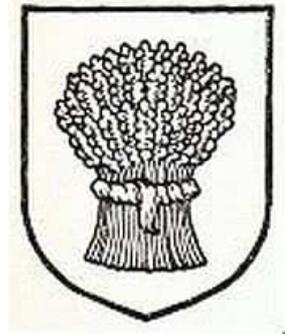


Monday, August 6, 2018



HALLGARTEN & COMPANY

Portfolio Strategy

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Model Mining Portfolio: Battery Metals Taken to the Woodshed

Performance Review – July 2018

Model Mining Portfolio

Battery Metals Taken to the Woodshed

- + **The flow of takeovers is starting to heat up**
- + **Hostile offers are making a reappearance**
- + **The decline in Lithium company financings is making it less likely that there will be any surfeit of production capacity in the mid-2020s**
- ✗ **The trade “war” talk is being blamed for lower base metal prices and it certainly is fueling uncertainty**
- ✗ **The Gold price has lost almost \$100 per oz in a month with little evident rationale for it not maintaining this path lower**
- ✗ **Base metals prices may be subject to manipulation at this time with Zinc definitely showing signs of fiddling with LME warehouse stock by a party or parties unknown**
- ✗ **Cobalt is off the boil after being overhyped and some hedge fund hoarders losing interest and moving on**
- ✗ **Lithium stocks are generally in a bad place with the good, and the bad, seeing hefty stock price declines**

Bump in the Road or a Sinkhole?

The massive secular change that EVs were supposed to represent has seemingly met quite a bump in the road. Or maybe it's a sinkhole because quite a number of Lithium and Cobalt stories have run into it and disappeared from view. The woes of Lithium began when a Wall Street firm that wouldn't know the difference between *spodumene* and *petalite* shouted “Fire” in the crowded nightclub where Lithium-fuelled revelers were hard at their festivities. That has sent the good, the bad and the indifferent into a spiral, that may indeed be the death-spiral for many. Other worthy names (e.g. Neometals, Nemaska) have been sucked down in the same downdraught. We would humbly suggest this shows that Wall Street investment banks are not the only babes in the Lithium woods. Some projects have got their projects on the road and indeed can still get financed but this looks like 2010-11 all over again with the weaker wildebeest in the herd falling prey to the Darwinian forces of Bay Street and ultimately being repurposed for the next fad.

The Cobalt retreat is of a much more recent vintage. It can almost be timed to the Cobalt27 raise/royalty which told the market none too subtly that 1): majors like Vale/Inco were not believers in the Cobalt story and 2): that Cobalt was out there in major mines and in major quantities and all that needed to happen was that the mines needed to be extended at depth or along strike. Oops... not exactly an

endorsement of Cobalt's scarcity value. Majors can be wrong, BHP and RTZ show this with depressing regularity. However in this case a cursory glance at the people involved in ramping Cobalt gave one a case of déjà vu with many of our old friends from the Rare Earth and Lithium 1.0 phenomena were strongly represented.

The EV surge is not going away but it may also not evolve in the way that over-enthusiastic investors and promoters might imagine. This is not the first bump in the road (that was back in 2011) and this will not be the last. The search is on for a replacement for Cobalt in whole or part so pursuing the Cobalt dream looks like the weakest part of the battery metals quest. Lithium's role is guaranteed because the supply will rise to meet the challenge. The same cannot be said for Cobalt so the greatest likelihood is that majors (OEMs, battery makers etc) will start reformulating to minimize their exposure/risk from Cobalt not being deliverable for their needs. This does not mean that it will be replaced by other exotic metals but rather by metals that are a known quantity, such as nickel or manganese.

It is interesting to note that the price of EMD, an elaborated Manganese product has been rocking while Cobalt has been having its latest swoon.

The LiB Format – Flawed but Entrenched

The shortcomings of Lithium Ion batteries have become increasingly evident over the last few years. This is illustrated by the first suspicions in the MH370 disappearance being linked to a pallet of lithium batteries supposedly in the cargo and then the travel ban on the Samsung Galaxy Note 7.

As if the travails of the Samsung product were not enough there is a rising tide of frustration with the chargeability (or lack thereof) with the most common example of LIBs, namely in mobile phones. With rising usage (in terms of minutes and hours spent online) and ravenous apps continuing to operate even when a phone is not being actively used, the batteries are lasting ever shorter amounts of time and necessitating that users carry back-up power packs or spend their lives in search of "somewhere to plug in". If this is the future it looks very fraught and grim.

The die has already been cast though with regards to the type of battery that will go into the next few generations of EV and HEVs. It would be too expensive and disruptive for Western car makers to execute a *volte face* away from LiBs. However as applications proliferate so do technologies. Prominent amongst these are batteries utilizing Manganese as a key component.

