-Two Medicine Traditional Cultural District, which has blocked development of leases approved during Regan's presidency, and the Rocky Mountain Front Heritage Act. But these restrictions have not always been the law of the land.

"Oil drilling was common and there was interest in finding out if the large oil and gas fields in Southern Alberta could extend south into Montana," says Jim.

The Kevin-Sunburst field in North Central Montana, which housed the famous Fulton-Rice pool, ranked first in Montana crude oil production until it was later surpassed by production of the Cut Bank field in Glacier County in the early 1930s.

In the 1940s, the first well in the Black-leaf Canyon region of the Rocky Mountain Front was drilled. And by the fifties and sixties, the presence of natural gas in the area was well-known.

While many small, conventional oil and gas wells still speckle the Hi-Line just south of the Canadian border, more recent oil and gas exploration has been concentrated in the Bakken formation in Eastern Montana.

But for Jim, the Rocky Mountain Front has always inspired a sense of wonder.

"For years, I had looked at the moun-

tain front, and at some point, realized that there were things going on geologically that I didn't understand."

Years later, Jim would explore this fascination deeper as part of a collegiate thesis project.

The son of a farmer, Jim spent much of his upbringing as most Montanans do in the great outdoors. He enjoys hunting and fishing and had the opportunity to work on Kodiak Island as a bear guide for several hunting seasons after graduating from Choteau High School.

Ultimately, Jim knew he didn't want to pursue a career in farming or guiding.

"Farming made me sneeze, guiding involved a lot of cold and wet, and college didn't look that bad anymore," he says.

So, following in his brother's footsteps, he found his way to the Montana School of Mines, better known today as Montana Tech - go, Orediggers!

"My brother had graduated from Montana School of Mines with a degree in petroleum engineering, so I was familiar with Butte and felt the smaller school seemed a good fit," explains Jim. "At that time, Tech was active with earth science programs. Opportunities were available in a variety of fields, and I wasn't yet committed to oil and gas as a career."

One of Jim's first educational pursuits was geophysical engineering, where he met and worked with Dr. Charles Wideman, a professor in the geophysical engineering department.

"There was interest in alternative energy sources during the 1970s, and we did geophysical studies of geothermal occurrences in the western part of the state," says Jim.

During his summers, Jim continued work in geothermal projects, as well as uranium exploration in Idaho, and gold exploration and property evaluation in Nevada.

"I also continued to work on a thesis project centered in the Blackleaf Canyon Area northwest of Choteau looking at

stratigraphy and reservoir characteristics of the Madison Formation. I soon grew to conclude that everything was related, and nothing is unimportant when it comes to understanding geologic history or natural resource opportunities. I maintain that respect for data, and consistency in its application and interpretation are important in all endeavors including regulation."

Ultimately, Jim decided to major in geological engineering because, "it required less math than geophysical engineering." He started his career after college in Casper, Wyoming with Gulf Oil.

"I spent several years doing exploration geology in Western Montana and the thrust and disturbed belts. After the Gulf-Chevon merger, I worked in Denver where projects included a seismic and gravity investigation of the Colorado Front Range, and reservoir geology and engineering for fields in the Wyoming Thrust Belt."

Jim also served as a unit geologist for Chevron's CO₂ enhanced recovery project in Rangely Field, Colorado, prior to leaving the private sector to work as the petroleum geologist for the Board of Oil and Gas Conservation (BOGC) in 1990.

In 2014, Jim was appointed as administrator of the BOGC, following the retirement of longtime board Administrator and state senator, the late Tom Richmond. The change in job title, however, came with only a few changes, according to Jim.

Just "a few more trips to Helena and significantly more telephone and video conference time," he said, adding that, "Compliance issues are a never-ending task."

Montana's Board of Oil and Gas Conservation is a quasi-judicial board that administers Montana's oil and gas conservation laws; promotes conservation and prevents waste in the recovery of resources; and regulates oil and gas exploration and production.

The Board is the sole authority on well permitting in Montana. "It is efficient for both regulators and the regulated industry to have one primary source for as many things 'oil and gas' as possible," says Jim. "This promotes consistency and allows rejection or approval of requests and answers to questions in a reasonable timeframe."

"State agencies only have the authority delegated to them by the legislature. Attempts to interject additional processes are often based upon the perception that concerns are not being addressed at the legislative level," explains Jim.

Lately, Jim has been spending the bulk



of his time focused not on new oil and gas wells, but old ones.

"The oil and gas industry in Montana is now mature and a continuing challenge is dealing with wells as they reach the end of their economic lives," says Jim. "The board has taken an active role in addressing these issues, but as stated by a past DNRC (Department of Natural Resources and Conservation) director, it took over 100 years to get where we are so everything is not going to be resolved overnight."

In November 2021, President Biden signed a \$1 trillion bipartisan infrastructure package, which included more than a \$4.7 billion dollars to be used to plug some 130,000 orphan wells across the country to combat methane emissions. Montana's share of that funding amounts to \$26 million dollars.

During an interview in January, Jim told Yellowstone Public Radio that there are nearly 280 orphan wells in Montana. These wells are typically reclaimed by the State using extraction taxes paid by oil and gas operators, though Jim says the federal money will help to expedite the reclamation process, so long as politics don't derail the effort.

