

Aluminum-scandium master alloys, changing the way the world flies.

Scandium has until now only been a niche metal with demand in high end products such as the aerospace industry and sports equipment (bicycle frames, fishing rods, golf iron shafts, tennis rackets and baseball bats). It has great potential as an alloy because it has almost as low a density as aluminum with a much higher melting point. Scandium, when added to aluminum, creates a strong lightweight alloy with excellent resistance to corrosion and good weldability. Aluminum-scandium alloy can be 10-100% stronger than conventional aluminum alloys and has been used in Russian MIG fighter planes. A new analysis shows that scandium-contained aluminum alloys can save airline operators approximately \$9 million in net present value for a single B737 -sized jetliner, assuming scandium oxide pricing at \$3,500/kg.

NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF) is developing North America's only niobium, scandium, titanium project. Located near Elk Creek, Nebraska, the Elk Creek Project is the highest grade niobium project in North America, as well as the largest prospective producer of scandium in the world. NioCorp is sitting on 250,000 tons of niobium pentoxide, 2,300 tons of scandium, and 891,000 tons of titanium dioxide, and is heading towards being the only producer of its kind in the USA.

In a joint project with IBC Advanced Alloys, NioCorp announced in October the successful production of an aluminum-scandium master alloy. NioCorp and IBC intend to utilize the master alloy from this program to further the companies' ongoing efforts to develop specialty scandium containing alloys and/or prototype products for potential commercial use. This

agreement is to investigate and develop applications for scandium-containing materials for a range of downstream markets.

Mark A. Smith, CEO and Executive Chair of NioCorp and Chairman of the Board of IBC, said: "This is almost certainly the first aluminum-scandium master alloy made in the United States in some years. We look forward to the possibilities presented by the establishment of a domestic U.S. production capacity for aluminum-scandium master alloys that utilize scandium mined and purified in the U.S."

NioCorp is developing the Elk Creek Critical Minerals Mine and processing facility in southeast Nebraska, which is expected to produce more than 100 tonnes per year of scandium oxide when fully operational. As shown below the project has an impressive after-tax NPV8% of \$1.7 billion, with after-tax IRR of 21.7%.

[ELK CREEK REVISED FEASIBILITY STUDY HIGHLIGHTS](#)

TSX: NB | OTCQX: NIOBF | FSE: BR3

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\$2.3B

Pre-Tax NPV

24.3%

Pre-Tax IRR

\$1.7B

After-Tax NPV

21.7%

After-Tax IRR

\$389M

Averaged EBITDA over operational life

69.5%

Averaged EBITDA margin over operational life

\$17.6B

Gross ROM Revenue

\$12B

Operating margin over operational life

\$1B

Total Net Up-Front CAPEX

32 Yrs.

Mine Life

3.4 Yrs.

Payback period from production start

Elk Creek Feasibility Study highlights

NioCorp has also signed a commercial sales agreement with Traxys North America LLC. Under the agreement, Traxys is obligated to purchase 12 tonnes per year of scandium trioxide for the first 10 years of the project's production. Traxys

can purchase more than 12 tonnes per year and can extend the 10-year term by mutual agreement. This annual amount represents approximately 10% of NioCorp's planned annual production of scandium. According to estimates by the U.S. Geological Survey, 12 tonnes per year is approximately equivalent to all current global sales of scandium for 2018. Traxys will focus its scandium sales and marketing efforts to customers in the aerospace and sporting goods sectors, and it retains the exclusive right to sell NioCorp scandium to those sectors.

CEO Mark Smith continued: "We are very pleased with the size, term, and potential value of this contract. We look forward to working with the leadership at Traxys to build and grow markets for a variety of scandium materials."

