



## Oil & Gas

# MTU SERIES 4000 GENERATOR SETS POWER NATURAL GAS DRILLING OPERATIONS IN OKLAHOMA

<b>Who</b>	Unit Drilling Company
<b>What</b>	MTU Series 4000 generator sets
<b>Where</b>	Granite Wash Oil Field, Oklahoma USA
<b>Why</b>	Durability, reliability and power

**With crude oil prices in constant fluctuation, the United States needs to be ready to produce more—and more affordable—energy sources to power electric utility plants, businesses and homes. Thanks to recent advances in horizontal drilling and hydrofracturing techniques, the country is well positioned to produce liquid natural gas and oil extracted from shale, sandstone and other underground rock formations.**

### **A leader in the field**

One such shale reserve rests 180 miles west of Oklahoma City: the Granite Wash Oil Field, a 160-mile by 30-mile swath of land rich in natural gas. At the site, you'll find Rig 306 of the Unit Drilling Company ready to operate around the clock. The 172-foot Rig 306 performs directional drilling and hydrofracturing to optimize well production.





Directional or horizontal drilling has been in use for more than 50 years. But it only recently became widely practical and cost-effective with the integration of more reliable steerable motors, semi-continuous underground surveying and diesel-powered electrical drilling packages capable of delivering the combination of torque, horsepower, reliability and field-serviceability the drilling technique requires.

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**Mike Almond**  
Corporate maintenance manager, Unit Drilling Company

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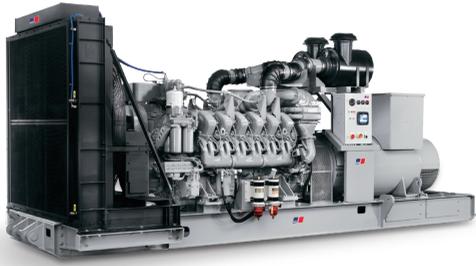
Mike Almond, Unit Drilling’s corporate maintenance manager, explains, “Oil plays are shallow and flat, but gas plays are deep and tougher to drill, and require the kind of power that the MTU engines deliver.” Unit owns 18 new MTU Series 4000 G73 generator sets, each incorporating the latest version of MTU’s 12V Series 4000 Tier 2-compliant engines. The engines can generate up to 1,105 kilowatts of electricity, enough to provide drilling and standby power for drilling operations to depths in excess of 20,000 feet—more than enough for Granite Wash. “Even though the engines only have about 4,000 hours on them now, we have no doubts about their durability in our fleet,” Almond says.

#### **New drilling techniques get the job done**

Like directional drilling, hydrofracturing (or fracking), has been used to complete and optimize vertical wells since the late 1940s but only recently has technology caught up with the process’s potential. Unlike conventional vertical wells, horizontally-drilled wells are well-suited to repeated fracking over their lifespan, making such wells more productive, durable and attractive to the energy companies who contract with drillers like Unit Drilling. Shale and other underground rock formation plays, including mammoth reservoirs like Bakken (North Dakota), Barnett (Texas) and Marcellus (Mid-Atlantic United States) all rely on horizontally drilled, hydrofractured wells for maximum gas and oil production, and indeed would likely not even be in use if not for these updated production techniques.

Refinements to both of these processes, ranging from better electronic controls to more powerful engines, make shale oil and gas drilling practical. When crude oil prices hit a certain level, shale oil and gas becomes worthwhile financially—extremely so in the case of electricity producers, the nation’s biggest consumer of natural gas. This leads to new discoveries of reservoirs and more drilling rigs built to capitalize on them. For example, the United States Geological Survey (USGS) has updated its estimates of shale oil contained in one place alone— the Piceance Basin of Colorado— to 1.5 trillion barrels, an amount exceeding the proven reserves of conventional (non-shale-derived) oil in the Middle East.

The boom could continue for years, based on both the list of reservoirs that have been discovered to date and the growing number of drilling rigs being erected to capitalize on them. For example, the United States Geological Survey (USGS) recently updated its estimates of shale oil contained in one play alone— the Piceance Basin of Colorado— to 1.5 trillion barrels, an amount exceeding the proven reserves of conventional (non-shale-derived) oil in the Middle East.



### Performing at high standards

Granite Wash, home to about 2,600 wells and counting, holds massive supplies of gas and oil and is considered one of the biggest current plays in the country, out-producing experts' estimates since its first horizontal well opened in 2010.

MTU engines are up for the task. Rig 306 manager James Hinnenkamp says, "The MTU engines don't care what we're drilling. We're going straight down about two miles and when we can't push any further, hanging a right. We'll be down about 12,000 feet and it'll take us about three to four days to make that turn, and then drill another 5,000 feet. As far as the MTU engines go, so far, so good."

With more than 30 years in drilling, Hinnenkamp has witnessed the tumultuous evolution of the oil business and the steady progress of the equipment used to get oil and gas out of the ground. He says, "It's early yet, but the MTUs are working fine. They're powerful, and (MTU distributor) United Engines gives us great support when we need it." That's no small praise from Hinnenkamp, who confesses to being "old-fashioned" in his preference for the simpler, albeit more labor-intensive drilling gear from days gone by. Keith McAlister, the assistant manager at Unit Drilling's Oklahoma City engine shop, says, "For a driller, reliability is paramount. The engines are the key to generating power for every drilling activity. In a business with as many ups and downs as the oil and gas industry, drillers need to be

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MTU Series 4000 G73 generator sets combine industry-leading reliability with extreme power and extended maintenance intervals.

able to count on engine performance 24/7. We've had competitive engines run up to 65,000 hours on rigs and we expect the same of the MTUs."

He explains that the distances between Unit's Oklahoma City headquarters and the dozens of rigs the company operates in remote locations all over the midsection of the United States can be a long drive for repair mechanics. That's one reason why Unit demands that preventive maintenance tasks such as oil and filter changes, and occasional field repairs be easy to perform onsite. "You can imagine how frustrating and expensive it would be for us to have to send mechanics out to some of our very remote rigs for simple repairs and maintenance, or repeated engine failures," he says.

### A rock solid solution

If MTU generator sets were not so durable and easy to maintain, in addition to being fuel efficient and outright powerful, drilling at Rig 306 could not proceed as planned. The operation works countless hours driving through thousands of feet of soil and rock. The generator sets must have the power to perform as expected with no questions asked, no matter how demanding the work. Engineered for solid, steady performance, MTU generator sets are more than ready.

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Rolls-Royce provides world-class power solutions and complete lifecycle support under our product and solution brand *MTU*. Through digitalization and electrification, we strive to develop drive and power generation solutions that are even cleaner and smarter and thus provide answers to the challenges posed by the rapidly growing societal demands for energy and mobility. We deliver and

service comprehensive, powerful and reliable systems, based on both gas and diesel engines, as well as electrified hybrid systems. These clean and technologically advanced solutions serve our customers in the marine and infrastructure sectors worldwide.