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Heavy Oil Project Starts To See Results

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VANCOUVER, BRITISH COLUMBIA—These are exciting days at the LAK Ranch, an 8,000-acre site along Interstate 16 in northeastern Wyoming.

A project that has been several decades in the making is finally coming on line. George Eynon, a director for Derek Oil & Gas Corporation, says the Canadian company began putting steam into a 12-well pattern of four injectors and eight producing wells on a 15-acre portion of the LAK Ranch in mid-July. If all goes according to plan, Eynon says in all likelihood Derek will drill another 180 wells over the next 18 months.

"We hope we will produce for a couple months and learn a lot about where the steam is going in the reservoir," says Eynon, who also is the vice president of business development and external relations for the Canadian Energy Research Institute and a former president of the Canadian Society of Petroleum Geologists. "Then we will design a rolling development of the area."

Although reluctant to put a firm number on the potential of the entire 8,000-acre property, Eynon contends Derek will be able to produce 40-50 barrels a day per well. "With eight producers, we can make 400-500 bbl/d," he says. "There is the potential to produce a lot of oil, especially for a little company like ours."

Earlier projections had placed the remaining oil in-place for the LAK Ranch Field at tens of millions of barrels with a wide-ranging predicted recovery rate of 30-70 percent.

Derek Oil & Gas is using steamflood technology, along with 3-D seismic testing, in this enhanced oil recovery from the shallow reservoir underlying the LAK Ranch property, which is located only

five miles from a refinery in Newcastle, Wy. It has taken a long time to get to this point, but Eynon says Derek has done the research, built the confidence and assembled the required expertise to make this project a major success.

Long Time Coming

Prospectors began drilling for oil in this region in the eastern portion of the Powder River Basin in the 1920s, but never had much success because of the viscosity of the oil. A number of major companies, including Texaco and Conoco, drilled around 20 wells on the property in the 1940s and '50s, but managed to produce only one or two barrels a day.

Derek invested \$9.5 million to construct a pilot plant, including a pair of horizontal wells, and had a successful production test of 5,300 barrels in 2001-02. The above-ground facility was engineered by Bateman's Engineering Inc. and includes a 27 million Btu generator

that is capable of producing enough steam to move in excess of 700 barrels of oil a day.

After the project was delayed by litigation, Derek signed a joint venture agreement with Ivanhoe Energy in January 2004. Ivanhoe pledged \$5 million to finance the capital cost of the pilot phase. Ivanhoe's endeavors were invaluable as Derek learned that the viscous oil could be moved to surface economically using steam. More recently, the Derek team managed to purchase its former partner's interest for a very well negotiated price and has regained operatorship of the LAK Ranch property.

The test site a year ago consisted of three vertical injector wells, one vertical temperature-observation well, and two horizontal wells: one that was producing and the other that carried a fiber optic cable, which measured the temperature in the reservoir. The wells were drilled to only 1,200 feet in the Newcastle Sandstone with a 40- to 70-foot pay zone.



From left, Derek Oil & Gas Corp. investor Gerry Nel, President and Chief Executive Officer Barry Ehrl, and Director Dr. Eike Hamer test some of the first oil from the LAK Ranch heavy-oil steamflood project in northeastern Wyoming.



The drilling crew works on one of 12 wells—four injectors and eight producers—Derek Oil & Gas drilled this spring in the initial phase of its LAK Ranch heavy-oil steamflood project.

“We got a year’s worth of production out of the well,” notes Eynon, adding that a 3-D seismic survey also was conducted. “The seismic is fabulous. The definition is very good. It is the best million bucks we have spent.”

Derek’s \$1.1 million, high-definition 3-D seismic survey was completed over 2,880 acres (4.5 square miles) of the 8,000-plus-acre LAK Ranch property. In the past year, however, Derek bought out Ivanhoe and decided to drill a 12-well pattern of vertical wells instead of continuing to use horizontal wells.

“We learned a lot,” claims Randy Metz, a geologist with Pacific Geotechnical Associates Inc. in Bakersfield, Ca., who is serving as a consultant on the project. “We were making oil at a paying rate, but not as much as we originally thought. We were producing an average of 40-60 bbl/d (from the horizontal well) when it was being steamed on a regular basis.”

12-Well Pattern

However, Metz explains that the oil-bearing sands in the reservoir are very compartmentalized. “I think people knew that early on, but they hoped horizontal drilling would be effective,” he says. “The ideal is to have a clear path from the injector to the producers, with the producers surrounded by injectors. You want the effect of steam having influence on the oil.”

He adds that Derek learned that when it put steam in the vertical injector, oil production increased immediately, indicating a good connection. “We saw the heat in the producing well,” Metz comments, explaining that with the fiber optic line, Derek

could tell when the heat was coming into the producer well bore, although the heat was coming in at the heel of the lateral and the rest of the lateral was pretty cool.

Because of that and the results of the 3-D seismic, which identified the channels in the oil-bearing sand, Metz says Derek decided to drill 12 vertical wells. The 12-well pattern of four injectors and eight producers totaled 13,540 feet. Metz says Derek finished drilling, casing and cementing all 12 wells in May, and then completed upgrades and servicing the steam generator in July.

“We are very excited,” Metz continues.

He says Derek expects a rapid response if the vertical wells act the same as the horizontal well, as is anticipated. Not only is the company putting steam into the four vertical injectors, but it also will continue to put steam in the injector along the lateral, Metz says.

He notes that instead of traditional rod pumps, Derek put progressing cavity pumps in the producers with automated temperature sensors in them. “Heat maintenance is critical because steam is the biggest cost we have,” Metz reflects. “We hope to put 125 barrels of steam a day into each injector.”

Metz says there are approximately 250 feet between the injector and producer wells in a pattern that was dictated by geology. There are four acres in



The LAK Ranch steam plant includes a 27 million Btu generator capable of moving more than 700 barrels of oil a day. The plant is highly automated so that it requires only minimal staff.



each square. “We knew how wide the channel was, thanks to the 3-D seismic survey.”

Eynon adds that the seismic survey showed that the Newcastle Sandstone is not a single blanket of sand containing oil, but instead is a reservoir with minor breaks or fractures at varying depths.

State Of The Art

The LAK RANCH project also is unique, according to Metz, who says he is aware of only two other thermal projects in the Powder River Basin. “We know the heavy oil (20 degrees API) found in the Newcastle zone responds well to heat.

It is like molasses,” he observes. “The more heat you put to it, the better it runs.”

While Derek has switched its plans from using horizontal producers to a 12-well vertical pattern, everything else about the state-of-the-art facility remains the same. The 27 MMBtu steam generator and plant are highly automated. Each valve can be turned on and off by an electro-pneumatic computer system, allowing the entire plant to be run with minimal staff. Water produced from the steam will be reinjected in a disposal well.

“The neat part is that oil prices have allowed us to do something with tertiary recovery,” Eynon comments. “We couldn’t

have done it 10 years ago. We have strong technical people, and we have hired a first-class general contractor. This area has been looked at for 20-40 years. A combination of new technology, higher oil prices, and a demand for product has made this project possible. Of course, having a refinery just four or five miles away is a plus, too. We may build a pipeline to the refinery in the future.”

Eynon says the Newcastle refinery has a capacity of 18,000 bbl/d, but is currently running only about 14,000 bbl/d, so it can handle additional oil from the LAK Ranch project. □