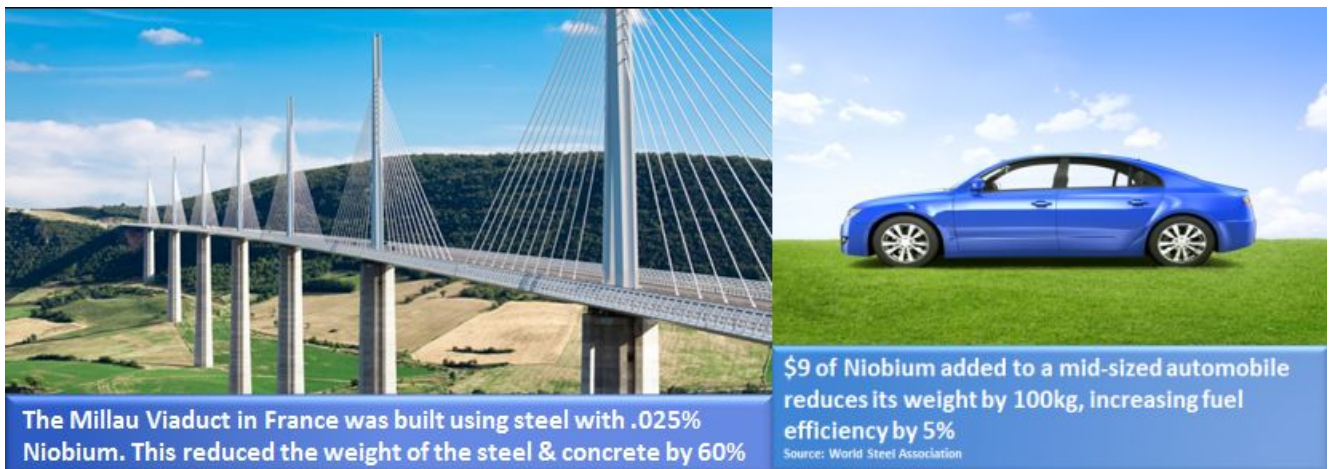
In May 2018, the Interior Department (US) moved to include niobium, scandium, and titanium on its list of critical minerals. NioCorp is very well placed to be a US leader in the above mentioned critical minerals.

All three of NioCorp's products have targeted applications in clean energy, aerospace/commercial aviation, defense, automotive, with independent estimates of the latent demand for scandium being placed at several hundred tonnes per year in the aerospace sector alone. The Traxys contract now means scandium sales are largely taken care of. Added to this NioCorp has 75% of their primary product (ferroniobium) already under contract over the first 10 years of production.

Given the above off-take and sales contracts NioCorp is looking attractive for finding a project funding partner, especially given they already secured an in-principle eligibility from the German Government loan guarantee program.

NioCorp's critical materials project achieves another milestone at Elk Creek Nebraska

Niobium is used to produce superalloys as well as high strength, low alloy steel, which is used in automotive, structural, and pipeline applications. Scandium is a superalloy material that can be combined with aluminum to make alloys with increased strength and improved corrosion resistance. Titanium is used in various superalloys and is a key component used for aerospace applications, armor and medical implants.



NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF) is developing North America's only niobium, scandium, and titanium project at their 100% owned Elk Creek Project.

Elk Creek Project

Located near Elk Creek, Nebraska, USA, the Elk Creek Project is the highest grade niobium project in North America, as well as the largest prospective producer of scandium in the world. These elements are unique and valuable superalloy materials that are strategic and critical to many industries and

national defense technologies.

Elk Creek's 2017 revised Feasibility Study resulted in an after-tax NPV of US\$1.7 billion, with an after-tax IRR of 21.7%. The project has a 32-year mine life with a 3.4 year pre-tax payback period from onset of production, with gross revenue of US\$17.6 billion over the mine's operating life. Total net upfront CapEx was estimated at US\$1b. The Elk Creek project is a large resource with long term potential with probable reserves of 31.7 million tonnes of ore at 0.79% niobium (Nb2O5), 71.6 grams per tonne (g/t) scandium (Sc), and 2.81% titanium dioxide TiO2. Indicated mineral resources are 90.9 million tonnes at 0.66% Nb2O5, 70 g/t Sc, and 2.59% TiO2 with an inferred mineral resource of 133.6 million tonnes at 0.48% Nb2O5, 59 g/t Sc, and 2.23% TiO2. The project's deposit is open in three directions, to the northwest, southeast, and at depth.

NioCorp is hoping to begin producing superalloy metals by 2021.



