

# Big E Drilling repowers two of its land drilling rigs

**A RIG REPOWER INVESTMENT** by a Texas drilling contractor is expected to pay off both immediately and in the longer term.

In late 1999, when **Lyle Eastham**, Executive Vice President, **Big E Drilling**, Bellaire, Tex, decided to repower two of his company's land-based drilling rigs, almost no one in the business was buying engines.

"Day rates were low," recalls Mr Eastham. "The market was just starting to get better." Eastham's confidence in the market and his ability to secure attractive financing convinced him to go forward.

Today, Big E's mechanical-drive Rig 1 and SCR Rig 2 operate with new **Caterpillar** Cat 3500 Family diesel engines, achieving fuel savings that Mr Eastham estimates at 10-20% over the previous engines, while delivering more power and nearly 100% uptime.

Mr Eastham believes the decision to repower has paid off both for the immediate future and for the long term. Currently, rig demand is high and he said "virtually any serviceable rig is attractive to the customers. That's driving day rates up, and our rigs are booked all through next year.

"But that's not going to be forever. There will come a time when the market gets tighter, and that's when the new power we have on those rigs will give us a competitive advantage."

## A CAREFUL DECISION

Big E Drilling bucked an industry trend to repower the company's two oldest rigs, but the decision was not made in haste. The company is built on a history of careful, planned growth.

Big E Drilling started in 1980 with the purchase and refurbishment of Rig 1, a mechanical rig with a 1,000-hp drawworks, 750,000-lb static hook load, and 14,000-ft maximum depth.

The next year, the company ordered Rig 2, a new SCR unit, also with a 1,000-hp drawworks but with 850,000-lb hook load and a 15,000-ft rating.

When the market collapsed in the early 1980s, the company put its rigs into stor-

age and cancelled an earlier order for another, paying heavy fees for doing so. But Big E kept its key employees on board and began to bounce back with an investment in Rig 3, a **Brewster** TR 800 trailer-mounted rig.

Big E resumed operations in early 1987, breaking out Rig 3 for **Exxon** and drilling two dozen wells at a day rate of roughly \$3,500.

"At that rate, the cost of operating the rig was more than the revenue it produced," said Mr Eastham. "We quickly learned that the day rate was not the way to make any kind of money, so we moved into the turnkey market."



The new diesel engines on Big E Drilling Co's Rig No 1 provide 210 additional horsepower while burning 10-20% less fuel.

Soon afterward, Big E moved Rig 2 and Rig 1 into the field and added new staff.

It is now a five-rig company with nearly \$15 million in revenue for fiscal 1999-2000.

The company employs more than 100, including field and office personnel. Rig 6, another 1,000-hp SCR rig, is under construction and will be put into service in June.

Rig utilization has hardly ever dipped below 90% in the last 13 to 14 years, according to Mr Eastham.

## PROOF IN OPERATION

The newest unit, Rig 5, is a 1,500-hp SCR rig with 20,000-ft depth rating, currently drilling deep gas wells in east Texas for **Anadarko Petroleum Corp.**

Built new but with rebuilt components, Rig 5 is a **Continental Emsco** C-1 Type II featuring a Continental Emsco CRLR 142-ft mast with 1.2 million-lb capacity.

The rig, completed in April 2000, is powered by three 12-cylinder Cat 3512 diesel engines coupled to 1,050 kW generators.

The operating performance and fuel efficiency of Rig 5 helped convince Big E to repower Rig 1 and Rig 2 with Cat 3500 Series engines.

"When we finally put the rig out, after the first two months of operation and financial evaluation, we saw basically that Rig 5, which is a 1,500-hp rig, was burning the same or less fuel than our Rig 2, which is a 1,000-hp rig," said Mr Eastham. That caused Mr Eastham to start thinking about repowering Rig 2.

## THE CASE FOR REPOWER

Cat 3500 engines are common replacements for the Caterpillar 6.25-in. bore D379, D398 and D399 diesels found on many drilling rigs. The 3500s deliver greater horsepower while having the same centerlines and essentially the same footprint as the 6.25-in. bore family, making repowers simple and cost effective.

Big E's Rig 2 had three D398 engines on board. Big E replaced them with three 3512 engines coupled to 910 kW generators.

The company saw that the resulting increase in horsepower would mean the rig could operate on one generator set, or at most two under difficult conditions, leaving at least one unit for standby.

"That's an extremely attractive feature of the rig," said Mr Eastham.

"We also looked at the cost of overhauls coming due. One of the 398s needed an overhaul in the next several months, and the other two definitely needed top-end jobs.

We were looking at \$150,000 we were going to spend on those engines.”

In addition, keeping the rig in service during the overhauls would have meant buying another D398 for roughly \$100,000.

On that basis, Big E decided to proceed with the repower and to purchase new generators instead of reusing the existing units.

Once the equipment was delivered, Big E staff spent a month doing preparatory work while the rig remained in service. The actual replacement was performed during a rig move, requiring only one additional day.

Repower for Rig 1 had not been in the company's plans. However, it was going



**Big E's Rig No 5 is a 1,500-hp SCR unit with a 20,000-ft depth rating and new engines.**

to be necessary to overhaul one of the two 379 engines on the floor of Rig 1, and **Mustang Power Systems**, the local Caterpillar dealer, had 3508 diesels in stock.

So Big E again devised a way to get the most out of its engines. The two 379s from the floor of Rig 1 went to an upgraded generator house built on the mechanical Rig 4, boosting power output from a total of 600 kW to 800 kW.

The 398 engines from Rig 2 will be overhauled as needed, then installed on the new Rig 6 as primary power.

The new 3508 engines on Rig 1 deliver 760 hp apiece, an increase of 210 hp per unit. “We have seen the benefit of having more horsepower on Rig 1's floor, and there's definitely more fuel efficiency,” said Mr Eastham.

Again, the engine replacement required only one additional day on a rig move.

An added advantage of the repower is an immediate reduction in maintenance, repairs and downtime.

“We are barely going to have to touch those new engines for two or three years,” according to Mr Eastham.

Eastham has not yet calculated the fuel savings from the repowered Rig 1 and Rig 2, but he estimates the savings at 10 to 20%. He expects to monitor Rig 2 fuel consumption for six months, then quantify the fuel efficiency improvement.

## **THINKING LONG TERM**

Big E decided to repower with the company's long-term future in mind. Just before repowering Rig 1, the company's contract with Anadarko changed, such that the customer—not Big E—would pay for the fuel.

“It was right before we put the two new floor engines on the rig,” said Mr Eastham. “I could have reneged on putting in

those two engines. I could have said, ‘It doesn't matter any longer how much fuel they burn.’ But I didn't see it that way. And Anadarko appreciates our efforts and the savings they will see from the work.

“We bought a new string of drill pipe and two new engines for that rig at the same time, at a total cost of \$700,000.

And that shows Anadarko that we're committed to refurbishing our rigs and providing good equipment.”

Likewise, Rig 2 is drilling for **Cross Timbers Oil Co**, which is pleased about the repower. “Cross Timbers is happy to see a contractor adding value to a rig, particularly with day rates going up,” said Mr Eastham.

The repowered rigs bode well for Big E's future, especially in market downturns.

“When prices take a turn south and the market isn't as tight as it is now, and we're bidding against another rig that has old 399s or 398s on it, you can bet we'll be in a strong position,” said Mr Eastham. ■