

Tuesday, June 6, 2017



HALLGARTEN & COMPANY

Portfolio Strategy

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Model Mining Portfolio: Beating the Bushes for Cobalt

Performance Review – May 2017

Model Mining Portfolio

Beating the Buses for Cobalt

- + Zinc nearly broke through the \$1.20 per lb mark again then weakened
- + Picture looks positive for base metals with improved EU economy and buoyant US
- + Gold creeping up, silver somewhat becalmed
- + Low oil prices continue to be useful to mine operators
- + The weak commodity currencies continue to aid the margins of miners based in those locations (excepting those with US operations)
- ✗ The negative effects of dumping of “junior miners” by GDXJ, and suspension of a derivative ETF, continue to weigh on the wider universe of junior explorers and smaller producers
- ✗ Financing activity has been negatively impacted by the GDXJ debacle
- ✗ Doubts spreading about the realization of the Trump Administration’s infrastructure “surge”

Cobalt – Points of Access

Usually the promotorial class of Vancouver and Perth can come up with “fresh meat” to feed the market when any new wave comes along without so much as batting an eyelid. However in the Cobalt surge over the last nine months they have been really floundering. The problem for the Perthlings is that Australia really is not endowed with much in the way of Cobalt and certainly nothing of major interest. For Vancouverites the dilemma is that Nickel/Cobalt deposits have quite a bad smell after the capex blowouts of the likes of Goro and Ambatovy. There is no loving of Nickel-Cobalt deposits without loving Nickel as Nickel is usually the dominant presence in a ratio of 10:1. For those who aren’t natural Nickel fans then the worry is that that metal was mainly driven higher in recent time by the erratic moves of the Filipino president. Not a firm base on which to make a cohesive investment case. Then there are the Copper-Cobalt deposits which while abundant in the likes of the DRC and Zambia are thin on the ground elsewhere.

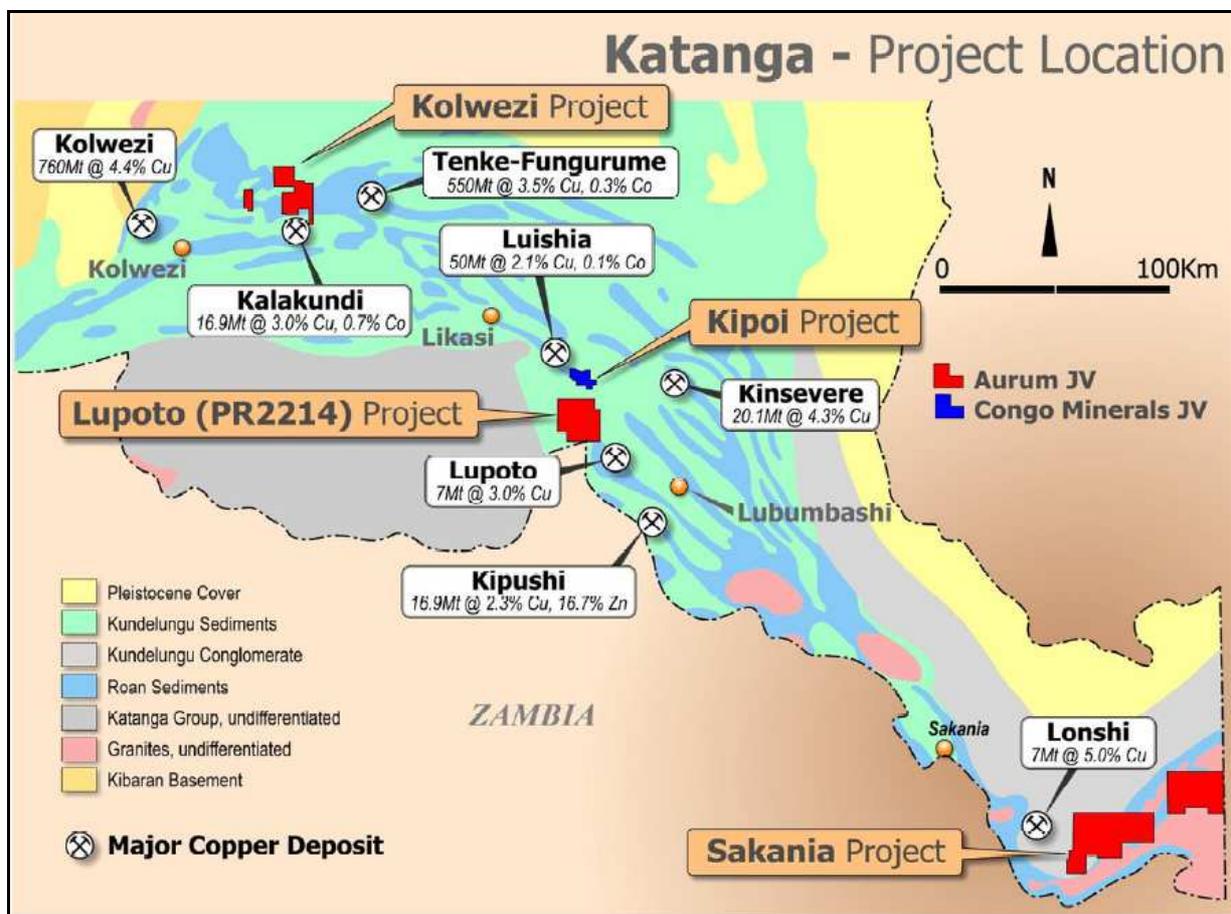
Where to go?