Feasibility Study highlights

Elk Creek is a de-risked project having 75% of its primary product ferroniobium, already under contract for the first 10 years of production. The project is located on private land with extensive nearby infrastructure (roads, rail, water, and

utilities). The U.S. Government have declared all three superalloy metals from the Elm Creek Project as “critical minerals”, as all three have key uses in national defense and civilian technologies.

NioCorp Developments Ltd. recently announced (August 27, 2018) a new proposed design by the Nordmin Group of companies for the underground portion of its Elk Creek Project. The new mine design confirms the technical feasibility of several innovative approaches to mining Elk Creek’s critical minerals which could further streamline the process of moving the project to initial construction.

Mark A. Smith, CEO and Executive Chairman of NioCorp, said: “Completing this phase of the design engineering for the Elk Creek underground mine marks a major milestone for the project. I was especially pleased to see that Nordmin clearly focused its efforts on proposing a mine design that maximizes value and minimizes environmental impacts. As a result, this design approach should result in a significant reduction in the government permits that the Elk Creek Project will need to secure while also potentially improving key aspects of the project.”

Mine design recommendations are now being analysed. If approved, they will then be integrated into the Elk Creek Project plan and overall impacts to the economics of the project can be assessed. The Elk Creek Project has already secured all ‘major’ federal permits required.



Addressable markets

All three of the Company's products (niobium, scandium, and titanium) have targeted applications in clean energy, aerospace/commercial aviation, defense, automotive, and more. This should make NioCorp "critical" to US needs for years to come.

NioCorp Developments Ltd. is headquartered in Tecumseh, Nebraska, USA; and has a market cap of US\$ 94.4 m.

NioCorp's niobium, scandium, and titanium make the U.S. critical minerals list

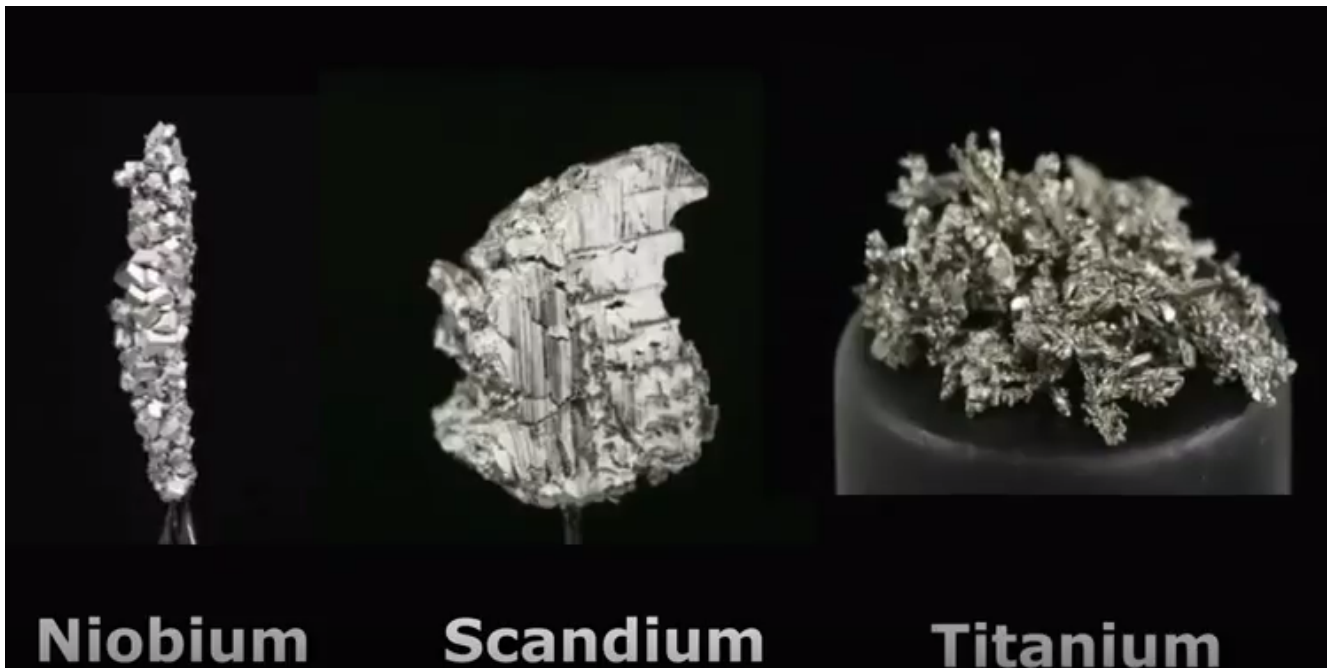
NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF) owns the Elk Creek niobium-scandium-titanium project in Southeast Nebraska, USA. NioCorp is focused on the three superalloy

