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ON **TIME** ON **BUDGET**

HOW **8** MEGAPROJECTS BUCKED THE TREND



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ON TIME ON BUDGET

HOW **8** MEGAPROJECTS BUCKED THE TREND

By *Melanie Collison*

After years of sporadic and often disappointing project delivery performance, a number of oilsands producers are executing on time and on budget by sharpening their own engineering, procurement and construction (EPC) tools.

The oilsands sector has a reputation for projects being completed late and over budget. However, Tom Mansfield, a senior director in the province's Economic Development and Innovation Department, says we could now be starting to see the results of better planning that began years ago.

Oilsands Review has compiled a list of eight major oilsands projects

that have been completed in the last three years on time and at or under the projected cost estimate.

"Industry has been working hard at getting better," Mansfield says. "Maybe it's been turning this whole time—but a ship doesn't turn on a dime. If it is the case that the messages rumbling through the industry are starting to take effect, then that's good."

While there has been recent success in project delivery, there have also been overruns—including for owners on our good news list. This includes the first phase of Imperial Oil's Kearl mine, which in 2013 came in at \$12.9 billion versus the original budget of \$8 billion. Suncor Energy came in

under budget at the fourth phase of the Firebag SAGD project, but was not so successful with the third. Firebag Stage 3 was completed in 2011 at a capital cost of \$4.4 billion versus the original \$3.6-billion budget.

There's also the Sturgeon Refinery, which is currently under construction and now expected to cost \$8.5 billion instead of the earlier budget of \$5.7 billion. And the final numbers have yet to come in, but all expectations are that Husky Energy will take a hit on the recently completed \$2.7-billion Sunrise SAGD project.

These figures aside, there are unquestionably recent major projects that have ticked the boxes

for delivery performance. The low price environment is also expected to keep inflation at bay for the approximately 900,000 bbls/d of new capacity that remains under construction.

STRATEGIES FOR SUCCESS

What works for oilsands project execution? Mansfield says:

- Implementing best practices, especially those that apply to construction productivity;
- Thorough front-end engineering and design (FEED) planning—the opposite of fast-tracking, where decisions are made on the fly;
- Supply chain collaboration that aligns partners, spurning



SYNCRUDE MILDRED LAKE MINE TRAIN REPLACEMENT

● **START-UP:** Q4/2014

Two mine trains, which first began operating in 1996, were fully dismantled and replaced. Canadian Oil Sands says the newly constructed mine trains are expected to increase processing capacity, improve reliability and reduce maintenance costs. The project was completed at a total cost of \$3.8 billion, a savings of \$400 million relative to the original budget of \$4.2 billion.

the traditional “three bids and a buy” that can trigger unexpected costs;

- Recognizing that productivity is as significant as safety in terms of the impact it can have on a company’s success; and
- Honing repeatability to avoid doing the extra planning and design work of a custom process.

CANADIAN NATURAL RESOURCES: KIRBY AND HORIZON 2A

Réal Doucet, senior vice-president, Horizon projects with Canadian Natural Resources, attributes some of the execution success the company is having to innovative crane operations.

Taking advantage of advances in crane technology, Horizon expansion projects are modularizing everything and using a supercrane.

“A big crane is expensive, but the focus and controlled

environment mean not only is it an easier job, but a lot more contractors can qualify to do this job—maybe 50 contractors instead of four or five,” Doucet says.

“More competition means better prices. You can control the job better. You have better access to all your people. It changes the dynamic of the job entirely.”

After using a large EPC contractor on Phase 1 of the Horizon mining and upgrading project, Canadian Natural has taken the Phase 2/3 expansion entirely in-house.

“We will not give away our ability to manage the outcome of the expenditure,” Doucet says. “We manage each step; we manage each sub-element of the contract. We have an engineering firm and most of the time we lead the engineering development. We will involve the construction contractor, and we will coordinate several contractors. We are the general contractor.”

Canadian Natural has also broken its expansion into several pieces that Doucet says are more manageable.

“The coker project, at \$300 million to \$400 million, is one among 25 or 30 pieces, so the overall site ends up in billions of dollars.”

He explains that the company doesn’t consider each piece to be a huge project, except in terms of logistics such as flying in workers and road access.