"The current federal regulatory climate

and political desire to phase out oil and gas use are concerning and will complicate this issue. Minor regulatory changes at either the state or federal level could increase the number of orphaned wells almost immediately. Some of the proposed methane regulations that could impact smaller operators of older wells are a specific concern," says Jim.

When asked to consider the biggest changes he's witnessed in Montana's oil and gas industry, Jim describes the transition away from wildcat and conventional wells.

"The biggest single change in industry I have experienced is the development of resource plays such as the Bakken Formation in North Dakota and Eastern Montana. These types of projects are generally different in terms of community and economic impact than conventional oil and gas activities. Accumulations cross multiple townships or counties, and horizontal drilling presents unique regulatory challenges that are still being addressed."

Though oil and gas has always been a cyclical industry, with prices driven by supply and demand, the politics of energy have taken a toll on domestic production. Years of anti-oil opposition and fearmongering about various aspects of exploration and production have also impacted public perception of the oil and gas indus-

"Regarding national and media attention, not all perceived possible impacts of oil and gas development are applicable to every geographic region or geologic basin, and not all media information regarding hydraulic fracturing was correct," explains Jim.

"Hydraulic fracturing is a good example of a changing public and regulatory environment," Iim says, "Fracture stimulation had been utilized since the 1940s. Horizontal drilling and Bakken development in Montana and North Dakota represented one of the earlier resource plays. By the time national and media attention focused on hydraulic fracturing, years of development had already occurred. Landowners in eastern Montana were generally familiar with the process and had the opportunity to discuss issues and express their concerns as development progressed. Rumors of possible horizontal drilling and fracturing expanding to include areas with little or no actual potential led to additional public involvement and many comments were received from communities that had not been involved in the earlier development."

Montana is unique in that anyone, anywhere can protest any proposed well, anywhere, regardless of whether that person has a right to either the surface or mineral estate of the property in question. While the broad protest ability exists to offer concerned citizens an opportunity to be heard before the BOGC, concerns may be unwarranted, as the current regulatory environment exists to protect both the public and our environment.

"Regulatory agencies have the difficult task of receiving and acknowledging public concerns, evaluating actual regulatory needs, and facilitating legislative changes to accommodate appropriate rule chang-



es," says Jim. "Whether right or wrong, any attempts at reasonable resolution of issues often end with one side or the other threatening to bring suit, but that seems to be the world we live in."

Those in extraction industries, whether for timber, copper, coal, or oil, have all grown to expect the inevitable eventuality of litigation. More than ever, public policy seems to be motivated by ideology - ban fossil fuels - and not by reality. Simply look at how quickly the United States has gone from energy dominant, to where we are today; record high gas prices, depleting the Strategic Petroleum Reserve, asking foreign nations to increase production, and accusing oil companies of price gouging.

"I watch the arguments for and against hydrocarbon utilization and climate discussions with amusement and try to remain non-committal," says Jim. "Oil and gas are a finite resource, and the fundamental economics of production are going to determine future usage. I'm skeptical that a quick energy transition from hydrocarbons is possible without significant societal impact and would prefer a logical approach to preparation for the inevitable future."

Elections have consequences. After repeatedly promising on the campaign trail to 'end fossil fuels', it should come as no surprise that the Biden Administration has been unwilling to see the oil and gas industry as vital partner in our economic recovery and national security; banning lease sales, increasing royalties, cancelling leases, increasing the social cost of carbon, and reversing approval on the Keystone XL pipeline, to name a few of the Administration's moves in only the first 16 months of the Biden presidency.

"Changes in state and federal regulations impact the level of activity, and broader political or public issues influence the availability of funding for oil and gas projects," says Jim. "It is important that agencies and regulators know that they have broad responsibilities and must constantly evaluate whether existing regulatory requirements are adequate or excessive."

Aside from the political headwinds faced by the oil and gas industry, companies are now struggling to pull together the resources needed to restore production to pre-pandemic levels.

"The pandemic's impact on the workforce, supply chain issues, and the lack of oil field services in Montana continue to affect day-to-day work," says Jim.

While he may continue to follow oil and gas issues 'recreationally', Jim retired July 29, 2022 after 32 years of service to Montana on the Board of Oil and Gas Conservation. Looking back at his career, it's the people Jim worked with that he will miss the most.

"My fondest memory will be working with board members of various backgrounds, and each of the staff, past and present. A relatively small group of people has been able to address changes in the industry and regulatory environment and continue to provide good service to industry and the public. I also enjoyed working with company representatives

and land and mineral owners, many of which have become at least telephone friends," explains Jim.

"I would be remiss to not mention the benefits of working with Tom Richmond for over 20 years. He helped formulate my views about regulation and proper regulatory approaches."

When asked about his message to the next board administrator, Jim stated, "The only advice that I could give is to pay attention to details and never leave anyone with the impression that you don't care about their problems or concerns."

