

THE NORTHERN MINER

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Unfinished business at Prairie Creek

IS THE MINE'S LONG AND WINDING ROAD TO PRODUCTION
NEARING ITS FINAL DESTINATION?



PHOTO BY ANTHONY VACCARO

Canadian Zinc VP of exploration and COO Alan Taylor (left) and equipment operator Jason Matt at the Prairie Creek zinc-silver-lead mine in the Northwest Territories.

SITE VISIT

NAHANNI NATIONAL PARK, N.W.T. — The paint dried over 30 years ago, but a “wet paint” sign still hangs on the metal railing that was erected to stop the uninitiated from falling into the crushing circuit below.

The hopelessly outdated sign wasn't the only thing left behind. Alan Taylor, **Canadian Zinc's** (CZN-T) chief operating officer, explains that



BY ANTHONY VACCARO

empty cups of coffee were perched on the control-room desk when his team first came into the mill in the early 1990s.

The signs and mugs are remnants of past ambitions to build a mine that would pull silver, lead and zinc from beneath the mountain to feed the wealth of one of America's richest families at the time. And while that

particular dream died 30 years ago, Canadian Zinc stands on the cusp of bringing its own vision to fruition: mining

one of the highest-grade, undeveloped zinc, lead and silver deposits in the world.

While impressive, it isn't such mineral wealth that makes the Prairie Creek mine one of the most well-known “almost” mines in Canada. The project's status partly comes from its connection to the notorious Hunt brothers, and more prominently from being close to the Nahanni National Park in the Northwest Territories.

Both factors contributed in their own way to keeping Prairie Creek as an

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Processing equipment at Canadian Zinc's Prairie Creek project in the Northwest Territories.

almost-mine some 80 years after its discovery. But to understand how, we have to go back to the beginning.

The Prairie Creek tale begins with prospector Poole Field, who made the discovery back in 1928. Field was hiking up the Prairie Creek in the Nahanni River region when a sheen off a mountain face caught his eye, and then his imagination. Field believed he had stumbled upon the same gold deposit discovery a friend told him about in a letter 16 years earlier.

A former Mountie-turned-pro prospector, Field knew the Nahanni region well and understood more than anyone how it had earned its haunted reputation. It had been Field, after all, who discovered the headless bodies of two prospectors in his days as a Mountie, and it was also Field who found the bones of his friend after he made that gold discovery. The

friend's name was Martin Jorgenson, and his bones were found near his scorched cabin, but his skull wasn't.

With rumours of prehistoric, man-eating animals wandering the valleys and cannibals living near the cliff no doubt circling inside his head, Field found his way back to civilization after his find, with his head still on his shoulders. And while he has the distinction of being the first to dream of turning the find into a silver mine, he was also the first to be denied its fulfillment.

Field died, and over time the fear of cannibals and prehistoric animals subsided. But the region's growing reputation as a place of natural beauty introduced new obstacles for developing a mine.

In 1972, then-prime minister Pierre Trudeau designated the area around the Nahanni River as the Nahanni National Park, and in 1978, the United Nations

Educational, Scientific and Cultural Organization chose the Nahanni as the first World Heritage site. And while the Prairie Creek property lay just outside of the original park boundaries, it was clear that a balance between environmental stewardship and northern development needed to be struck.

By 1978 the development side was represented by Nelson Bunker Hunt and Herbert William Hunt. Best known as the "Hunt brothers," the pair had made billions on Texas oil, and billions more on silver, before their attempt to corner the silver market came back to bitethem.

While their massive silver play rolled along — silver went from US\$6 to nearly US\$50 over the course of their buying in the 1970s — the brothers decided that a silver mine at Prairie Creek would be the ticket to more wealth through the 1980s.

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But their dream was not to be. The price of silver collapsed, investors filed suit and the U.S. Congress stepped in to investigate whether the Hunts' activities in the silver market were legal. With depressed silver prices and mounting regulatory fines, the Hunts were up against bankruptcy and had to pull the plug on Prairie Creek, just three weeks before the mine was set to enter production.

And so back at the mill, coffee left in mugs evaporated and wet-paint signs grew cobwebs, until Canadian Zinc — then San Andreas — came onto the scene in 1993, and purchased the property for \$3.25 million.

Since then it has been the company's challenge to convince regulators and communities around the park that it can mine the ore in a way that preserves the integrity of the Nahanni, while at the same time convincing investors that it can do so with robust margins.