Tiger Resources – Cobalt in the Heart of Darkness

Alas, Copper-Cobalt is the best way to go for access and the 800lb gorilla (pardon the pun) is the DRC and its natural gifts in this respect. There are the well-known large plays in this space but that does

nothing for the promoters or for investors wanted to get in on the ground floor. For us the most obvious answer was to find an up and coming player. Our filters led us to an ASX-listed story, Tiger Resources, that was not a new player by any means having an established copper production operation in the DRC already. The novel thing was that its circuits had not been set up to process the cobalt in its mineralogy so the potential was going to waste, and the potential was sizeable. This was an opportunity to get on the Cobalt boat after the copper boat had sailed.

The thing that perked up our interest was that the company had undertaken a study to investigate the viability of producing cobalt from ASX-listed Tiger Resources' Kipoi project in the Democratic Republic of Congo which had returned positive results.



The company commissioned a study, undertaken by independent engineering company Mintrex, that concluded based on an expected nameplate copper cathode production level of 32,500 tpa, that there is sufficient cobalt potential within the current Kipoi copper leach circuit to justify further studies.

The current Kipoi mineral resource contains cobalt and while it has known for many years that there is latent cobalt in its processing circuit; cobalt pricing has not made it worthwhile to process.

The study has identified two potential cobalt process routes for Kipoi, these are:

- intermediate cobalt intermediate recovery (cobalt hydroxide)
- cobalt refining (cobalt cathode metal)

While these processing pathways could be developed progressively or in stages, Mintrex recommended the development of a cobalt hydroxide circuit producing a cobalt hydroxide intermediate product as a first step. This strategy was expected to cost of US\$22mn (+/-40%) to integrate a 1,000 tpa circuit into the current copper circuit. However with Cobalt where it is now this would give a massive boost to revenues, margins and viability.

The next step is for the company to scope a metallurgical test work program to confirm commercial process flow sheets and firm up the capital cost and estimate likely operating costs.

Travails

The company has run into process issues in recent times with problems in the leach tank operations at the plant. Tiger produced 26,151 tonnes of copper cathode at Kipoi in 2016, and is undertaking debottlenecking works at the solvent extraction and electrowinning plant to increase nameplate production capacity to 32,500 tpa. Cash operating costs for 1Q17 were US\$2.23.

Underperformance on the production front (plus the extended period of low copper prices led to financial issues with the company needing to renegotiate debt and suspending trading while that was resolved.