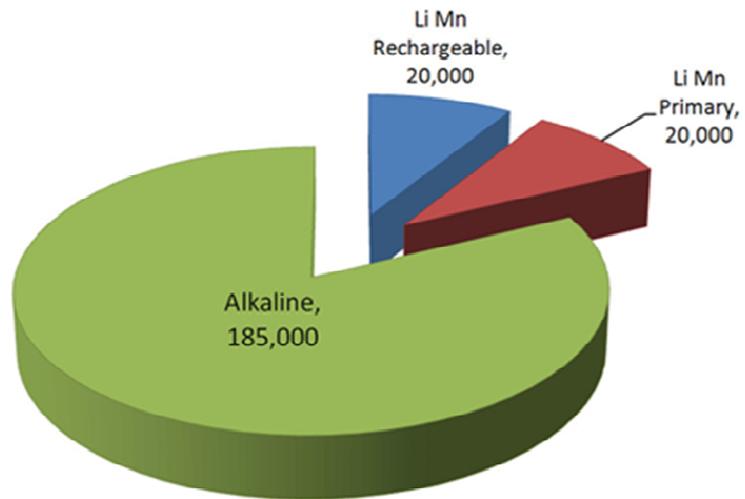
Manganese Usage in Batteries

It is not news that manganese is currently employed in that most prosaic of battery formats, the alkaline battery (think AA or AAA). There is nothing new in that but it does provide a constant demand for manganese and has done for over half a century. It is also one in which little effort goes into the recycling of the Manganese metal in batteries.

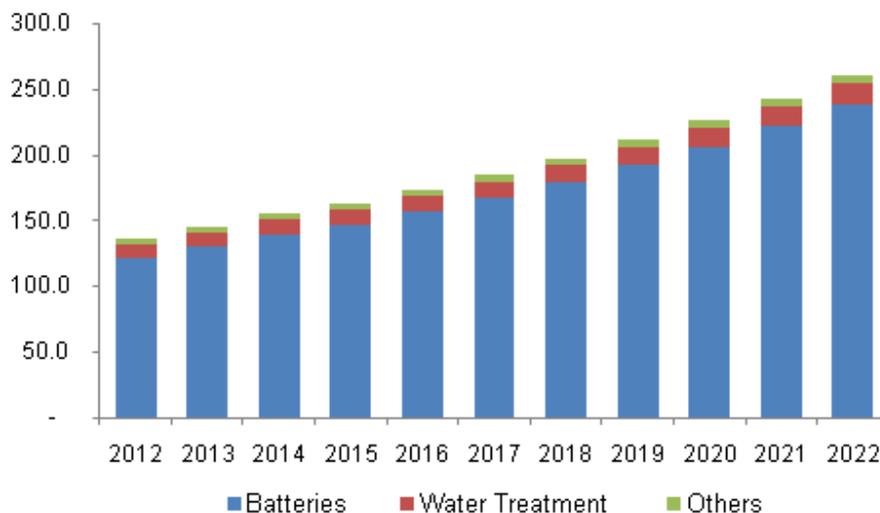
The cutting edge application is the Lithiated Manganese Dioxide (LMD or LMO) Battery. The Lithium-Mn

oxide spinel is a relatively new material with some proposing that, the ongoing expansion of the EV market may rely on its greater use in rechargeable batteries. LMO batteries are associated with good structural stability, low-cost and good electronic and lithium-ion conductivity. With growing concern over the safety and viability of other cathode designs spinels based on LiMn_2O_4 are growing in popularity as cathode materials.

Electrolytic Manganese Dioxide (EMD) is a vital ingredient in the production of alkaline batteries with total annual production capacity estimated by the International Manganese Institute at roughly 430,000 mt. The pie at the right shows how (a few years back) the metal already had a strong position though overwhelmingly skewed towards alkaline battery applications.



Battery consumption of Electrolytic Manganese Dioxide (EMD) has been predicted to be fastest growing segment of manganese production with a CAGR of 5.1% from 2015 to 2022. As can be noted in the chart of projected usages below:

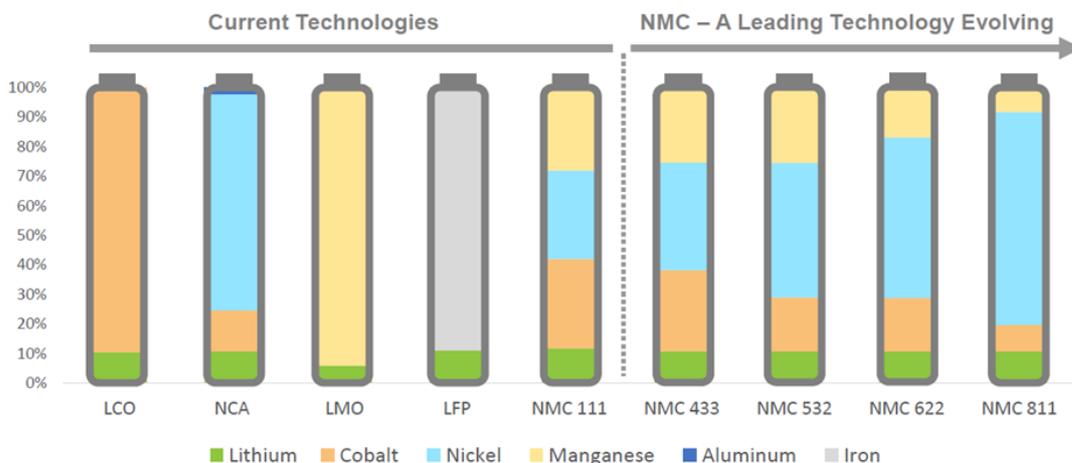


Source: Grand View Research

The standard mix of LMD used in batteries contains 4% Lithium, 61% manganese and 35% oxygen by atomic weight. The attractions of this format are that LMD has high power output, thermal stability and enhanced safety when compared to other lithium ion battery types. For these reasons LMD batteries are used in the Chevy Volt and Nissan Leaf. Research at the University of Illinois has achieved an advanced prototype battery, using Lithiated Manganese that can be recharged in as little as two minutes (equivalent to filling a gas tank).

The Chinese market is currently heavily weighted towards the Lithium iron phosphate (LFP) battery formulation with little to no Cobalt involved. However, Manganese is a key ingredient in the cathodes of two of the most prominent up and coming electric vehicle battery types: the nickel-manganese-cobalt (NMC) battery, and the LMD/LMO battery.

The chart on the following page shows the potential mix of battery metals and how in some combinations it can enable nickel as a Cobalt replacement rather than acting as the Cobalt replacement itself *per se*.



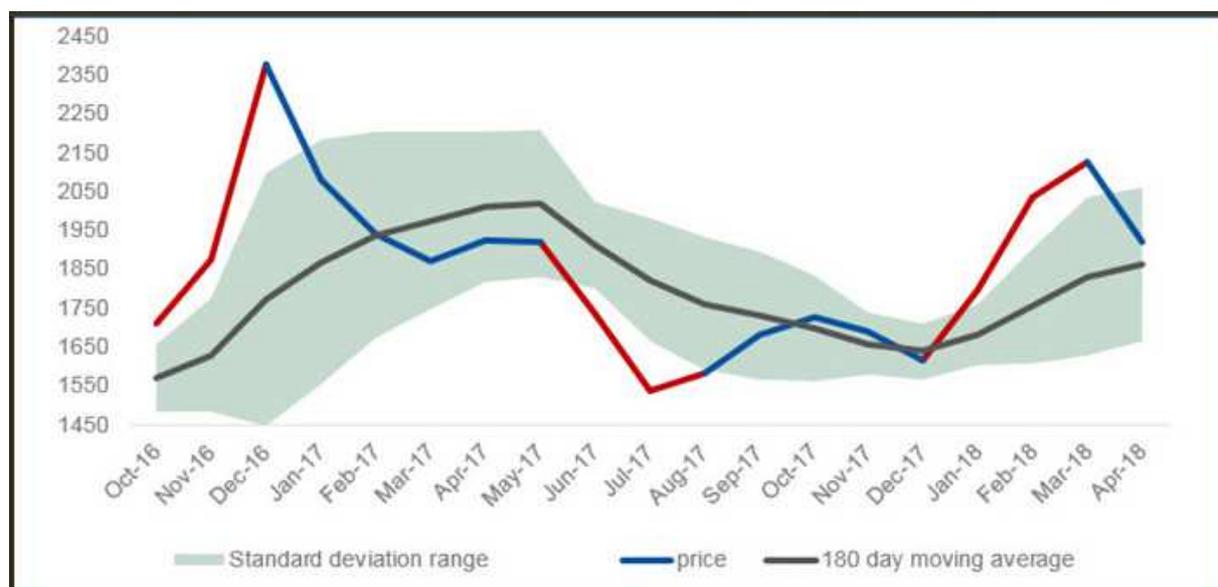
Source: HIS Markit

As the cathode markets develop toward NMC, it is felt by many observers that the LFP format favored by Chinese manufacturers, with lower suitability for electric vehicles will lose market share. Current NMC ternary lithium-ion batteries from South Korean and Japanese makers typically employ a ratio of 60% nickel to 20% manganese, and 20% cobalt (6:2:2), but as that ratio moves to 8:1:1 in 2018 and beyond, the cathode is a key element in achieving vast cost efficiencies. At the current moment though other formulations such as 5:2:3 and 1:1:1 have higher global markets shares than those favoured by the Japanese and Koreans.