It hasn't been a quick process. Chief operating officer Alan Taylor has been at it for 19 years, but in December 2011 a milestone was reached when the company won an environmental approval for the mine.

The approval was a high bar to clear. And when combined with the Impact Benefit Agreements signed with the two First Nations communities in any sort of proximity to the project, there is cause for renewed optimism.

Two big pieces to the puzzle remain, however, in the form of a crucial water permit and a road permit.

On the water permit front, Canadian Zinc has recently finished lock-cycle tests that will help clarify what the compliant numbers will be in terms of acceptable levels of toxicity in the discharged water. The levels are remarkably small, reaching the fourth decimal place.

Water discharge is being tested and

results are being sent to regulators, but there is a slight wrinkle that is specific to the project.

The wrinkle has to do with how water treatment discharge is monitored. Normally regulators take an end-of-pipe approach to measuring discharge. In the case of Prairie Creek, however, the project will discharge treated water into a mountain creek that has dynamic water flow.

So where regulators normally measure on a day-to-day basis, the company has something else in mind.

"We're not proposing [a consistent discharge volume]," Taylor says. "We will decant more treated water when the creek flow runs high, and less when the creek runs low. A consistent volume ratio of treated discharge water to local creek flows at an acceptable concentration provides a consistent mix, and in turn has the least impact on the ecosystem."

Another permit is needed for a road that will allow the company to truck concentrate from the mill, through the park and down to the railhead, 460 km away.

The road has, in the past, been a sticking point for environmentalists who argued that a road carrying heavy trucks could damage sensitive areas of the park. In response, Canadian Zinc designed a road that goes around the areas of concern.

But the road permit is multi-jurisdictional, with the Mackenzie Valley Land and Water Board being the authority for the portion on Crown land, and Parks Canada being the authority for the portion of the road running through the Nahanni National Park.

The Crown land portion of the road has received a draft permit, and the company's board is revising the draft based on comments received. It may issue a second draft for quick review.

The company has applied for the

permit from Parks Canada, but says the agency likely won't consider the application complete until it submits a road design, which it expects to do by the end of October.

Provided the permits are sorted out, the company's grand plan is to truck concentrate 85 km to the Tetcela transfer facility, which would make space for concentrate to be stored until the southern stretches of the road freeze over, allowing the stockpiles to be hauled out.

The bottleneck in the trucking process would be an ice bridge, which would cross the Liard River and only open in January, February and March — which is why a concentrate storage supply is needed near the ice-bridge crossing at Tetcela.

By building up concentrate supply during the periods the bridge isn't open, the three-month window will be maximized so that the company can get all of its annual production out.

From the bridge, the trucks will wind their way through the mountains until they reach Fort Nelson, where railcars will take the concentrate to port, likely for shipping to overseas smelters.

Canadian Zinc estimates that trucking costs will come in at \$115 per tonne of concentrate and rail costs will be \$100 per tonne, for a total cost to port of \$215 per tonne.

When and if the final water licence and road permits are issued, Canadian Zinc will at last be in a position to get its Prairie Creek zinc-lead-silver project here in the southwest corner of the Northwest Territories into production.

The company has \$12 million in cash, and estimates that it will need \$200 million to build a mine that would generate a net present value of \$253 million, using an 8% discount rate. The internal rate of return is an estimated 40.4%.