The Debt Issue

The fly in the ointment for Tiger has been the debt it took on to move itself forward to production. However in early June, the company reached an agreement with the senior lender group of its \$162.5mn financing facility to extend the repayment date.

As a result of the deal both the first repayment installment of \$1.625mn and the second scheduled repayment of \$812,500 would be due in July 2017, while a number of other conditions under the financing facility was also extended or waived.

This was the second time that the repayments of the \$162.5mn financing facility has been pushed back having originally been due in January.

A portion of the facility was used to refinance the previous secured debt facilities with Taurus and financier Gerald Metals SA, while the balance provided expansion capital for the debottlenecking initiative to increase the capacity of the Kipoi mine's to 32,500 tpa.

With the fervour for Cobalt these days Tiger is the most Plug & Play Cobalt story we have found. What other company can go from no Cobalt to 1,000 tpa per annum but just adding a circuit for a little over \$20mn? Now it needs to get a financing done to leave behind these payment woes and get on the road to being a Cobalt producer.

Portfolio Changes

There were two portfolio changes during the month.

- Added a Long position in Abitibi Royalties. Bought 11,000 shares in RZZ.v at CAD\$9.10 per share on the 31st of May
- Added a Long position in Tiger Resources. Bought 2,000,000 shares in TGS.ax at AUD\$0.049 per share on the 31st of May

The Portfolio Move

The Model Mining Portfolio started to regain its mojo rising to a month-end value of US\$4.16mn after having ended April at \$4.089mn,. Net cash declined from \$917,000 to \$771,000.

The rationale for adding Tiger we have just laid out.

Near the end of the month we attended a lunch presentation by Ian Ball the CEO of Abitibi Royalties. We had known him previously from encounters with US Gold/McEwen Mining (which perversely we had a highly profitable Short position upon in the past). However our problems with Rob McEwen did not include problems with Mr Ball and the story at Abitibi is fairly compelling with the company having a look of "Osisko Royalties Jr" about it and a feeling pervading the room that it might eventually become a

target of the larger entity for a rationalization of ownership of the royalty interests on the Canadian Malartic mine. We shall elaborate more upon this story in the future.

Scandium – The Technology Metals Race Where All are Winners

Australians are such aficionados of gambling that there is an old adage that they will bet upon two flies crawling up a wall. There are two Scandium (Sc) stories of note in Australia and both are in New South Wales and both are separated by a mere 90 miles. The first is Scandium International – SCY.v (which we have covered before and has had a stellar run this year) and the other is CleanTeq (CLQ.ax) which, despite its name, is a Scandium developer as a by-product from a Nickel-Cobalt project. With Cobalt as the word on everyone's lips and Scandium the word on ours, it scores a very respectable two out of three.

Getting Informed

At the start of the Rare Earth boom, many misinformed observers referred to Scandium as a Rare Earth, this was despite it not being in the Lanthanide series at all and rarely even appearing with other REEs in mineralisations. This was just blatant false news. Indeed Scandium is twice as prevalent in the Earth's crust as Lead. Rarity should be made of sterner stuff.

The thing that is rare is Scandium production. What production there is (and it amounts to between 10-25 tonnes per annum and even that is a shaky statistic) comes as a by-product of refining of mainly base metals. Indeed Scandium metal is very difficult to reduce to its pure elemental state. In fact, it was not isolated in pure form until 1937 and the first pound of pure elemental scandium metal was not produced until 1960.

The potential of Scandium as an alloying element in aluminium (Al) alloys has been a long-simmering desire of many informed observers over the last two decades. Hundreds of scientific papers have been published describing various improvements in properties that can be achieved, and one text book and a string of reviews or other overview articles are written on this subject.

The use of Scandium as an alloying element in aluminium alloys was first investigated by scientists of the former Soviet Union, who developed several Sc-containing Al-alloys during the 1980's and 1990's.

