



K+S Potash Canada

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Countdown to Startup



Construction at the Legacy site was substantially complete at the end of March and much of the remaining work involves testing equipment and systems in preparation for startup in the second quarter of 2017. However, while the bustling outdoor activity accompanying peak construction last summer has lessened considerably, steam billowing from a towering boiler stack serves notice to all in the vicinity that the Legacy mine will soon be producing potash.

“That nice steam billowing out of the stack is a visual reminder that something’s really happening inside there now,” says Sam Farris, Vice President of Operations and General Manager at KSPC. “It’s no longer simply a construction project.”

The large boiler will be used primarily for potash processing once production is underway, says Farris. But it’s also used to provide heat for cavern development and warmth for employees in the process plant. It’s being used for both of those purposes right now. Farris says two additional boilers the same size as the first, and each with its own 66-metre boiler stack, were scheduled to be commissioned by the end of March.

Countdown to Startup

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Meanwhile, a 15-megawatt gas turbine electrical generator for use primarily as backup power for the process plant recently became operational. The generator operates continuously and provides a portion of the power required on site.

By the beginning of March, the on-site workforce had dwindled to about half of the more than 3,000 people who passed through the project's security gates each day during the peak construction period in summer 2016, says Kevin Brown, Project Director for Amec Foster Wheeler, the contractor in charge of construction at the site. "And between the middle of March and end of April, we'll have a fairly steep decline in those numbers, as well," says Brown. Direct construction personnel such as pipefitters and electricians are still working on site but the main focus now is on the commissioning team, which is comprised largely of trades people and operations staff who are testing equipment and preparing for startup. Also still on site are the service contractors who operate the Legacy construction camp, security people and the emergency response team. "Site services personnel number about 150 people on a daily basis, so about 10 per cent of our overall complement," says Brown.



No. 1 boiler was fired for the first time at Legacy in December 2016.

He says Pre-commissioning, the testing of individual pieces of equipment, is well advanced and also the commissioning of the systems comprising those components has shown good progress over the last months..

"The further advanced we are on the pre-commissioning, the more commissioning fronts we have available to us."

While the failure of a vessel support structure last July resulted in the startup date being moved to the second quarter of 2017 from the end of 2016, KSPC says the Legacy Project remains on schedule to reach its target capacity of 2 million tonnes per year by the end of 2017.



This 15-megawatt gas turbine electrical generator on site recently became operational.



Dr. Ulrich Lamp, President and CEO; Sam Farris, VP and GM of Operations; and Kevin Brown, Project Director for the Legacy Project, Amec Foster Wheeler, in the compaction area of the plant.

Testing Proves Pipelines Are Safe and Sound

This is a story about two little pigs and their smart partner. Actually, make that PIGs, which stands for Pipeline Inspection Gauges. PIGs are devices that are sent through pipelines to clean them, make sure they meet design specifications and are structurally sound. Two main lines that were "pigged" at the Legacy site in August and October last year passed their tests with flying colours.

"The results were excellent," says Marian Pietrasik, Superintendent of Reliability at K+S Potash Canada (KSPC). Pietrasik says the 18- and 24-inch pipelines in question are situated about three metres underground – beneath

the frost line – and run 6.7 kilometres from the wellfield to the process plant. Each has an aboveground "launcher" and "receiver" for PIGs. After the cleaning PIG is sent through the pipe as many times as is required, the gauging and sizing PIG is sent through via water pressure. Data generated is interpreted to determine whether it's then safe to launch a "smart" PIG through the line. The smart PIGs – there was one to fit each pipe – employ sophisticated technology enabling contracted engineers to check for flaws and anomalies in the conduit.

Pietrasik says it's important that the data from the first two PIGs be accurately assessed

to ensure the smart PIG does not become damaged or lodged in the pipe, which would require excavation of the line as well as extrication and possibly replacement of the expensive tool. "These smart PIGs are the brains of the operation," he says. "They're worth a minimum \$500,000 each."

Pietrasik says the "pigging" process took five days per pipeline and represents the final step in proving the validity and integrity of the lines to the Saskatchewan Ministry of the Environment. He says there are several more underground pipelines that need to be similarly inspected in the future.

Assembling a Clear Picture of KSPC's Potash Resource

In 2015, K+S Potash Canada (KSPC) geologists used soundwaves generated by controlled explosions to create 3D images of the ore zone north of the Legacy site wellfield. Over the fall and winter of 2016-17, they took core-drilling samples from a portion of that area and are now studying the samples to get an even better understanding of what lies below. "The 3D seismic gives you a general picture while the drilling gives the fine definition," says Megan Frederick, Manager of Geology at KSPC. Data compiled through both sets of tests will go toward creating a detailed picture of the ore zone that will be used by the company to plan future mining operations.

For the most recent tests, oilfield contractors extracted core samples from four tightly-spaced locations in the southeast section of the North Mine Plan (NMP) project. The NMP encompasses about 67 sq. km. of KSPC's approximately 40,000 hectare lease and the drilling occurred in an area adjacent to – and roughly the same size as – the Legacy site's existing wellfield. The NMP project operates with the assistance of Dr. Rainer Stax at K+S Group's head office in Kassel, Germany.

Jared Galenzoski, Geologist at KSPC's mine site and manager of the NMP project, says KSPC's geology team is now busy analysing

the core samples. While the full results won't be available until this summer, preliminary results are positive.

"The analysis of these core samples will tell us about the quality of the ore zone, what level of grade is present," he says. "What we're seeing so far is encouraging."