materials niobium, scandium, and titanium. All three of which were last week included in the “critical minerals” list of just 35 critical minerals, by the US Government.

Niobium is mostly used for steel alloys as it makes steel lighter and stronger. Niobium is used in bridges and other large infrastructure projects, in high pressure oil and gas pipelines, in virtually all steel-chassis vehicles, and in many other applications. NioCorp states – “\$9 of Niobium added to a mid-sized automobile reduces its weight by 100kg, increasing fuel efficiency by 5%.”

Scandium is also used for light weighting. It is used in aluminum-scandium alloys for aerospace industry components and for sports equipment such as bicycle frames, fishing rods, golf iron shafts and baseball bats. NioCorp states – “Scandium expert says airline industry stands to reap hundreds of millions of dollars in annual savings by integrating scandium alloys into commercial jetliners.”

Titanium is as strong as steel but much less dense. It is therefore important as an alloying agent with many metals including aluminum, molybdenum and iron. These alloys are mainly used in aircraft, spacecraft and missiles because of their low density and ability to withstand extremes of temperature.



Niobium, Scandium and Titanium

NioCorp's Elk Creek has the highest-grade primary niobium resource in North America, and the only such resource under development in the US. Elk Creek has Probable Reserves of 31.7 million tonnes of ore at 0.79% niobium (Nb₂O₅), 71.6 grams per tonne (g/t) scandium (Sc), and 2.81% TiO₂. Indicated Mineral Resources are 90.9 million tonnes at 0.66% Nb₂O₅, 70 g/t Sc, and 2.59% TiO₂. The Elk Creek deposit is open in three directions: to the northwest, southeast, and at depth.

Infrastructure is good with the deposit located next to a highway and rail line.

Figure 4.1 Project Location Map



NioCorp Elk Creek Nebraska location map

The December 2017 Definitive Revised Feasibility Study resulted in a post-tax NPV 8% of \$1.7 billion, with post-tax IRR of 21.7%, a 32-year mine life with a 3.4 year pre-tax payback period from onset of production. The project is expected to produce an average of 7,055 tonnes per annum (tpa) of ferroniobium, 103 tpa of scandium trioxide, and 11,445 tpa of titanium dioxide. CapEx was estimated to be US\$1b. Forecast production costs (net of TiO₂ byproduct credit) are \$12.14/kg of niobium (on a niobium equivalent basis) and \$1,127/kg of Sc₂O₃ (on a Sc₂O₃ equivalent basis).

NioCorp has 75% of their primary product ferroniobium already under contract for the first 10 years of production – 50% to ThyssenKrupp Metallurgical Products GmbH and 25% to CMC Cometals.

NioCorp is still very well valued with a market cap of just CAD \$152m, compared to a NPV of \$1.7b.

NioCorp's challenges lie around funding their large CapEx. However, given their very impressive Feasibility Study result, their 75% ferroniobium off-take commitments, and their

eligibility for the German Government loan guarantee program the company is well positioned to progress to the final stages.

Of key significance is the fact that the US relies on China and Russia for these three critical metals. With last week's change to include niobium, scandium and titanium in the US critical minerals list, and with NioCorp's 2021 timeline to production, that could soon change.

The dawn of a niobium and scandium renaissance

Humanity's dependable need for progress has long motivated engineers to improve commonly used materials, and metallic alloys are no exception. The pressure to reduce emissions and increase efficiency could create a renaissance of sorts for two of the least mined elements on Earth.