Aeronautics

Much of the alloy development that took place in the USSR appears to have been intended for aerospace applications. One alloy, 1421, is used for fuselage stringers of large cargo aircrafts, and some parts of the MiG 29 military aircrafts are also made of Sc-containing Al-Li based alloys. It is also claimed that some parts of the international space station (ISS) are made from alloys with Sc.

Aircraft manufacturers have been particularly interested in scandium alloyed aluminum materials. Aircraft designers believe use of Al-Sc alloys can reduce aircraft weights by 15%-20%. In addition, the

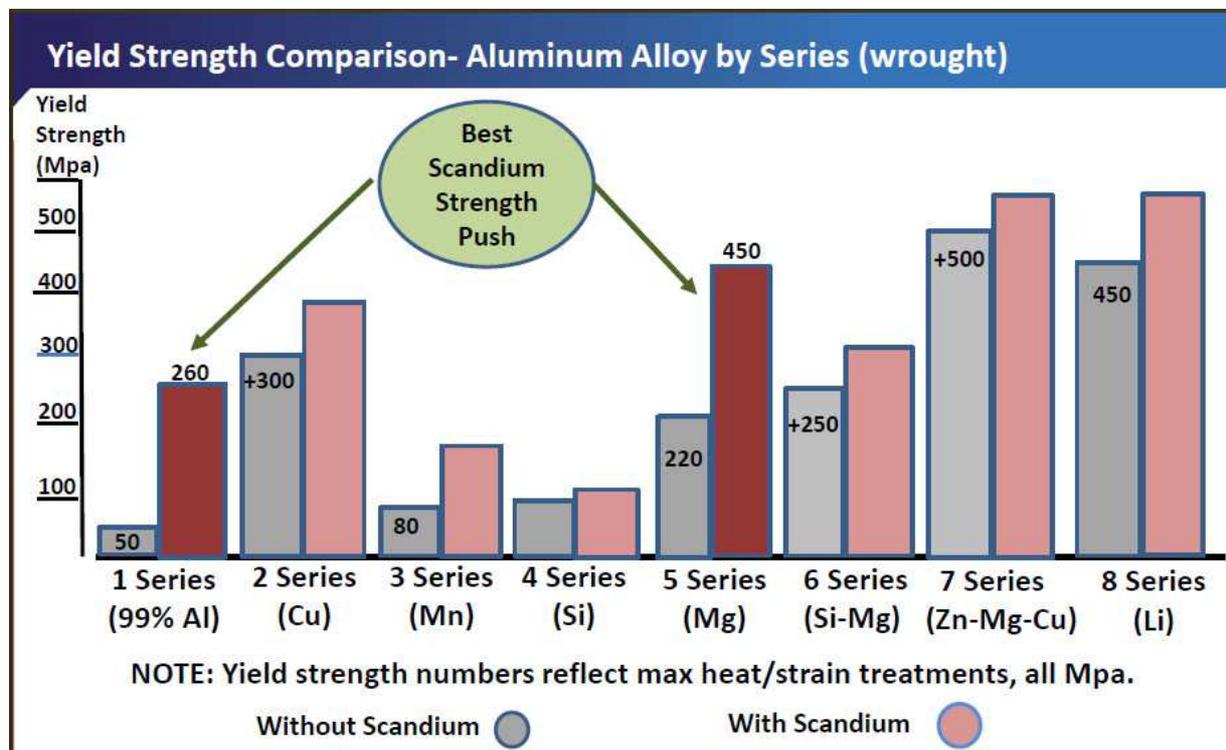
ability to employ weldable structures promises similar cost reduction potential.

The three principle effects that can be obtained by adding scandium to aluminium alloys are

- grain refinement during casting or welding
- precipitation hardening from Al₃Sc particles
- grain structure control from Al₃Sc dispersoids

Addition of scandium in combination with zirconium is particularly effective (which gives us a chance to mention Alkane, which is in close proximity to both the projects in NSW).