Jim leaves behind a legacy of reasoned decision-making and thoughtful collaboration with a myriad of stakeholders. A lifetime of curiosity helped Jim to become a kind of rare breed of regulator these days - the kind that doesn't make up their mind without a thorough investigation of available facts. Perhaps soon, Jim will be able to direct that curiosity towards more enjoyable endeavors.

"I have no specific post-retirement plans. Some morning, I will wake up and decide it is time to go fishing. Beyond that there is a lot of country just in Montana to visit and several geologic questions that I still would like to answer."



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Future-proofing your facility for EPA's methane rules



By Jeremy Sell, PE, Vice President, Air and Process Services, Trihydro Corporation



ON NOVEMBER 15, 2021, the U.S. Environmental Protection Agency (EPA) published proposed rules that establish additional new source performance standards (NSPS) and emissions guidelines for the crude oil and natural gas source category under the Clean Air Act (CAA). The proposed rule, entitled Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, is comprised of three parts (plus proposed Appendix K):

- Updates to OOOOa, primarily to conform with Congressional Review Act resolution
- 2) Proposed OOOOb
- 3) Proposed OOOOc
- Proposed Appendix K, focused on optical gas imaging (OGI) monitoring protocols and procedures

The November 2021 proposal did not contain specific regulatory text for OOOOb or OOOOc. EPA has indicated it will issue a supplemental proposal sometime in 2022 containing details on proposed requirements with regulation text. Industry commenters have noted concern that the compliance date of proposed OOOOb should not be established until actual rule language has been released but it is not clear how EPA will proceed with the date.

As the oil and gas industry awaits specific rule language, several actions can be taken in the near term to prepare for the anticipated OOOOb and OOOOc rules, which the EPA expects to finalize by the end of 2022.

OOOOb: Proposed standards for new, modified, and reconstructed sources after November 15, 2021

Under a new subpart called NSPS OOOOb, the EPA proposes to update the current requirements under CAA section 111(b) for methane and VOC emissions from affected sources that commenced construction, modification, or reconstruction after November 15, 2021. OOOOb includes standards for emission sources not regulated under NSPS OOOOa and is intended to address fugitive emissions from well sites and compressor stations, storage vessels, pneumatic controllers, reciprocating compressors, pneumatic pumps, and equipment leaks at natural gas processing plants.





Future-proofing your facility for NSPS OOOOb

 Keep track of new, modified, or reconstructed affected sources for which construction commenced after November 15, 2021.

Like all NSPS regulations, EPA proposed that the effective date to meet NSPS OOOOb requirements will be the proposed rule publication date (November 15, 2021). While it is possible EPA could establish a later effective date given the initial lack of regulatory language, it is conservative to use the currently proposed effective date as a basis. Therefore, facilities with the following features are advised to track new construction and potential modifications for which construction commenced after November 15, 2021:

- a. Oil and gas production well sites.
- b. Compressor stations.
- c. Storage vessels/batteries EPA proposes that the emissions threshold will apply to tank batteries (tanks that are manifolded together for liquid or vapor transfer), not individual tanks. Modification triggers may include additional wells or refracturing that increase tank throughput.

- d. Natural gas-driven pneumatic controllers – the proposed standard will apply to each individual new controller.
- e. Well liquids unloading while the final rule is not likely to impact already completed well liquids unloading activities, it could potentially require liquids unloading events immediately following final rule publication to meet the new standards. EPA has deemed each individual well liquids unloading event to be an affected source, meaning NSPS OOOOb requirements will apply to new unloading events at existing wells. The default requirement is proposed to be zero volatile organic compounds (VOC) and/or methane emissions.
- f. Centrifugal and reciprocating compressors, including horsepower ratings and blowdown/rod packing/wet or dry seal routing.
- g. Pneumatic pumps at natural gas processing plants and in the transmission and storage segment.
- h. Control devices, including inlet flow monitoring and pilot flame monitoring systems (or the ability to install once required).
- 2. Consider designs (where applicable) to

- capture and control blowdown emissions associated with pig launchers and receivers.
- Consider designs to capture vapors associated with tank truck loading activities (e.g., vapor balance systems) at new well pads.
- 4. Evaluate the ability to connect associated gas to a sales line (if not already planned), and if gases must be flared, verify that flares will meet NSPS Subpart 60.18 requirements.
- 5. Consider future-proofing facilities and budgets for complying with the proposed rules:
 - a. Can costs be distributed over multiple budget cycles?
 - b. Are there ways to future-proof the design of facilities not yet constructed or modified?
 - c. Can potentially affected facilities be modified in a more effective, costefficient way to achieve compliance?

OOOOc: Proposed emission guideline for sources constructed prior to November 15, 2021

Under a new subpart called emission guideline OOOOc, the EPA proposes the first nationwide emission guide-



line for states to limit methane pollution from certain existing facilities. Although the requirements are generally similar to OOOOb, emission guideline OOOOc does not impose requirements directly on sources. Instead, EPA mandates that states develop and implement regulations to meet this emission guideline. Under the proposed rule, states will be required to submit their regulatory program to the EPA for approval prior to implementation. In the backup documentation for the proposed OOOOc, EPA indicates that the agency does not expect industry to commence OOOOc expenditures until 2026, reflecting how long it may take for states to implement and obtain EPA approval of their OOOOc programs.