One of our subjects, scandium, can be used to lighten aircraft by up to 20%, but difficulties relating to its extraction keep current consumption to a minimum. Similarly, niobium is a prime candidate for decreasing material weights, but economical deposits are so rare that only three primary producers of niobium exist globally, none of which are in the US, and zero new niobium mines have come online since the 1970s.

The evidence currently suggests that uptake would be vastly higher if the supply side was able to provide the necessary goods, since the monetary and ecological savings of lightening large metallic bodies are obvious. This is borne out by the fact that NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF)

("NioCorp") has already shifted 75% of its ferroniobium product-to-be in the form of offtake agreements with two major metallurgical companies.

The material will come from the company's Elk Creek deposit in Nebraska which, already being in possession of a full feasibility study, is on the brink of construction. In fact, the CEO of NioCorp recently ploughed another \$180,000 of his own money into the development of the project; confidence is high all round.

The study reveals that Elk Creek is expected to produce 7,055 tonnes per annum (tpa) of ferroniobium, 103 tpa of scandium trioxide, as well as 11,445 tpa of titanium dioxide over its 32-year operating life. Given that the current scandium market is only good for around 15 tpa, these are indeed some ambitious numbers, but they are supported by the fact that new patents involving scandium applications have increased dramatically in recent years in anticipation of the cost savings. And besides, it would only take a tiny fraction (0.1 percent) of the annual aluminum market to reasonably create around 350 tonnes of annual global scandium demand. The NI 43-101 compliant report also states that the resource could attract a total lifetime revenue of \$17.6 billion, so anyone interested in helping to fund this project should be amply rewarded.

Numerous new applications for scandium have been identified and are under research; most notably high intensity stadium lighting, high voltage power transmission and 3D printing could all benefit massively from increased scandium supply.

The need for these materials is clearly strong, but the United States currently produces neither. The state military applications alone could give rise to billions of dollars worth of offtake if scandium and niobium alloys were applied to their fullest potential, and the resulting fuel savings could have a positive environmental impact of colossal

proportions. The pursuit of lighter metals is therefore not simply a cold economics game to benefit shareholders, but an all-round-good-for-everyone affair.

The USA's commitment to construction in the near-future creates an opportunity to employ more superalloys in pipelines, rail networks, buildings, aircraft and many other areas. Despite the low production rates of these elements, there really is no shortage of applications for lighter metals, and this is why Elk Creek appeals to me so strongly; it exists in a complete vacuum.

Upon the launch of the project, the USA should not only receive significant tax revenue (just over \$27 million each year), but become one of the world's top suppliers of superalloys. Materials scientists will always strive to improve products wherever possible, and I fully expect this pressure to manifest as a bolstered superalloys market over the next decade.

Feasibility Study results position NioCorp “shares to head skyward”

NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF) (“NioCorp”) released a positive feasibility study for its Elk Creek project in Southeast Nebraska. The results show that the deposit contains valuable niobium, scandium and titanium metals. The primary focus of the group is to produce ferroniobium and to this end, the company has already secured an offtake for 75% of its production, which de-risks the project considerably.

According to the feasibility study, this massive ore body has a potential value of \$17.6bn over a life of 32 years and has the capacity to produce 143,824 tonnes of niobium, 3,237 tonnes of scandium and 359,128 tonnes of titanium oxides. Capital raising is already in full swing, with \$2m already secured in a private placement so that construction on the mine can begin. The company must now execute a graceful run-up to completing the \$1bn facility that could turn Nebraska, which is not a major mining destination by local or global standards, into the state's major mining destination.

Taking a total of only 36 months, the feasibility study was completed remarkably efficiently, which is largely attributable to the experience of the management team allowing them to move more confidently through the formalities of the exploration stage. Now that the project is de-risked, the company can follow-up on an in-principal agreement with a loan guarantee scheme from the German government to serve as debt financing. This loan agreement will be sufficient to kickstart decent equity financing and propel NioCorp to the ranks of major producer.