The table below shows graphically the eight major series of Aluminium alloys. As can be noted all of them provide aluminium with a strength push when combined with Scandium in an alloy. The two that show the greatest benefits are with pure aluminium and in alloys with Aluminium and Magnesium.



Source: Scandium International

A little goes a long way with Scandium in alloys. Small additions of the metal to an alloy can produce a quantum benefit in strength for a relatively low cost (in many cases the Sc added to the alloy master mixes is a fraction of a percent of the total metal). The effect though is massive in lowering the weight of the plane and thus the fuel costs of operating the plane. The stronger the aluminium the less than needs to be used.

The problem the aircraft manufacturers face in adoption of Scandium alloys *en masse* is not one of price or desirability it is of supply. With no primary mines and no sizeable supply there could at some point be an absolute absence of Scandium supply for either competition reasons or geopolitical considerations. Boeing going to the storage division and finding no Scandium for that day's production would effectively shut down operations. Only with a largish, stable supply from a politically friendly jurisdiction can a wholesale adoption of Scandium in aeronautical applications be considered. For the first time since 1960, this possibility can be realistically contemplated.

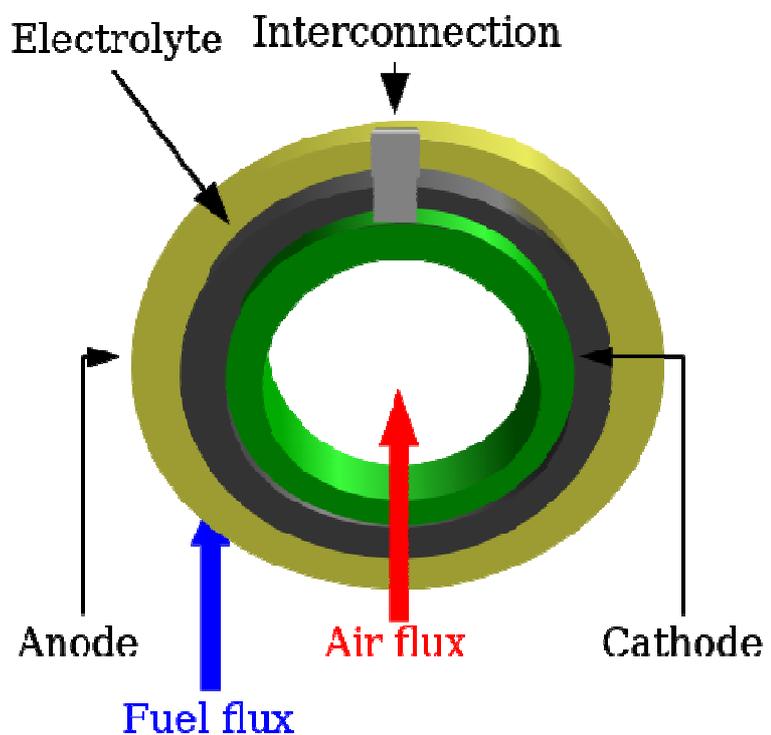
Solid Oxide Fuel Cells

A solid oxide fuel cell (or SOFC) is an electrochemical conversion device that produces electricity directly from oxidizing a fuel. Fuel cells are characterized by their electrolyte material; the SOFC has a solid oxide or ceramic electrolyte. Advantages of this class of fuel cells include high efficiency, long-term stability, fuel flexibility, low emissions, and relatively low cost.

Scandium's usefulness for SOFCs is that it exhibits exceptional electrical conductivity and heat stabilization qualities and therefore the largest volume current use for the metal is in SOFCs.

Scandium is used as the electrolyte component in the fuel cell, most commonly as scandia stabilized zirconia (ScSZ). At the right can be seen a conceptualization of how these fuel cells work, with the electrolyte (containing the Scandium) being the dark grey layer.

Incorporation of scandium in SOFCs enables a lower operating temperature resulting in longer lived equipment and less costly materials of construction. Bloom Energy is the leading SOFC manufacturer and currently the single largest scandium user. The fuel cells are massed into stacks to match the energy required so the potential is enormous and once again limited only by the reliable supply of Scandium rather than any lack of potential end demand.