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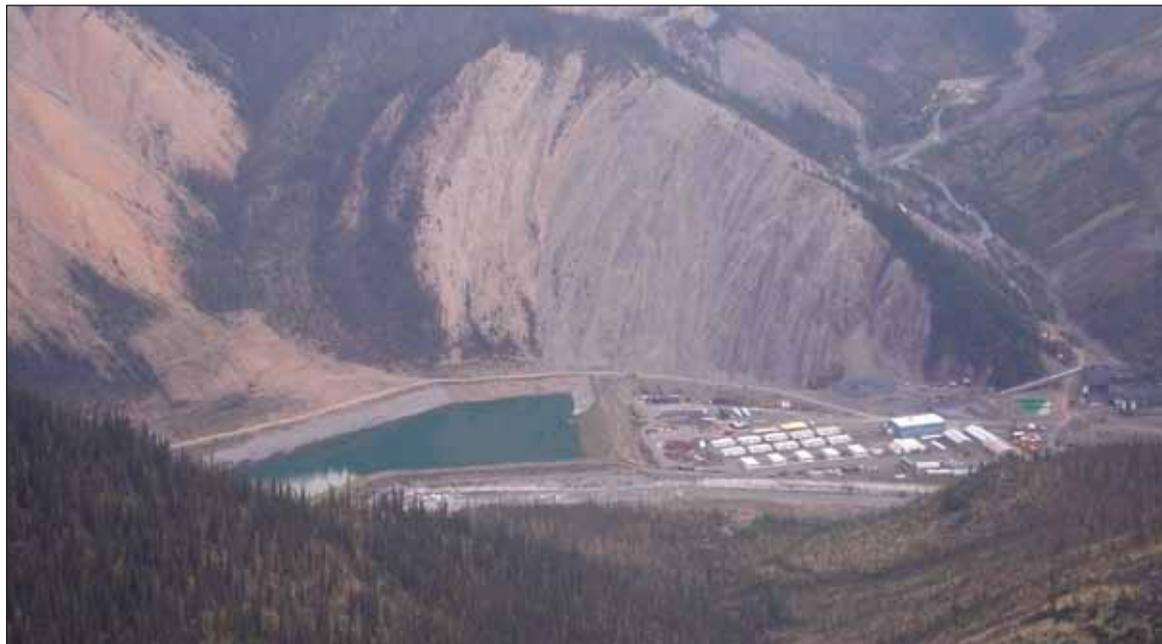


PHOTO BY ANTHONY VACCARO

An aerial view of Canadian Zinc's Prairie Creek zinc-lead-silver project in the Northwest Territories.

These numbers come out of a prefeasibility study released by SNC Lavalin this year, and were generated using zinc and lead prices of US\$1.20 per lb., and a silver price of US\$28 per oz. for the first two years. It used longer-term prices of US\$1 per lb. for lead and zinc, and US\$26 per oz. silver.

The study envisions a mine that would produce 60,000 tonnes of zinc concentrate and 60,000 tonnes of lead concentrate, for 76 million lb. zinc, 90 million lb. lead and 2.2 million oz. silver per year.

Of the construction costs, roughly \$80 million will go towards improving the mill, with the big ticket expenses residing in new diesel generators, a dense-media-separation (DMS) plant and building a paste-fill plant to handle tailings. These items are expected to account for \$80 million of \$160 million in capital expenditures, leaving \$30 million for contingencies.

It's a bargain by today's standards, as

far as Taylor is concerned.

"One of the reasons we're here is because of the mill that is already standing," he says. "It would cost a quarter of a billion to build this facility from scratch."

After 30 years, the mill is insurprisingly good condition. Once it is refurbished, it will have a 1,700-tonne-per-day crushing capacity, although the plan is to mine 1,300 tonnes per day, and mill 1,000 tonnes per day.

To run the mill Canadian Zinc will need 5 megawatts of power, which will come from new Caterpillar diesel generators. The 1.5-megawatt units cost \$20 million, but use 30% less fuel than the rusting hulks now housed in the mill. Heat from the new generators will also help heat the camp.

Another new addition to the facility will be the DMS plant, which will be part of the crushing circuit and separate light from heavy material, allowing the company to upgrade feed without ex-

panding the mill.

Taylor says the DMS plant will help relieve stress on dilution from underground operations by removing all limestone and dolostone at an early stage — acting as a kind of pre-concentrator of ore, before it goes through the rest of the circuit. Some of the waste rock from the DMS plant will be carried by conveyor belt to mix with tailings and aggregate at the paste-fill plant.

The paste-fill plant is a major component of the mine's environmental protection engineering. Rather than deal with any risks of having a tailings pond in a river valley, all tailings from underground will be processed in the plant, and put back underground as paste fill for areas that have been mined.

Forty-seven percent of the mined rock will go back into the mine as paste back-fill, 27% will be stored as harmless waste rock — with no acid rock drainage issues — and the remaining 26% will make its way into the concentrates.

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Canadian Zinc vice-president of exploration Alan Taylor at the Prairie Creek project in the Northwest Territories.

These concentrates will contain silver and copper, with the lead concentrate holding silver at a ratio of 7 to 3 in favour of lead. Copper will appear in both the lead and zinc concentrates at a 1-to-1 ratio.

Taylor says it is also possible to produce a copper concentrate on its own. The idea was considered back when the Hunt brothers ran the show, but the process being considered at that time involved using cyanide. Cyanide is off the table, given today's heightened environmental sensitivities, but Taylor says that a copper concentrate could be made without using cyanide.