“Each manager has a team and manages the project like they’re totally accountable, and they have the support they need to complete it. The focus on schedule and cost is much, much stronger that way.”

Canadian Natural also recently completed its first foray into Athabasca SAGD at Kirby South and did it on time and on budget. Terry Jocksch, senior vice-president, thermal, says that

having more than one contractor gave the company added cost-saving flexibility.

“It gives us some backup. If one part is ahead and one a little behind, it allows us to work together to help each other to get it done,” Jocksch says.

That can make a vital difference, given how any delay can cause a domino effect.

As general contractor, Canadian Natural can ensure subcontractors are following its schedule and controls and can be certain it’s spending money where it earns value, Jocksch says. Setting a fixed fee before the contract goes out for bids, rather than reimbursing incurred costs, motivates the contractors to meet their deadlines.

“Contractors want to perform and get out of there; that’s how they are successful,” Doucet says. That requires the thorough FEED planning Mansfield mentioned.

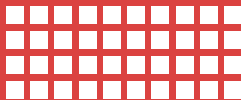
“You must have a very well defined scope of work,” Doucet says.

“Lay out your principles for what you want to achieve, and—this is ▶

CANADIAN NATURAL RESOURCES KIRBY SOUTH SAGD

● **START-UP:** Q3/2013

● **CAPACITY:**



40,000 bbls/d ■ =1,000 bbls/d

Completed two months ahead of schedule and on budget of approximately \$1.2 billion.

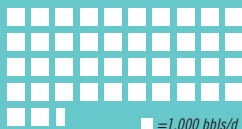
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SUNCOR ENERGY FIREBAG STAGE 4 SAGD

● **START-UP:** Q4/2012

● **CAPACITY:**



42,500 bbls/d ■ =1,000 bbls/d

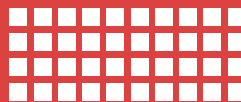
Completed ahead of schedule and \$300 million under its planned capital budget, at \$1.7 billion versus \$2 billion.

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CENOVUS ENERGY CHRISTINA LAKE SAGD PHASE E

● **START-UP:** Q3/2013

● **CAPACITY:**



40,000 bbls/d ■ =1,000 bbls/d

Completed the fifth phase of its high-performing Christina Lake SAGD project on time and on budget of \$2.7 billion.

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says. “In the field, if you’re trying to solve questions on the fly, that’s when things can go sideways quickly.”

Doucet says that requires settling thousands of questions before hiring contractors.

“Taking time to really define the project in every way is key to success.”

That includes a detailed lessons-learned analysis to understand not just previous problems but their underlying causes.

And the owner must be organized; it sends a message to contractors.

“It is the first major incentive for the contractor to perform well,” Doucet says. “If you are not organized, don’t ask the contractors to pull miracles. If you don’t set up your job, infrastructure and supplies right, the contractors won’t perform.”

Performance is also tightly tied to ensuring that owner and contractor goals are in alignment. Get to know your contractors thoroughly, Doucet says, including their

so important—have the discipline to stick to it. Many circumstances will motivate you to deviate from your original concept, but sooner or later you will pay the piper if you do. If you have a vision for a project, that doesn’t mean the 10,000 people working on the project will share

that vision. If you don’t instill a way of controlling that vision, your project will go all over the map.”

Thorough FEED means the job is designed before field work begins.

“Get the necessary drawings complete. Otherwise you get into mistakes and do-overs,” Jocksch

IMPERIAL OIL NABIYE CSS (GOLD LAKE THERMAL PROJECT PHASES 14-16)

● **START-UP:** Q1/2015

● **CAPACITY:**

Imperial Oil reports that it completed this \$2-billion project on time and on budget.



**40,000
bbls/d** ■ =1,000 bbls/d



strengths and weaknesses and how they deal with mistakes.

Jocksch adds, “Part of our mission statement talks about working together. That applies not just to working together in the Calgary office, but together in the field and together with all the contractors, vendors and suppliers when we go into a project. We look at vendors and contractors as our partners—we’re not in this alone. We want to be sustainable; this is long-term. You figure it out together and you both win.”

Unquestionably, he says, “the up-front time is the most critical time.”