Build it and They Will Come?

Scandium is the example, par excellence, for our thesis of “Build it and they will come”. In the aeronautics industry in particular tooling up for a different mode of manufacturing or input can be a massive cost running into the hundreds of millions of dollars if not billions. It is clear that the industry wants to apply the benefits that Scandium brings but it is not going to go out on the limb and hope that the adage “Build it and they will supply us” proves to be true. As we all know that train is heading down the track full-speed towards Tesla that has foolishly failed to secure its supply of Cobalt and Lithium for the future. The likes of Boeing and Airbus are not so naïve.

Thus when a significant supply of Scandium is guaranteed then the synergies between aeronautics and Scandium mining will come into play and the uptake of product will be potentially enormous. That in itself will trigger more realistic and workable pricing and in turn that will feed greater uptake (beyond the aeronautical industry into those with more sensitive price points, such as lighting and fuel cells). Scandium International (a long term constituent of the Model Mining Portfolio) is well positioned to do this as a primary mine and potentially CleanTeq will be able to follow with its sizeable by-product credit of Scandium from a Nickel/Cobalt production facility.

It also seems that Australia and most specifically New South Wales will be the epicentre of Scandium activity for the short term and maybe even farther into the future. This in some dusty pub in the Australian pub in the outback will find that betting on either or both of those flies will pay off.

Parting Shot

We were snookered during the month. We published a results note on the truly dire December quarter (and annual) results of our Short call Galane Gold. Seeing the company had plunged to its worst loss in ages, mothballed its South Africa n operation before they had even started production and seemingly did not have enough cash or cashflow to meet its imminent debt repayment obligations we figured that the rumoured acquisition of Vantage Goldfields (the benighted, delisted from ASX, South African player with its subsidiary in administration after a mine disaster) was cast to the trash-can of history. Alas, we hadn't counted on the desperate move of a gambler facing the bitter end that then doubles down and the day after our note the company announced some sort of “acquisition” of Vantage.

The vagueness of this proposal would not have flown if it had been made on the ASX but as Vantage has been delisted the only market that got to hear the announcement was the TSX which is notorious for being undemanding of companies with regards to new release clarity. Galane would have been halted in Australia until it elaborated the transaction. In Canada, though, the stock soared to over 10cts as the lemmings crowded on board for the last voyage of the SS Galane. It reminded us of the joy of Leonardo de Caprio's character at winning a Titanic ticket at a card game. Needless to say the Exchange did not query the company's announcement.

The problems at Galane are threefold. Obviously management is dire, secondly the auditors have rather

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glibly offered going concern assurances that would take anyone else a lot of derring-do to sign and finally the TSX has allowed the company to drive a truck through news release rules by making an announcement that is not only almost empty of detail, but one that also is highly illogical.

The announcement said: "Galane Gold Ltd. has entered into a letter of intent (LOI) for the acquisition of all of the outstanding shares of Vantage Goldfields Ltd., a gold mining company with operations in the Mpumalanga province of South Africa.

The LOI establishes the terms of the acquisition as between the parties and is expected to be followed by the execution of a binding acquisition agreement setting forth the detailed terms of the acquisition and containing conditions customary in transactions of this nature, including completion of satisfactory legal and technical due diligence, delivery by Vantage of a National Instrument 43-101 technical report, and receipt of all other necessary regulatory or third party approvals, including the approval of the TSX Venture Exchange and approval of the business rescue practitioner according to applicable legislation in South Africa. The final structure of the acquisition will be determined by Galane and Vantage to accommodate various legal, tax and accounting considerations. The LOI is not binding (other than certain provisions, including exclusivity obligations) and may be terminated by, among other things, mutual consent or if the acquisition agreement and related transaction documents have not been entered into by June 16, 2017. Further details regarding the acquisition, including the consideration to be paid for the outstanding Vantage shares, shall be provided in connection with the announcement of the signing of the acquisition agreement".