The economics of this process are being evaluated.

The ore, however, has a high mercury content, especially in the zinc concentrate. Taylor says the company has already reached out to smelter operators, who are confident that the mercury content is workable.

Feeding the concentrate production will be a deposit with measured and indicated resources of 5.43 million tonnes grading 10.8% zinc and 10.2% lead, with 160 grams per tonne silver and inferred resources of 6.24 million tonnes grading 14.5% zinc and 11.5% lead, with 229 grams silver per tonne.

Of the measured and indicated material, 5.2 million tonnes are in the proven and probable reserve category, with an average grade of 9.4% zinc, 9.5% lead and 151 grams silver.

But like many underground deposits, the rich mineralization trends to greater depths, and a producing mine at Prairie Creek could prove-up new reserves as it goes forward.

The preliminary feasibility study completed in June outlined a mine with an initial 11-year mine life, ignoring inferred resources. To give a sense of just how much mineralization is present, the current global resource runs 2.1 km

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down into the base of the mountain, with more than half of that area remaining in the inferred category. Exploration drills tested a further 1.8 km downdip, and hit high grades, with a highlight intercept of 3.4 metres grading 11% zinc and 5% lead.

and the Road River formation (above the cut).

The two structures make finding targets for future exploration a somewhat simple task. The Rico showing offers the most exploration-upside potential, and even though it is

host the known deposit, because the Cadillac formation — which overlies Road River and upper Whittaker — is brittle, and would have allowed mineralization to pass through. If this is the case, Zone 3 could extend another 4 km.

As for how much capital should go into continued exploration, considering how much ore has already been outlined, Taylor is ambivalent.

“We can do it or not,” he says. “The region likes to see activity at the site, and without exploration, there wouldn’t be much activity.”

The statement points to how much the company values community relations, and how well it has done on that front.

The two impact-benefit agreements signed in 2011 cover the community of Nahanni Butte — which is the closest community to the mine, at 90 km south-east — and Fort Simpson, 150 km west.

Signing the deals was a testament to

The paste-fill plant is a major component of the mine’s environmental protection.

The deposit is composed of a richly mineralized vein that is part of the north-trending Prairie Creek fault structure, which runs over 10 km on the property. Within that structure there are 12 separate sulphide vein occurrences, but the current resource focuses on Zone 3.

Walking down the adit and into the mine, the mineralized vein of Zone 3 is readily visible. It cuts through the Whittaker formation (below the cut),

roughly 6 km from the mine site, it too is connected to the Whittaker and Road River formations.

The Rico showing is made up of high-grade boulders that were discovered during road construction. Assays returned 1.1 metres grading 35% lead, 18% zinc and 242 grams silver. Taylor opines that the high-grade boulders likely came from the same Road River and Upper Whittaker formations that



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Equipment at Canadian Zinc’s Prairie Creek zinc-lead-silver project in the Northwest Territories.

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the strong community relations team that Canadian Zinc has assembled. Taylor gives much of the credit to Wilbert Antoine, an elder and member of the Liidlii Kue First Nation, who has 40 years of experience in the mining industry. Antoine is the company's manager of northern development.

Coinciding with the improved community relations is Bob McLeod's tenure as premier of the Northwest Territories. McLeod, who was elected in 2011, is considered one of the most dynamic premiers in terms of supporting northern development.

Such an improved business environment makes Taylor optimistic. "There are

more challenges behind us than ahead of us, now," he says.

It's been a tough road for the company to get where it is today. The usual technical challenges of outlining a deposit and planning a mine have been compounded by the project's location, and being in a remote area makes the Prairie Creek project especially susceptible to ill-formed opinions from the public. If an average citizen in Calgary or Halifax reads that a company plans to build a mine near a National Park, he or she would be concerned.

But that kind of knee-jerk concern fails to consider that a facility has already been standing for 30 years, and

that engineering has advanced to a level where a facility can be built that doesn't degrade the surrounding environment.

With time and education, perceptions about building a mine near a treasured park are changing. Naysayers play to Canadians' pride in pristine landscapes, but others argue that pride can also be drawn from Canadians' mining expertise and environmental sensitivity that allows for the building of a mine that can contribute to the Far North's economy without wrecking the surrounding land — a fine balance between engineering, economics and environmental stewardship not found just anywhere in the world.