The study's results show that the potential returns are indeed substantial and demonstrates a positive net present value (NPV) and internal rate of return (IRR) of \$2.3billion and 24.3% respectively, at a discount rate of 8% and an after-tax NPV of \$1.7bn. The payback period following production is expected to be 3.4 years. With three quarters of the company's ferroniobium production already committed, recouping the cost outlay should be a smooth run.

Over the last six years, more than \$6bn was invested into the niobium market and the landscape of this niche metal has gone through considerable changes in a very short time frame. For years, ferroniobium demand was met by almost entirely by the Salles family in Brazil (CMBB), with Anglo American's Brazilian operations providing the balance. IAMGOLD in Canada was arguably the only other significant producer. Since this

time, 30% of CMBB has been sold to two Asian consortia for \$3.9bn, while IAMGOLD sold its deposit to Magris Resources, a private equity firm, backed by Singapore and Hong Kong investors and not to be left behind, Anglo American sold its Brazilian based niobium business to China Molybdenum (CMOC). Today, Asian investors are said to own more than one third of the globe's ferroniobium production capacity.

Ferroniobium is used to increase steel strength, and with the US's emphasis on domestic infrastructure development, high-strength steel is going to be important in the medium term. Moreover, as the largest players are now in Asian hands, the regional diversification, that Niocorp offers, cannot be underestimated.

With a key federal permit in-hand, NioCorp's advance should be fairly swift, especially considering that management have completed the feasibility stage in such a short time frame. Once the funding is secured, construction could be complete within a couple of years, and with numbers like these, the value of the company's shares are set to head skyward. NioCorp is currently trading at C\$0.68 with a market cap of C\$129.74m, and investors hopeful about making money from the junior mining world should be looking for the most feasible, de-risked, and therefore potentially profitable outfits.

Two key breakthroughs prove the magic of niobium

There is no name for the specific emotion one feels when a silver bullet downs eight problems at once, but no doubt there definitely should be. It is similar to that relief you feel

when you're watching an episode of *The Walking Dead*, and twenty-thousand decaying corpses are but a millimeter from the carotid you happen to be most fond of, which also just happens to be in a collapsing building and, oh yea, everything is on fire; until a surprise twist results in everyone you care about surveying the scene from a safe distance within 0.8 seconds. Suggestions in the comments, please.

NioCorp Developments Ltd. (TSX: NB | OTCQX: NIOBF) ("NioCorp") have had a January to shout about. Back in 2015, they received the results of their Preliminary Economic Assessment (PEA), and aside from the incredibly favourable outcomes, it called for the construction of a seven-kilometer railroad spur line with considerable supporting infrastructure; the function of the railroad was to permit delivery of approximately 7,000 tonnes of reagents every single week that were required for the separation and purification of the three valuable superalloy metals (niobium, scandium, and titanium) that NioCorp is going for in Nebraska. Whomever said the cornhusker state was known only for football and cows was clearly rather shortsighted.

The railroad would have required NioCorp to casually throw up several bridges over the Nemaha River, Elk Creek, and various tributaries, as well as impacting an estimated 2.6 acres of wetlands and open water, and more than 1,700 feet of various water channels. Not to mention the additional land purchases, permits and, oh yea, and everything is on fire.

Terrible, right? Nope. NioCorp has utilised the admittedly oxymoronic magic of science to achieve a great deal this month. In a single announcement, they told us of two key breakthroughs that not only render the rail construction project entirely redundant, but dramatically reduce the environmental impact of the whole extraction going forward.

The first of these breakthroughs permits a large reduction in the size of a range of equipment since NioCorp discovered that

it can still attain high Niobium recovery rates even while using up to an order of magnitude less water than previously planned. This breakthrough removes a zero from the costs!

The second breakthrough came when NioCorp realised they could source the essential reagents from their own waste products. The company found that it can convert significant fractions of its neutralization solids and acid regeneration solids into supplies of neutralizing agents and process reagents that are used to help produce the commercial products. The solid material is comprised mostly of calcium compounds similar to those found in household wallboard, and were originally planned either for disposal on-site or the backfilling of the mine.