So this begs a number of questions. What is being taken over here? The subsidiary in South Africa that is in administration, or the whole delisted entity in Australia? Who has signed the LOI? The board of Vantage? What say do Vantage's shareholders have in this matter? How is it being taken over? Cash? Shares? We have not heard of a liquidator allowing a company in its charge to be acquired for stock alone? But as Galane has no cash how can it make a cash bid? How can a "business rescue practitioner" allow its charge to pass to a company that has strongly negative cashflow to acquire one that is similarly stricken as it gives no assurance to creditors that they will be paid back? We should remind the administrator that the "acquirer" is itself subject to several debt moratoriums having been unable to pay back Samsung and the Government of Botswana.

With the so-recent example of the Galaxy debacle (mothballed before it was reopened) then how can this acquirer be regarded as a competent acquirer/operator for a mine (Vanguard's Lily mine) that was itself shut after a tragic sinkhole incident that literally swallowed the mine's admin hut and the staff working therein.

The long suffering shareholders/creditors of Vantage may soon find they have jumped out of the frying pan into the fire. As for Galane's shareholders... well they were warned..

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Mining Model Portfolio as at: 2-Jun-17

| Security | Initiated | Currency | Avg. Price | Current Price | Portfolio Weighting | Increase in Value | Target | |
|------------------------------|-------------------------------------|------------|------------|---------------|---------------------|-------------------|---------|---------|
| Long Equities | | | | | | | | |
| Various Large/Mid-Cap | Capstone Mining (CS.to) | 5/29/2009 | CAD | 2.32 | 0.91 | 1.00% | -60.80% | \$2.00 |
| | NevSun (NSU) | 3/23/2012 | CAD | 3.45 | 3.27 | 3.70% | -5.20% | \$5.00 |
| | Sherritt International (S.to) | 7/11/2013 | CAD | 1.78 | 0.78 | 2.70% | -56.20% | \$2.50 |
| | Palladium ETF (PALL) | 10/16/2014 | USD | 72.08 | 79.14 | 4.90% | 9.80% | \$80.00 |
| | Metals X (MLX.ax) | 29/5/2014 | AUD | 0.98 | 0.76 | 2.30% | -22.30% | \$1.00 |
| Uranium | Uranium Participation Corp (U.to) | 10/20/2010 | CAD | 7.01 | 3.74 | 2.10% | -46.60% | \$6.00 |
| | Western Uranium (WUC.cx) | 7/5/2016 | CAD | 2.25 | 1.49 | 2.00% | -33.80% | \$4.80 |
| | GoviEx (GXU.cx) | 6/29/2015 | CAD | 0.08 | 0.17 | 4.70% | 106.90% | \$0.50 |
| Zinc/Lead Plays | Zinc ETF (Zinc.L) | 1/15/2010 | USD | 7.04 | 7.28 | 2.20% | 3.40% | \$9.00 |
| | Canadian Zinc (CZN.to) | 12/9/2011 | CAD | 0.82 | 0.2 | 0.50% | -75.60% | \$0.70 |
| | Ascendant Resources (ASND.v) | 10/31/2016 | CAD | 0.48 | 0.7 | 3.20% | 47.40% | \$1.70 |
| | Nyrstar (NYS:BR) | 9/28/2009 | Euros | 65.1 | 5.43 | 3.70% | -91.70% | € 11.00 |
