

Drillers turn to technology to corral well site noise

Dan Larson For The Tribune May 26, 2018 Share (13) Tweet Comments (0)

Drilling and completing an oil and natural gas well involves the simultaneous operation of dozens of motors, pumps, engines and special motorized equipment, all of which make noise.


Lately, the industry has made tremendous strides in reducing noise generated during the 24 hours of daily operation at a busy well site. There also have been remarkable advances in technology and in the techniques for corralling unwanted sound and isolating it from those living and working nearby.

Mitigating the noise produced during drilling and well completion involves much more than simply erecting the familiar beige sound walls around the well site. The science of acoustic engineering now includes specialized detector arrays that can paint an image of the sources of noise that travel farthest and generate the most complaints. And advances in sound barriers and noise absorption allow operators to reposition sound walls during different stages of well development for maximum noise mitigation.

To learn about the latest developments in this specialized segment of oilfield service, The Tribune contacted Donald Behrens, an engineer consulted by regulators and operators across the country for his expertise in noise mitigation.

Behrens, president of Environmental Noise Control of Hawthorne, Calif., is a registered environmental assessor with more than four decades experience as an engineer, manager and senior consultant in oil and natural gas development and environmental noise measurement and mitigation. His expertise in noise control has been applied in oil and gas developments across the U.S., in major construction and public works projects and on Hollywood movie sets.

Born in Brighton, Behrens' education and early career was as an oil and gas engineer and manager. While working as manager for Baker Oil Tools in Los Angeles in the mid-1980s, he started a project with Chevron to respond to noise complaints that targeted the oil company over its operations there.



"Once we dug into the issue, we realized the available environmental noise materials were designed for factories or interior spaces and not up to the task we were looking at," Behrens said.

"Until then, there was not a need for temporary or exterior-grade sound control," he said. "So, we began development of the acoustic blanket. We found a company in

Bakersfield that produced cotton bales using form-fitted PVC sheets as sleeves and asked them to produce sound barrier blankets using absorbent materials we specified."

Once perfected in the early 1990s, the acoustic blanket was soon in demand for use in oil and gas operations and in construction projects from California to Texas to Massachusetts.

When the Barnett Shale play in Texas turned hot in 2005, Behrens was called upon to demonstrate that noise from oil and gas development could be managed, even in dense urban areas.

"We were asked by the City of Fort Worth task force to study noise issues, and eventually they asked us to produce a demo project in 90 days," Behrens said. "Our noise-control project convinced them that noise could be taken off the table as a development issue."

Today, oil and gas noise mitigation makes up about two-thirds of his company's business, Behrens said. He added that the balance of his business comes from the construction and entertainment industries.

"Sound is sound is sound," Behrens observed. "Whether it's a public works project like the freeway tunnel under Boston Harbor, the New Orleans Jazz Fest or a movie studio, noise is universal."

Noise Studies

Behrens, whose company has an office in Longmont, was called upon three years ago to join a work group hosted by the Colorado Oil and Gas Conservation Commission to review the commission's noise regulations under Rule 802.

The group developed a preliminary report but was disbanded in late 2016 before formal recommendations could be presented.

Todd Hartman, director of communications at the Colorado Department of Natural Resources, said the work group produced a draft list of recommendations, but it was not finalized.

"The COGCC did not advance the issue to the rulemaking process as there remain technological challenges," Hartman said. However, the agency has seen the industry "take positive steps in implementing some of the recommendations, such as quiet fracturing fleets, discussed in the work group."

Also in 2016, a study of noise levels at oil and gas operations in Colorado was released by Cameron Radtke, a graduate student at Colorado State University. The study reviewed previous noise studies, including Behrens' work in Fort Worth, and gathered data at 23 oil and gas sites where drilling, completion or production was taking place.

Radtke's study concluded that well drilling and completion work at sites without sound walls generally exceeded the state's noise rules while those sites enclosed with

sound barriers exceeded residential noise levels but were borderline for exceeding levels in commercial zones during daytime and within noise regulations for industrial zones.