IMPERIAL OIL: KEARL PHASE 2 AND NABIYE

Imperial Oil essentially completed construction of the 110,000-bbl/d Kearl Phase 2 project in late

2014. Company spokesman Pius Rolheiser says the project is evidence of Imperial’s focus on repeatability.

“[It is] a carbon copy of the Kearl initial development, leveraging the principle of ‘design one, build multiple.’ We only do the designing and engineering once,” he says.

“We used basically the same contractors that built the initial development. The people simply moved across the road and started the expansion. They’re familiar with our approach and our values. It’s a matter of reapplying principles that have been successful for us.”

At Cold Lake, Imperial is now in double-digit phases of thermal oil production and expansion since starting operations in 1985. ▶

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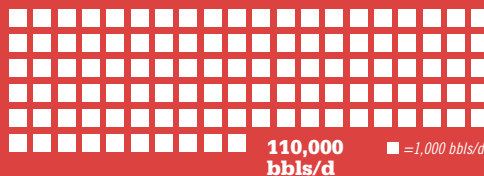
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IMPERIAL OIL KEARL MINE PHASE 2

- **START-UP:** Commissioning underway, first oil in Q3/2015
- **CAPACITY:**



Imperial Oil originally anticipated to start up the Kearl expansion in late 2015, but says the \$8.9-billion project is essentially complete and continues to track on budget and ahead of schedule.

CANADIAN NATURAL RESOURCES HORIZON PHASE 2A COKER EXPANSION

- **START-UP:** Q3/2014



Canadian Natural says the coker tie-in was originally scheduled to be completed in mid-2015, but due to strong construction performance the company accelerated the tie-in to commence August 2014. While the capital figure is unavailable, Canadian Natural says the project was completed on time and below budget.



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Rolheiser says that each expansion has leveraged learnings from the previous one.

The recently completed Nabiye expansion, which was completed on time and within its \$2-billion budget, “is a carbon copy of our Mahkeses plant, which has been operating quite successfully since 2002,” Rolheiser says.

“Things are in the same place; the co-generation unit was manufactured by the same manufacturer. [But] the well pads in the

field are significantly better because advances in horizontal drilling technologies between when we planned Mahkeses in the late '90s and now enabled us to develop it with less than half the number of well pads and half the disturbance.”

Long-term, Imperial plans a series of SAGD developments in 35,000-bbl/d increments. “We’ll use exactly the same approach as with our current project, for significant cost savings in terms of

engineering and construction,” Rolheiser says.

One best practice Imperial employs is modularization, building everything it can in modules on a shop floor under controlled conditions—flat ground, no wind, no biting cold—then assembling the units on the project site.

DEVON CANADA: JACKFISH 3

Devon is known for pushing its supply chain management beyond partnership to full collaboration,

with which it experienced great success on the Jackfish 3 SAGD project. As with Canadian Natural, Devon contracted EPC work on Phase 1 then developed the internal capabilities.

For Devon, the emphasis is on collaboration with its suppliers.

“If we’re good at collaborating and do it right, you create a trusting relationship,” says Steve Bass, Devon’s director of supply chain.

“It’s often difficult to get there because you test each other along

DEVON CANADA JACKFISH 3 SAGD

● **START-UP:** Q3/2014

● **CAPACITY:**



**35,000
bbls/d**

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Devon says an integrated supply chain approach helped bring in this US\$1.3-billion project on time and ahead of schedule.



the way, but if we stand by our values we've agreed to stand by, trust develops. It's an outcome, something earned by dealing with difficulties along the way."

It's time-consuming but essential to setting up success.

In collaborating, each partner looks out for the other, Bass says, anticipating and handling problems and pitfalls to protect the integrity of the capital efficiency and manage the risk.

THE BEST TIME TO BUILD: EXECUTION STRATEGY IN THE LOW PRICE ENVIRONMENT

Seeing the bigger picture and cooperating along the supply chain could be key to helping everyone

succeed, especially in the face of a long price trough.

"Eighteen months to two years ago, at the peak of cost inflation, we noticed that the ability to be competitive was being eroded. High oil prices were not the answer to cost inflation," says Greg Stringham, vice-president, oilsands and markets, with the Canadian Association of Petroleum Producers.

"While there are projects that have been deferred, the ones mostly completed, or the ones companies are choosing to continue with, are benefiting from getting higher productivity and tighter supply chains with better pricing." **OSR**

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