| | Southern Silver Exploration (SSV.v) | 8/25/2016 | CAD | 0.38 | 0.485 | 2.80% | 27.60% | \$0.94 |
| Gold Producers | Patagonia Gold (PGD.L) | 10/2/2013 | GBP | 3.6 | 1.65 | 1.30% | -54.20% | £4.00 |
| | Komet Resources (KMT.v) | 11/25/2016 | CAD | 0.47 | 0.39 | 1.80% | -17.00% | \$1.28 |
| | Para Resources (PBR.v) | 2/17/2017 | CAD | 0.23 | 0.21 | 2.40% | -8.70% | \$0.58 |
| | Westgold (WGX.ax) | 12/6/2016 | AUD | 2.01 | 1.87 | 3.90% | -7.00% | \$2.40 |
| | Eldorado Gold (EGO) | 6/21/2012 | USD | 9.12 | 4.14 | 3.80% | -54.60% | \$5.50 |
| | Teranga Gold (TGZ.to) | 6/21/2012 | CAD | 1.57 | 3.01 | 8.20% | 91.60% | \$1.50 |
| Copper Producer | Coro Mining (COP.to) | 2/23/2015 | CAD | 0.03 | 0.13 | 3.00% | 333.30% | \$0.30 |
| | Tiger Resources (TGS.ax) | 5/31/2017 | AUD | 0.049 | 0.05 | 2.30% | 2.00% | \$0.12 |
| | Royal Nickel (RNX.to) | 11/17/2016 | CAD | 0.33 | 0.21 | 1.40% | -36.40% | \$0.60 |
| Royalty Trust | Abitibi Royalty (RZZ.v) | 5/31/2017 | CAD | 9.1 | 9.13 | 2.30% | 0.30% | \$18.00 |
| Processor | IBC Advanced Alloys (IB.v) | 4/29/2016 | CAD | 0.3 | 0.41 | 0.90% | 36.70% | \$1.40 |
| Driller | Cabo Drilling (CBE.v) | 9/28/2016 | CAD | 0.025 | 0.02 | 0.90% | -20.00% | \$0.08 |
| Tungsten Producer | Almonty Industries (AII.v) | 7/31/2015 | CAD | 0.36 | 0.25 | 2.90% | -31.00% | \$1.00 |
| Copper Explorer | Asiamet Resources (ARS.v) | 4/28/2016 | CAD | 0.05 | 0.05 | 1.80% | 4.00% | \$0.24 |
| | Western Copper & Gold (WRN.to) | 4/25/2017 | CAD | 1.57 | 1.34 | 3.10% | -14.60% | \$2.74 |
| Nickel Explorer | Sama Resources (SME.V) | 23/2/2015 | CAD | 0.16 | 0.19 | 3.50% | 18.80% | \$0.30 |
| Lithium | Neometals (NMT.ax) | 7/31/2014 | AUD | 0.04 | 0.25 | 2.90% | 575.70% | \$0.60 |
| | Galaxy Mining (GXY.ax) | 6/28/2016 | AUD | 1.73 | 2.25 | 2.20% | 30.20% | \$3.50 |
| Scandium Explorer | Scandium International (SCY.to) | 8/23/2016 | CAD | 0.14 | 0.36 | 4.90% | 157.10% | \$1.00 |
| Graphite Producer | Elcora Resources (ERA.v) | 29/5/2014 | CAD | 0.2 | 0.23 | 2.60% | 15.00% | \$0.64 |
| Graphite Developer | Talga Resources (TLG.ax) | 8/25/2016 | AUD | 0.27 | 0.68 | 7.80% | 156.60% | \$0.90 |
| REE Explorer | Northern Minerals (NTU.ax) | 6/9/2011 | AUD | 0.73 | 0.1 | 0.30% | -86.30% | \$0.28 |
| NET CASH | | | | | 771,007 | | | |
| Short Equities | | | | | | | | |
| Shorts | Bacanora (BCN.v) | 12/4/2015 | CAD | 1.53 | 1.59 | 49.10% | -3.90% | \$0.80 |
| | Galane Gold (GG.v) | 4/28/2016 | CAD | 0.06 | 0.09 | 50.90% | -50.00% | \$0.03 |

| | |
|--|------------------|
| Current Cash Position | 771,007 |
| Current Liability on Shorts Not Covered | 144,000 |
| Net Cash | 915,007 |
| Current Value of Bonds | 0 |
| Current Value of Long Equities | 3,245,888 |
| TOTAL VALUE OF PORTFOLIO | 4,160,896 |

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