The conclusion noted that while oil and gas production sites, including those without noise mitigation, "do not exceed current COGCC noise regulations, it is recommended that additional measures are taken to further reduce sound levels at drilling and hydraulic fracturing sites."

In the meantime, Behrens' company, Environmental Noise Control, continues to work with several oil and gas operators in the DJ Basin, which includes Weld County, to design and build noise barriers tailored to the surroundings of an individual site.

"We can build something after the project is underway, but it is always smarter to bring us in during the design stage," Behrens said. "Before we even get started, we visit the site to gather data on ambient background sound from highways and other sources."

When first approaching a project, Behrens said it is important to differentiate sound from noise. Sound is what we hear when something like a loudspeaker or an engine vibrates and moves the air to create a pressure wave that bounces off our eardrums; that pressure wave can be measured. Noise is unwanted sound; we recognize noise when we hear it but it cannot be objectively measured because everyone perceives noise differently.

Weighted Scale

A normal conversation inside a room is sound that can be measured. About 3 feet from the speaker, that conversation would measure about 50 decibels. The decibel scale for sound goes from 0, the lowest sound we can hear, to 204, the sound of a Saturn V rocket and the loudest sound NASA ever recorded, according to the website [FiveThirtyEight](#).

Standing right next to a vacuum cleaner would register 75 decibels, while a snow blower is 85 and a table saw 105. Often, sound measurements are expressed as in an adjusted scale that reduces the weight given sounds at the very low and very high ends because people cannot hear at those frequencies.

It is such low-frequency sounds that cause the most problems for noise mitigation systems, Behrens said.

Low-frequency sounds can travel farther, he said. So, it is important to identify low-frequency sound sources and treat each one as either a sound to be mitigated or a mechanical issue or both. For example, Behrens said he helped one company that was the subject of repeated noise complaints during well drilling pinpoint a major noise source as the rig's shaker table.

"The rumbling of the shaker table was amplified by the holding tank underneath," Behrens said. "By decoupling the shaker table from the rig and the tank, the noise was greatly reduced."

Even with mechanical solutions, low-frequency noise mitigation remains a complex problem, Behrens said. Higher-frequency sounds can be blocked with dense layers of materials packed into sound walls. Low-frequency noise mitigation requires sound walls that are layered with dense materials for blocking sound waves and absorbent materials for low-frequency sounds.

Behrens said his company can provide standard sound walls up to 40 feet high, the tallest temporary sound barriers outside the movie business. Its latest specialized sound wall, the SK-8, is designed for low-frequency noise absorption and easily can be repositioned with a forklift as equipment comes and goes on the site.

Sound engineers now have access to specialized sound detectors that not only pinpoint where a noise may be coming from but its frequency and amplitude, key data points for determining the type of sound barrier needed and where it should be placed.

"The business of noise mitigation is like anything else," Behrens said. "Once the need for a solution is clear, someone will step up with the right product."

For communities along Colorado's Front Range, that's music to their ears.

How to file a complaint

The Colorado Oil and Gas Conservation Commission has established a clear, simple process for anyone to file a complaint related to oil and gas operations in the state.

The complaint process is "an important public action that helps identify and resolve issues," according to the agency.

Complaints must be in writing and can either be submitted in an email or on the COGCC website.

» Online: cogcc.state.co.us/complaints.html

» Email: dnr_cogcc.complaints@state.co.us

A complaint should include a detailed description of the issue; its location (street address, nearby intersection, or location name); and your contact information for follow-up. COGCC indicates that complaints may be submitted anonymously.

"The more information in a complaint, the more efficient and timely the COGCC can respond," the agency states.

Once filed, a complaint is investigated, the operator contacted and appropriate action taken. The person filing a complaint can follow the process online. The agency has an internal review process to verify the results and compare to a matrix of similar actions taken in the past. The person is formally notified once the complaint is resolved or otherwise closed.