With the dissipation of the anticipated impacts, the project's permitting should be vastly smoother, and the associated environmental review process able to be conducted more efficiently. If all of these benefits are achieved, and there is no reason they shouldn't be, NioCorp could reduce both their OPEX and CAPEX for specific portions of the project.

To top it all off, NioCorp announced a \$2m private placement deal on January 27th. Not really surprising given the recent developments, and we're sure there'll be many more eyes cast their way before the snow melts. The PEA, without the rail demands, shows that the Elk Creek Project will deliver exceptional economic results. With anticipated production of 7,490 tonnes per annum of ferroniobium, 97 tpa of scandium trioxide, and 23,960 tpa of titanium dioxide over its 32-year life, Elk Creek is estimated to have pre-tax NPV of US\$3.07 billion. Goodbye railway; hello feasibility study.

Niocorp on the path to global niobium leadership



Niobium is one of fourteen metals or groups of metals that the Council of Europe has identified as critical. The United States National Research Council considers it even more important, listing it as one of the five “most critical” metals. Niobium carries great economic

importance, made all the more so by its high level of supply risk. As has been the case for rare earths, niobium is one of the metals needed to produce ‘new technology’ items. It is needed to develop a wide range of super-alloys, which have applications in aerospace, nuclear energy (associated with zirconium for their resistance to the flow of neutrons) or in powder form to make micro-capacitors. However, niobium’s demand continues to derive from ‘ferroniobium’ thanks to the former metal’s ability to improve steel’s mechanical properties. This is because alloys used in steel must add strength and reduce brittleness while also reducing weight and malleability. Just a few grams of niobium added to a ton of steel can help raise the resulting alloy’s strength by 40%. In other words, a fractional amount of niobium can add enough strength to steel, that it can help engineers reduce weight of any steel based product by as much as 10%. In automobiles, niobium enhanced steel can contribute to significant fuel consumption reductions.

NioCorp (‘Niocorp’, TSXV: NB | OTCQX: NIOBF) believes it has access to over 100,000 tons of niobium in a property about 70 miles southwest of Lincoln, Nebraska at the Elk Creek Project.

Currently, there are no niobium producing mines in the United

States but Niocorp's Elk Creek deposit is rich in barium, rare earth element mineralization and especially high grade concentrations of niobium, which will be the main focus of the project. Niocorp recently announced some very favorable drilling results. The Company announced that its two holes from its latest drilling campaign at Elk Creek have yielded assays containing over 3% niobium pentoxide (Nb₂O₅). The new drillholes were drilled along the opposing sides of the defined Resource and they add to the success from three previously drilled holes that together constitute Phase I of Niocorp's 2014 drilling program. Six more drillholes will be explored as part of Phase II and this process has already started. The results suggest that Niocorp is sitting on a world class deposit, which has prompted the Company to proceed quickly with metallurgy and pilot plant work.

Niocorp's project enjoys strong local support because the eventual niobium mine could employ a few hundred people and benefit the community at a larger scale. Niocorp took over the Elk Creek project from Molycorp (NYSE: MCP), which has since abandoned the site and nobody had done any work on it since Niocorp resumed exploration drilling in 2011. The recent results have given Niocorp officials great confidence in the project given that they are committed to a full metallurgical analysis, leading up to the mine construction stage, which is approaching faster than expected given the quality of the assays to date. Moreover, Niocorp has no competition and niobium demand is only increasing. Niobium has not been produced in the United States in large quantities since 1959 but niobium imports have increased in the United States. Most of it is produced at a mine in Brazil and the total world market is in the 80,000 to 100,000 ton range. While it is crucial for the electric car industry, it is actually in demand by the automotive sector as a whole.

Niocorp can fill that need while also meeting international demand given that the Elk Creek Niobium deposit could be one

of the largest sources of niobium (and other rare earth elements) in the world. Niocorp is very committed to the project and moving this project into development as fast as possible. Niocorp's background is very interesting and shares a history with Molycorp. The Elk Creek property itself was first discovered by Molycorp in the late 1960's and even did some work there in 2010. Mark Smith, after retiring from Molycorp, in late 2012, was asked by Niocorp to lead its management team and is now also its single largest shareholder.