Future-proofing your facility for Emissions Guideline OOOOc

Since OOOOc will apply to existing facilities, operators should consider the same future-proofing concepts discussed above for OOOOb. Although OOOOc will likely include a period of time for operators to come into compliance, designing facilities to meet or readily retrofit equipment to meet these potential requirements may simplify future compliance actions. This also may include evaluating current operations and maintenance activities such

as equipment replacements to move in the direction of future compliance.

APPENDIX K: Optical gas imaging considerations

Requirements proposed under Appendix K intend to standardize a written protocol for OGI survey requirements and include standards for monitoring equipment, survey procedures, camera operator training, and recordkeeping. Although changes are expected in the final protocol, evaluating your OGI program for compliance with Appendix K as it is currently written may be prudent.

Future-proofing your facility for Appendix K

- 1. Track each OGI technician's classroom and field training activities
- 2. Track each OGI technician's monitoring events and monitoring hours
- Check current OGI equipment to confirm it meets the specifications in Section 6.1 of Appendix K and inquire about other required equipment sourcing
- Confirm you have a system in place to track OGI camera maintenance records
- Consider general personnel training level and if you currently have senior OGI camera operators (defined as "A

- camera operator who has conducted OGI surveys at a minimum of 500 sites over the entirety of their career, including at least 20 sites in the past 12 months, and has completed or developed the classroom camera operator training.")
- 6. Consider whether your existing data management approach can reasonably manage the additional data requirements included in proposed Appendix K. Trihydro's LeakTracker ProTM provides an alternative for your consideration.

As of press time, EPA has not released full regulatory text for OOOOb or OOOOc.

Trihydro Corporation has helped the petroleum industry tackle complex environmental and engineering challenges since 1984. Trihydro has been listed on Engineering News-Record's Top 200 Environmental Firms in the U.S. for 16 consecutive years and is recognized as one of America's Safest Companies by EHS Daily Advisor. Trihydro's team of 500 engineers, geologists, scientists, and regulatory specialists provides professional services to all 50 states, Puerto Rico, and several foreign countries.



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 - Yearly MPA planning meeting in Big Sky, Montana.
 - Bi-yearly premier MPA Legislators Brunch (averages 180 to 200 people).
- Associate member highlights in the monthly e-newsletter, "Heard It Through the Pipeline".
- Free 1/3-page ad in the membership directory.

For full details and Montana Petroleum Association associate membership levels, contact Bobbie Gardner at (406) 442-7582 or bobbie@montanapetroleum.org.

montanapetroleum.org

The value of coalitions: There is strength in numbers

By Peggy Trenk, Executive Director, Treasure State Resources Association

THERE'S AN OLD ADAGE in politics that suggests you "need to make your friends before you need them." That is often practiced in the election arena by identifying political candidates to support, with the hope they'll answer your phone call after the election.

The same theory can apply to advocacy work in general. Legislative and regulatory issues are often muti-faceted, impacting different industry sectors. They can also be messy and controversial, putting a spotlight on one company or industry without providing the necessary context to promote public understanding of what may be at stake if a certain action is taken.

In those situations, it's also helpful to have made "friends" who can step forward to demonstrate the impact on a broader section of the community and help you push back against unnecessarily restrictive laws or rules.

That's where coalitions play a role. Coalitions create structures for organizations and individual businesses to share common goals and offer strength in numbers to meet difficult challenges. They can be a source of power by either symbolizing the legitimacy of an issue or highlighting the threat it may pose. Because coalitions demonstrate that a proposed law or rule will impact multiple constituencies, it

makes it more difficult to single out any one industry without consequence. In summary, coalitions help you accomplish what you may not be able to achieve on your own or soften the "political" cost of going it alone.

Sometimes forming a coalition in the short term is necessary to battle a ballot measure or other challenge that is short term in nature. This temporary alliance may last only a few weeks or months. Collectively, the group might raise money, hire consultants, and wage a campaign. Participation is fluid, depending on whom the proposal affects. The threat ends, and then the parties go their separate ways. While important to addressing the matter at hand, these short-term collaborations don't necessarily translate into going working relationships.

That's why there is also value in participating in long-term coalitions with others from different industries, associations, and interests to be ready to tackle challenges yet unknown. To loosely quote civil rights activist Bernice Johnson Reagon, "Coalitions can provide the connections, knowledge exchange, and complementary resources that help achieve advocacy goals."

From a practical sense, coalitions can help members save money by sharing technical, political, and financial resources. For example, one member might bring specialized scientific knowledge and experience, while another offers legal







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expertise. Others may have close working relationships with key legislative or regulatory officials that help leverage the ability to make the case as to why a certain action should or shouldn't be taken. Time spent working together inherently builds knowledge about each other's priorities and concerns so a foundation is already in place before their help is needed.

There is a need to be thoughtful about how and with whom you participate in a coalition. Consensus in every issue area is not required, but members should share a clear purpose or objective. If the scope is too narrow, or requires members to give up their own identity or autonomy, it might not be for you. There are plenty of issues to work on together without compromising one's own self-interest. Again, the purpose of a coalition is to attain goals that individual companies or organizations might not be able to achieve by themselves, not try to tackle every issue that rears its head.

