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New technologies go commerical as ConocoPhillips Canada starts ramping up Surmont 2

Two emerging technologies are taking a big step forward along with completion of the biggest SAGD phase ever built, and operator ConocoPhillips Canada (CPC) says that meaningful cost savings on energy use will come as a result.

If everything goes to plan, the massive 118,000-bbl/d Surmont 2 project will rocket CPC's total SAGD volumes to the top of its peer group. The project, which achieved first steam in June and first oil in September, is expected to reach capacity through 2017. Add those barrels to about 30,000 bbls/d from Surmont 1 and non-operated volumes of about 150,000 bbls/d from Foster Creek and Christina Lake (which are also expected to grow through the period) and CPC's SAGD portfolio will approach 300,000 bbls/d.

"Surmont 2 is just a giant step forward in terms of our production. It's pretty exciting to have this big a portfolio in oilsands," says Kate Easton, who currently serves as CPC's director of Canada's Oil Sands Innovation Alliance (COSIA), and has spent years working on the development of Surmont 2.

"It's always a difficult decision to decide what size you go with. Our project teams evaluated several options and they decided that going big was what we wanted to do this time," she says.

But Easton's excitement about Surmont 2, which CPC shares 50/50 with Total E&P Canada, is not about its size. It's about the technology, including systems that will see their first broad application in the oilsands.

VACUUM INSULATED TUBING AND FLOW CONTROL DEVICES

Seven years ago at Surmont 1, CPC started testing the viability of vacuum insulated tubing (VIT) as a way to use heat more efficiently as it travels from the plant through the pad to the reservoir. The results were clearly encouraging, since VIT is a core feature of Surmont 2.

"We are using vacuum insulated tubing in all of our injector wells," Easton says. "It's basically insulating the steam pipe as it goes into the ground so there is no heat lost. The steam all reaches the reservoir with as much heat as possible."

Typically, operators generate 80 per cent steam in oncethrough steam generators or drum boilers. The hot water portion is stripped out and then the pure steam is transported up to five kilometres in insulated pipes to the wellhead.

As the steam travels down to the reservoir, it can encounter various cooling factors, including water-saturated formations that suck away more heat. By the time the steam reaches the toe of the well, it can be mostly hot water, carrying little ability to form a steam chamber and leaving reserves at the end of the well largely untapped.

"[VIT acts] like a vacuum-sealed Thermos," Eric Klotz, business development manager for VIT manufacturer ANDMIR Group Canada told *Oilsands Review* last fall.

The technology was initially created by GE and used to protect permafrost in Alaska from melting around hot pipe applications in oil and gas. It has also been used widely in the Liahoe heavy oil field in Inner Mongolia. Surmont 2 will be its widest commercial application in the oilsands.

Also capitalizing from past testing at Surmont 1, CPC has opted to include flow control devices on its SAGD wells. Easton expects the devices will, like VIT, help with energy efficiency and the corresponding costs.

According to TOP Analysis, flow control devices are designed to promote a more uniform distribution of steam along the injection well and fluid draw-down to the production well. They are also often utilized as a way of ensuring pump longevity by reducing the likelihood of steam interaction with artificial lift. In the past few years, TOP says it has become more common to include technology that hydraulically isolates various regions of the wellbore to ensure a more even distribution of injected steam or produced fluid.

Easton explains that, "In the reservoir, it's not all the same. Sometimes it is really easy to get the steam in and sometimes it is really hard. We put flow control devices in the well, and it helps distribute the steam evenly so that we can most efficiently recover the oil and use the steam energy."

Easton says that flow control devices have been installed in about 30 per cent of the wells at Surmont 2.

Both VIT and flow control devices come at a premium to conventional SAGD development, but she says that the benefit will come over the longer term.

"They have a capital cost to install them; they cost more than just doing a regular well, but we've done the homework and we believe that the energy savings should be worth the cost."

Surmont 2 is born from lessons in the south athabasca (http://www.oilsandsreview.com/index.php/component/search/?searchword=athabasca&searchphrase=all&Itemid=101) region that began in the late 1990s with the Surmont SAGD pilot, seen here. Operated by ConocoPhillips' predecessor Gulf Canada, Surmont tested SAGD in gas-over-bitumen zones. Photo: ConocoPhillips Canada.

HARNESSING THE GAS-OVERBITUMEN ISSUE

That CPC is tweaking the SAGD process at Surmont 2 is not surprising, especially since it has been recognized since the days of the Alberta Oil Sands Technology and

Research Authority (AOSTRA) that SAGD as originally envisioned simply would not work on the Surmont leases. The main issue: overlying natural gas in places in contact with bitumen. This creates what is known as "thief zones" that could fatally interrupt steam chamber development.

In the mid-1990s, oilsands and natural gas resource owners argued, at times bitterly, about which asset should take development priority in gas-over-bitumen areas. After years of technical review and regulatory hearings, the Alberta regulator issued two decisions, in 2004 and 2005 respectively, that ultimately shut-in gas production in 900 wells in the oilsands.

Meanwhile, CPC and its predecessor company, Gulf Canada, had been progressively testing SAGD production at Surmont, first through a pilot starting in 1997 and then through Surmont 1, which opened in 2007.

The Alberta Department of Energy's 2010 technical audit report on gas-over-bitumen described the success of CPC's operations.

"The Surmont pilot project has been operating since July 1997 and has advanced its findings regarding operating SAGD in a resource with bitumen in contact with top water and a depleted associated gas cap; so much so that ConocoPhillips is operating its commercial project and has filed a 125,000-bbl/d expansion application," reads the report.

"The key conclusion to date demonstrates that successful SAGD performance requires operations to balance the steam chamber pressure with the thief zone pressure. This results in the need to design operations with three stages of steam chamber pressures."

Essentially, SAGD starts at higher pressures using gas lift. Steam pressures are then progressively reduced and mechanical lift is introduced in order to minimize steam to oil ratios.

"[Gas-over-bitumen] is always going to be an issue, but we've learned how to manage it and how to produce the bitumen effectively. Later, we can produce the gas," Easton says.

THE NEXT STEPS

ConocoPhillips may be in the middle of divesting a series of assets in western Canada, but the oilsands is not part of that package. The company had put pieces of its oilsands portfolio on the auction block a couple of years ago, but then reportedly pulled back because it was able to raise funds by selling other properties globally.

Surmont 2 is one of seven major projects around the world that ConocoPhillips expects to complete this year—the company characterizes the oilsands as part of the long-term, low-decline portion of its asset base that is a stable source of funding to sustain its dividend. In an October investment presentation, ConocoPhillips highlighted debottlenecking and optimization studies are currently underway at its oilsands projects. At Surmont 2, Easton says that the main priority right now is reaching its 118,000-bbl/d nameplate.

"Right now, the focus at Surmont 2 is safely ramping up to full production and there's a lot of work going into that. That is very exciting and very challenging," she says. "Surmont 2 is really a long-term asset for the company and we expect it to provide value over the next 50 years. In that context, it's really important that we ramp up our production and we continue to look for ways to improve our efficiency and reduce our costs."

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