The Prairie Evaporite Formation, which hosts the three ore zones, is about 70 metres thick and lies 1,500 metres beneath the surface. It includes three layers, known as "members," named Patience Lake, Belle Plaine and Esterhazy. Galenzoski says the core drilling takes samples from that entire sequence. The well spacing represents a tight hole spacing for the potash industry giving even finer detail to the selected area. "Given the density and spacing of the holes we drilled, this is a high level of confidence for the standards in the industry," he says.

According to Saskatchewan law, the drillcores are the property of the Province of Saskatchewan. Galenzoski says that means KSPC must get permission from the government to process the cores. The company must send half of each sample to the government, which stores them in a special repository.

Once all the data have been analysed, the results are reported to senior management of K+S. "The information we provide will allow the mining group to go and pursue that additional potash resource in the future," says Galenzoski.

KSPC's Derrick Loucks, Supervisor, Drilling; Megan Frederick, Manager, Geology; and Jared Galenzoski, Geologist.



Opportunities with K+S and Contractors

Interested individuals may apply for posted jobs and keep an eye out for new ones on KSPC's career page.

ks-potashcanada.com/opportunities

Additional information on jobs, job fairs, information sessions and company culture are available by following links to KSPC's Facebook, Twitter, LinkedIn and YouTube accounts.



If you have questions or concerns about the Legacy Project, please call the K+S Community Hotline at:

1-855-385-8686 ext. 2999

First Rail Cars Arrive at Legacy Site

Another sign that production is about to begin at the K+S Potash Canada (KSPC) Legacy site was the arrival of the first 177 custom built rail cars on March 13, 2017. The rail cars will be stored at KSPC's own industrial rail yard and will support commissioning in preparation for the beginning of production, scheduled to occur in the second quarter of this year.

The rail cars are among 531 manufactured by National Steel Car (NSC) of Hamilton, Ont., and will be used to ship potash to KSPC's port facility in Port Moody, B.C. The balance of the rail cars were scheduled to be shipped to site by end of March 2017.

Karen Koziki, Senior Specialist, Logistics and Transportation at KSPC in Vancouver, says CP

stored the cars at one of its Saskatchewan rail yards before delivering them to the Legacy site via their new, 30-km Belle Plaine subdivision. The Belle Plaine subdivision links CP's main line at Belle Plaine to the KSPC's 14-km industrial line. "Via CP's main line, KSPC now has access to the port terminal in Western Canada, as well as to domestic markets," says Koziki.

While KSPC employees at the Legacy site's loadout and shipping areas become accustomed to using their new equipment and procedures, Heather Pollock will be refining her skills with a computer program that connects the Legacy mine site to the global network operated by parent company K+S in Germany. Pollock, Shipping Coordinator for KSPC at the Legacy site, says the program ties

the mine's loading systems into the K+S sales department. Once production is underway, she will complete a waybill when the rail cars are loaded with product and the program will automatically transmit that information to CP. "It will basically tell them there's a trainload ready for transport to port," says Pollock. She adds KSPC is working closely with CP to coordinate operations.

On December 1, 2016, CP organized a tour of its Belle Plaine spur line for Saskatchewan Ministry of Highways and Infrastructure officials as well as guests from KSPC. Attendees travelled by road and rail in a "High Railer" bus to observe one of the largest earth-moving projects in Western Canada, just before it was completed.



Saskatchewan Ministry of Highways and Infrastructure, Canadian Pacific and KSPC representatives toured the new rail line on December 1, 2016.



KSPC's custom rail cars were designed by National Steel Car.

Historic Agreement Reached on Grassland Offsets



Representatives from NCC, Saskatchewan's Ministry of the Environment and KSPC at the announcement of the offset project on October 4, 2016 in Regina.

K+S Potash Canada (KSPC) has contributed almost \$1 million to Nature Conservancy of Canada (NCC) in an agreement ensuring native grasslands impacted by the Legacy mine project will be offset through the purchase and preservation of high value native grassland elsewhere in Saskatchewan. The agreement, based on a novel science-based formula developed by the Government of Saskatchewan working collaboratively with NCC and KSPC, is the largest-known industry investment in a grassland habitat offset in provincial history. The method and formula used to calculate the offset has already been used as a template by

Saskatchewan's Ministry of Environment and other industries in the province and adapted to other habitat types.

"Compensation is not a new concept in habitat mitigation but determining what's appropriate had not been standardized," says Erin Robertson, Environment Manager of KSPC.

"This new approach uses a system of scientifically informed "debits" and "credits" to estimate the ecological value of habitats and ensures unavoidable impacts are off-set appropriately." Under the new formula, the 194 hectares of grasslands affected by the Legacy mine site, wellfield and rail line will be off-set by conserving an estimated 402 hectares of high-value grassland.

Eric Cline, KSPC Vice President of Land and Sustainable Development, says the agreement satisfies a Saskatchewan Ministry of Environment (MOE) condition of approval for

KSPC's Environmental Impact Statement and does so through a credible third party. "It's an advantage to have Nature Conservancy of Canada do this because their interest is to maximize the amount of grassland in Saskatchewan," says Cline. "It's good from the point of view of our company because it meets our commitment and it also assures the public, through the Ministry of the Environment, that it's done in a scientific way."

KSPC is expected to announce a related agreement on wetlands offsets in June.



The Baird's sparrow is just one of many "indicator species" for native prairie.