If participating in a coalition seems to make sense for you, look around your business and political circles to see if one already exists that meets your needs. Depending on the scope of your work and how much exposure you have to regulatory and political challenges, you may even want to participate in more than one coalition.

Or think about informally reaching out to colleagues, representatives of other organizations or industries, and even folks with whom you might not always agree. What issues collectively keep you up at night? Is it unreasonable, or unachievable environmental requirements that could limit your ability to do business in the future? Is it the potential for increased taxes that make your business less competitive? Where is there common ground to work together?

That is the foundation on which the coalition organization I represent has operated for more than 40 years. The Treasure State Resources Association (formerly WETA) started in 1976 when leaders from organized labor, industry, and agriculture sought to "provide people from all ways of life with the opportunity to enhance and improve their quality of life by providing practical and environmentally responsible approaches to the use and development of our natural resources." Today we continue to unite agriculture, organized labor, natural resource industries, utilities, transportation, business, and recreation interests as one collective voice on issues that touch our members. Over 20 other trade associations also belong. Our members appreciate the broad range of contacts and support they wouldn't otherwise have available. They understand the value of making friends early.

In conclusion, coalitions work. They do take some care and feeding, but when you find the right fit for your business or organization, participation will increase your political influence manyfold.



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The impacts of the oil and gas industry to the Montana economy

By Derek Sheehan, Economist, Bureau of Business and Economic Research, University of Montana

Derek Sheehan.

LIFE AND WORK IN the Treasure State require a substantial amount of energy. In 2019, Montana ranked 11th in total energy consumption per capita. Overall, the state owes this high ranking to large open spaces, low population, temperature extremes, and an economic base in energy-intensive industries, including mining, oil and natural gas production, oil refining, and agriculture. This demand for energy is fulfilled in large part by fossil fuels.

Montana is also a significant producer of oil and gas and therefore is influenced by global market conditions and prices. Over the past one and a half years, global crude oil prices have reached both the highs and the lows of the past decade. These dramatic swings have affected the activity of the oil and gas industry, as well as overall economic output and tax collections within the state.

This article highlights the current contribution of the oil and gas industry to the Montana economy. We find that in 2021, Montana's oil and gas extraction, processing, and manufacturing support 28,668 jobs in the state economy, \$1.7 billion in income received each year by Montana households, as well as over \$121 million in oil and gas production taxes paid annually to the state of Montana.

2021: Global Energy Disruptions

Energy prices exhibited substantial volatility sine 2020, starting with the reduced oil demand caused by COVID-19 in 2020 and the Russian invasion of Ukraine in February 2022. The snapback of global demand after the brief, but severe, declines in gasoline consumption at the onset of the pandemic, and the attempts to embargo Russian oil and gas combined to push up crude oil and natural gas prices dramati-

cally (Figure 1).

Western Texas Intermediate (WTI) crude oil prices have continued to rise from their unprecedented negative price in April of 2020, as shown in Figure 1. Since then prices have risen almost continuously. As of this writing, WTI crude oil prices sat at 114 dollars per barrel, a level not seen since August 2008. Given the expected continuation of high oil and natural gas prices combined with improved drilling efficiency, U.S. total fossil fuel production is expected to grow through 2023 (EIA 2022).

Tracking the Impacts of Oil and Gas Activity in Montana

Despite these global disruptions, the oil and gas industry continues to play an outsized role in the Montana economy. Specifically its footprint includes:

· Oil and gas production in Montana, in-

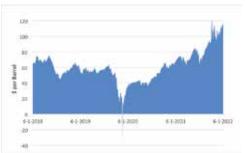


Figure 1: West Texas Intermediate (WTI) Spot Oil Prices, 2018-22. Source: U.S. Energy Information Administration.

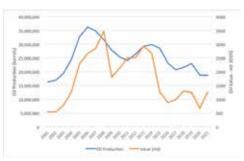


Figure 2: Montana Oil Production and Value, 2001-21. Source: U.S. Energy Information Administration.

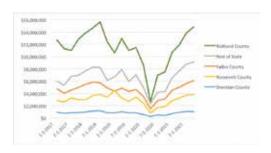


Figure 3: Quarterly Oil and Gas Production Tax Collections, Select Counties, 2017-21. Source: Montana Department of Revenue.

cluding both extraction and the drilling and completion of new wells, supports a broad spectrum of industry jobs as well as vendors and suppliers;

- The transportation of oil and gas at various stages of production, through pipeline, rail, trucks and other means, whether sourced from Montana wells or facilities or otherwise, provide services that support employment and the state and local tax base;
- The construction associated with expansions and maintenance of energy production, processing and transportation infrastructure are an essential economic activity that would not exist if it were not for the presence of the oil and gas industry in our state;
- The oil refineries in Billings, Laurel, and Black Eagle are highly capitalized, high value-added facilities that pay wages substantially above the state average;
- The services and intermediate goods provided by Montana-based facilities both within (e.g., mining services) and outside (e.g., food vendors, security services, equipment repair) the oil industry in support of oil and gas production in Montana, Wyoming, North Dakota, and elsewhere broaden the footprint of the oil and gas industry beyond production and transportation.

Additionally, oil and gas industry activity has an outsized influence on the economy as a whole because of the higher wages earned by industry workers. The 2020 annual average salary for oil and gas occupations in Montana was \$69,250, well above the Montana average of \$47,270. In fact, most occupations in the oil and gas industry continue to earn more than the Montana average, as shown in Table 1.

Ultimately, the contribution made by Montana's oil and gas activity to the state economy produces further impacts as the employment, wages, investment, and spending by companies and workers propagate through the rest of the economy. The total impact is estimated using an economic model that quantifies those

Table 1: Annual Salaries of Oil and Gas Occupations in Montana, 2020

Occupation	Average
Occupation	Annual Salary
Petroleum Engineers	\$131,200
Geological and Petroleum Technicians	\$60,690
Service Unit Operators, Oil, Gas, and Mining	\$65,020
Roustabouts, Oil and Gas	\$54,240
HelpersExtraction Workers	\$35,590
Petroleum Pump System Operators, Refinery Operators, and Gauger	s \$89,950
Pump Operators, Except Wellhead Pumpers	\$53,940
Wellhead Pumpers	\$65,020
Average Wage	\$69,250

Table 2: Montana Oil and Natural Gas Production, 2020

Source: U.S. Bureau of Labor Statistics

	OIL			GAS	
County	Oil (Barrels)	Percent of Total	County	Natural Gas (MMCF)	Percent of Total
Richland	8,088,284	43%	Phillips	7,431,425	33%
Fallon	3,097,934	17%	Fallon	5,088,296	23%
Roosevelt	2,535,139	14%	Blaine	2,948,411	13%
Powder River	2,386,788	13%	Hill	2,444,487	11%
Rest of State	2,629,356	14%	Rest of State	4,627,278	21%
Total Production	18,737,501	100%	Total Produc	ction22,539,897	100%
Est. Mkt Value*	\$622,272,408		Est. Mkt Val	ue*\$47,565,832	

Source: Montana Board of Oil and Gas, Energy Information Agency. *average domestic crude oil first purchase price (\$33.21) and 2020 Henry Hub natural gas spot price (\$2.11)

interactions.

Oil and Gas Production in Montana

Montana remains a significant producer of oil and gas in the United States, producing 18.7 million barrels of oil and 22 trillion cubic feet of natural gas. In 2021, 74 percent of the oil produced in the state was extracted in Richland, Fallon, and Roosevelt counties on the eastern border overlying the Bakken Shale. Montana's gas production is centered in north-central Montana, with Phillips, Blaine, and Hill counties accounting for 69 percent of statewide production, in 2021, as detailed in Table 2.

Oil production globally has witnessed a turbulent two years that is without precedent in post-war history. In the spring of 2020, mobility patterns were abruptly changed by the pandemic's stay-at-home orders. At its low point in mid-April, gasoline consumption was down by 46 percent nationally from year-ago levels, and remained depressed for much of the rest of the year. Demand then came back almost as abruptly, with consumption by the second half of 2021 rebounding to prepandemic levels.

Bakken production, including Montana, suffered a decline in 2020 that has not been made up as national demand for petroleum-based products has resumed. The less than 19,000,000 barrels of crude oil produced in Montana last year was the lowest state production level since 2002, as shown in Figure 2.

Montana's natural gas production has been gradually declining for more than a decade. While production was briefly interrupted in spring of 2020, for the whole

Table 3: Oil and Gas Production
Tax Collections, 2021

Tax Conceions, Lozi			
County	Production Tax	Percent of Total	
Richland	\$ 51,332,645	42.1%	
Fallon	\$ 21,208,280	17.4%	
Roosevelt	\$ 13,585,891	11.1%	
Powder	\$11,641,860	9.5%	
Sheridan	\$3,704,201	3.0%	
Wibaux	\$2,014,438	1.7%	
Dawson	\$2,784,899	2.3%	
Carbon	\$2,256,747	1.9%	
Rest of State	\$13,425,881	11.0%	
Total	\$121,954,842	100%	
Source: Monto	ana Department	of Revenue	

year, it was down only eight percent – less than declines in either 2016 and 2018.

At the time of this writing, strong global demand and the disruptions in supply related to the Russian invasion of Ukraine continue to put upward pressure on prices for both oil and natural gas. The prospects for Montana production have certainly improved, but no meaningful gains have yet materialized.

The Fiscal Impact of Oil and Gas Production

The ups and downs of the value of oil and gas production are reflected in state and county tax collections. In 2020, oil and gas production tax collections totaled just \$61 million. Just a year later, collections nearly doubled, exceeding pre-pandemic levels at about \$122 million. The top three producing counties accounted for 70.6 percent of total oil and gas revenue in 2021, as shown in Table 3.

On a quarterly basis, the volatility in oil and gas tax collections over the recent years is dramatic. As shown in Figure 3, the overall decline in the full year of 2020 was entirely due to the huge declines suffered in the first half If that year. During the second half of the year collections grew strongly. The surge in prices for both oil and natural gas has contributed to the growth in collections that continued into last year. Overall, the state of Montana in 2021 received \$122 millions in tax collec-

Table 4: Reported Federal Revenues, Montana 2021

Revenue Type	Oil and Gas Revenue	Percent of Total	
Royalties	\$ 1,365,935	96%	
Rents	\$212,358	1%	
Bonus	-	0%	
Other	\$673,188	3%	
Total	\$22,251,481	100%	
Source: Office	e of Natural Resour	ces Revenue	

tions in 2021, nearly returning to the \$127 million collected in 2018.

In addition to state revenues, oil and gas produced on Federal land in Montana are subject to royalties, rents, and bonuses. Federal revenues totaled \$22.3 million in 2021. Almost all of that revenue originates from royalties paid to the federal government, as shown in Table 4.

The Economic Contribution of Oil and Gas Activity in Montana

We consider the economic contribution of the oil and gas industry to the economy of the state as consisting of two components. The first is the spending, production, and employment of the industry itself. The second component comes about as that spending is received by Montana workers, businesses and governments, who re-spend a portion of what they receive in the state economy. Adding these two together gives a measure of how much the total economic pie is made bigger by the presence of the industry.

We adopt a narrow definition of the oil and gas industry, consisting of the following activities:

- (i) the production of oil and gas,
- (ii) the transportation of oil and gas,
- (iii) the operations of the state's four operating oil refineries in Billings, Laurel and Black Eagle.

Other activities, such as the wholesaling and retailing of refined petroleum products, or the mining services jobs in Montana that serve other states, are not included in this analysis. Thus, the estimates of oil and gas industry economic

Table 5: The Economic Impact of Oil and Gas Operations in Montana. 2021

Category	Units	Impact 2021
Total EmploymentJobs		28,668
Personal Income\$ Millions		1,677
Disposable Pers. Income	\$ Millions	1,442
Output	\$ Millions	11,937
Population	People	42,179
Source: BBER Analysis		

contribution presented here are conservative. Nonetheless, even with this restricted definition of the industry, the contribution are substantial.

The continued operation of the oil and gas industry in Montana is currently responsible for:

- 28,668 permanent, year-round jobs across a wide spectrum of industries, averaging \$59,600 in annual earnings;
- More than \$1.6 billion in annual income received by Montana househods, of which \$1.4 billion is after-tax income available for spending;
- Almost \$12 billion in annual economic output, defined as gross receipts of Montana business and non-business organizations:
- More than 42,000 additional people living in Montana, dominated by workingaged families and their children.

Conclusion

Oil and gas production, refining, and transportation play a prominent role in supporting the Montana economy. In a time of profound valiatility, the of the industry in Montana remain substantial. The oil and gas industry employs Montanans at higher than average wages, contributes considerably to local, state, and federal revenue, and supports many downstream Montana jobs and businesses.

References

EIA. 2022. "Short-Term Energy Outlook." June 7, 2022. https://www.eia.gov/outlooks/steo/. ■

MPA members connect to communities in many ways

THE MONTANA PETROLEUM ASSOCIATION and its member companies are connected to the state in many ways, some of which involves community involvement and workforce development. Companies modified their strategies and tactics during the pandemic and were successful in making a real difference.

Here are a few examples of what a few of our member companies are doing to make a difference in cities and towns in which they operate.

ENBRIDGE USES UM PROGRAM TO BOOST STEM EXPLORATION IN CENTRAL MONTANA SCHOOLS

In 2019 and 2020, Enbridge gave \$27,000 to spectrUM Discovery Area (Missoula) to build interest in STEM and STEM careers for students in central Montana. The students in six central of Montana's communities received a science kit specially designed and prepared for them. All the K-12 students in Lewistown, Harlowton, Stanford, Joliet, Ryegate, and Fromberg received a science kit. Many communities received enough kits to deliver to their preschool students as well. spectrUM packaged additional kits for each community so that teachers could use into the future or share with others. Additionally, they sent a "classroom STEM literacy" kit to each school, which can be shared among teachers. The feedback from schools has been extremely positive. Students were excited for the extension materials and noted the activities were fun and engaging.

All kits that were sent to central Montana communities were delivered in an Enbridge drawstring bag and came equipped with additional science toys, an Enbridge pencil, and information about a STEM role model and Enbridge employee Trina Salvisberg. Each of the 1,200 science kits included a printout of Trina's biography.

Teachers were grateful for additional hands-on STEM enrichment projects for their students. Many schools handed out kits for students to do on their own at home, and others did activities as a group in their classroom and libraries.

A few of the comments we received from schools include:

- "We appreciate the kits! The fifth-graders especially liked launching their flying spinners." Fromberg school librarian
- "Thank you for sharing science kits with our students it has been so helpful to share extension activities." Harlowton teacher
- "Enbridge is a great supporter in our area." Lewistown teacher
- "Science rocks!" Joliet school teacher





EMPLOYEE INVOLVMENT, CHARITABLE GIVING AT HEART OF CONOCOPHILLIPS EFFORTS

At ConocoPhillips, our SPIRIT values - Safety, People, Integrity, Responsibility, Innovation and Teamwork - inspire our actions. Being a good neighbor and building strong relationships in the communities where we live and operate is always a priority.

ConocoPhillips invests in local communities through charitable giving, employee volunteerism and sponsorships. The company also hosts Bakken Leadership Roundtables twice a year. The roundtables educate community leaders about ConocoPhillips, the benefits of our industry to their communities and to collaborate on issues important to them and their constituents. The attendees consist of asset leadership from ConocoPhillips and local government and civic leaders from operating counties.



In 2021, the ConocoPhillips Energy Scholarship at Bismarck State College was established to target the future workforce needs of the community by awarding scholarships to students pursuing careers in an energy program. This is the second year ConocoPhillips contributed \$25,000 for five student scholarships.



Additionally, ConocoPhillips hosted over 200 students in Grades 6 to 12 at a Bakken drone session at the local T4 (Tools Trades Torque Tech). T4 is a state-wide educational summit that introduces students to workforce skills, needs, training, and networking opportunities with industry leaders and technicians.



In March, the company contributed more than \$120,000 in grants to Bakken-area organizations. The grants support education, health and safety, natural resources, the arts, civic and social services, and disaster relief. These investments build on the company's 2021 contribution of \$100,000 to the Bakken Area Skills Center, a workforce training facility that will provide career and technical education training for high school students and incumbent workers throughout the Bakken.



ConocoPhillips offers various company volunteer opportunities throughout the year, where company ambassadors participate in community service projects. For example, employees volunteer in city cleanups and 'Pick Up the Patch' each spring.



This year, we will host our fifth annual ConocoPhillips Charity Golf Scramble in Dickinson. The scramble will benefit the Dickinson Area Community Foundation (DACF). DACF's mission is to improve the quality of life for residents through charitable giving and philanthropy to make lasting and beneficial investments. The 2021 scramble raised over \$90,000. Employees volunteer countless hours to make the tournament a success. They spend months leading up assisting with planning, helping host the event and taking the lead on post-tournament communications.



When I was young, I spent a lot of time outside. My experiences as a child helped bring science to life, and thanks to some really great mentorship from my high school math and physics teachers, I discovered an engineering career path.

I received a bachelor's of engineering from the University of Alberta and started with Enbridge as a pipeline engineer, moving all around western Canada and the Midwest. I moved to Montana two years ago and now am a Field Operations Supervisor. I am responsible for all aspects of the field operation and maintenance of our liquids pipeline system. All the knowledge acquired by my experience with pipeline engineering allows me to evaluate problems and make better decisions.

Science is amazing because it explains the fundamentals of the way the world works. Understanding these fundamentals give us a foundation to make decisions and develop opinions about just about everything. Most of all, science is fun because the best way to learn and understand is to do experiments and get our hands dirty!

Meet more inspiring role models at: www.spectrUM.umt.edu/education/rolemodels



"Growing up on a cattle farm, I absolutely loved spring time when there was a lot of running water through the corrals and ditches. I would spend hours using dirt, rocks, and sticks to dam up and re-route the water."



STEM AND WORKFORCE GO HAND-IN-HAND FOR EXXONMOBIL BILLINGS







Whenever conversations in Yellowstone County venture toward real-world workforce experiences, the topic of STEM and Exxon-Mobil are interrelated. That's because our world - and our future workforce opportunities. is deeply connected to science, technology, engineering, and math.

And the ExxonMobil Billings team is proud to be a part of it, whether we are judging a science fair project, coordinating a LEGO League team or removing the mystery about our industry at career fairs.

This spring, ExxonMobil employees stepped up to be a part of two career fairs in the Billings and Lockwood to inspire students as they prepared for the world of work. Promoting our two-year scholarships in the Process Plant Program at City College of MSU Billings, we urged students to think about operations as a career choice.

In addition, engineers, machinists, lab techs, and other professionals at the ExxonMobil Billings refinery are fully involved in STEM outreach and activities in a variety of ways. Most recently, the team provided encouragement and expertise to middle school students at Lockwood School District as four LEGO League teams were formed. The students used coding skills and collaborative problem-solving skills to take on a variety of robotics challenges and competed at a state competition in Bozeman.

In the community, ExxonMobil brings likeminded STEM en-



thusiasts work together to build capacity for students who are thirsty for more hands-on activities that are relevant to future

Partnering with other businesses, industry representatives, education professionals and non-profits, we support STEM Yellowstone, a unique program to engage kids in a hands-on and relevant fashion. Since 2015, that STEM project has provided influential events for more than 2,000 kids with nearly 100 volunteers from around the county.

Subject areas have included health, medicine, coding, computer science, technology, energy, engineering and environmental science. For us, it's not only fun, but it's a workforce development issue.

STEM Yellowstone partners have embraced the notion that work-based learning is in the eyes – and hands – of the beholder. Together, we know that passion can be found any time, any place... and yes, even outside of school hours.

Students are encouraged to be fearless while business/industry partners are urged to be bold in a new integrated approach to learning and training. The real-world application of math, chemistry, physics, engineering, and computer science has a major impact on feeding local workforce needs.

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