At the moment, NMC battery is setting the industry standard and is likely to be at the forefront for at least five or ten years.

Recent Price Trends

Spot export prices of Chinese electrolytic manganese metal surged over June and July as supply continued to tighten, supporting domestic prices further. S&P Global Platts' weekly 99.7% Mn electrolytic manganese metal assessment stood at \$2,800-\$2,850/mt FOB China in mid-July, up from \$2,530-\$2,580/mt on July 6 and \$2,200-\$2,300/mt on June 29.



Source: CRU Bulk Ferroalloys Monitor

The chart above shows the price of EMM in USD per tonne over the last few years, though excluding the latest dramatic uptick. The green area represents the zone of standard deviation.

Manganese (at least with current technologies) has not superseded Cobalt and shows no sign of doing so, but as an enabler of different battery chemistries it should send a shiver through Cobalt's fan-club.

With unquestioned availability and with a broader and more stable collection of producer nations it certainly is less problematic than the Blue Metal.

Portfolio Changes

There was only one portfolio change during July:

- Covered our Short position in Cobalt27. Bought 12,000 shares in KBLT.to at CAD\$7.69 per share

The Portfolio Move

The ongoing malaise in the markets caused the Model Mining Portfolio to retreat to \$4.856mn from the \$5.112mn registered at the end of June. Cash was down to \$1.438mn from \$1.49mn due to the Short covering.

Bacanora – Mired in Mexico

Our Short position in this stock looked slightly hairy when it made the switch from Canada to the London market to get away from the vagaries of Bay Street. It looked like a smart move to relocate to a market where the Powers-That-Be at the company had many “associates” that represented the levers and cogs to keep it at a healthy valuation. We almost thought of ditching the position despite our fundamental disbelief in the attractions of its Sonora deposit. However our convictions have been vindicated as the stock made a belated catch-up with the rest of the Lithium pack in the Downhill Slalom event.

Bacanora’s gyrations were due to its news flow during the month. Seemingly on the positive side on the 5th of July it announced it had entered into a US\$150 million senior debt facility with RK Mine Finance, a specialist in the provision of senior debt capital to mining companies, for the development of Stage 1 of the Sonora Lithium Project in Mexico, an initial 17,500tpa lithium carbonate (Li₂CO₃) operation (with a capex of US\$420mn).

The facility was to be structured as two separate Eurobonds to be listed in Jersey:

- Main bond: US\$150m nominal amount secured notes issued at a purchase price of US\$138m with a 6-year term and bearing an interest rate of three months LIBOR +8% per annum based on a nominal amount of US\$150m but payable only on drawn down principal. Interest will be capitalised every three months for the first 24 months and thereafter interest will be paid every three months in cash;
- Second bond: US\$56m nominal amount zero interest-bearing secured notes issued at a purchase price of US\$12m with a 20-year term. The nominal amount is repayable by reference to monthly production of lithium at a rate of US\$160 per tonne of lithium produced, with any remaining amount repayable at the end of the 20-year term; and
- Grant of 6 million warrants exercisable over five years at a 20% premium to the 20-day VWAP, subject to normal anti-dilution provisions, cash settlement at the Company's option, and cashless exercise at either party's option.

The facility may be drawn in three tranches of US\$25m, US\$50m and US\$75m.

Then mid-month the company announced it had agreed *conditional* strategic investments of US\$65mn from the State General Reserve Fund of Oman, the sovereign wealth fund of the Sultanate of Oman and US\$25mn from the previously announced off-take partner, Hanwa Co., LTD , for a combined total of US\$90m. What this was conditional upon was not clear.

Then on the same date it announced a US\$100mn placing with the gross proceeds being utilized to begin and progress construction as per the schedule outlined in the DFS published in January 2018 and allocated as follows:

- Beneficiation plant - US\$1.7mn
- Processing plant - US\$25.6mn
- Infrastructure - US\$38mn
- EPCM/Owners - US\$21mn
- Contingency - US\$10.7mn
- Working capital - US\$3mn

It's a short life but a lively one in the capital markets these days as the last proposal only lasted 3 days and the financing was scrapped. To the market this signalled that the project was going into the freezer, if not the deep freezer. The price action was grim for believers and heartening for Shorts like ourselves.

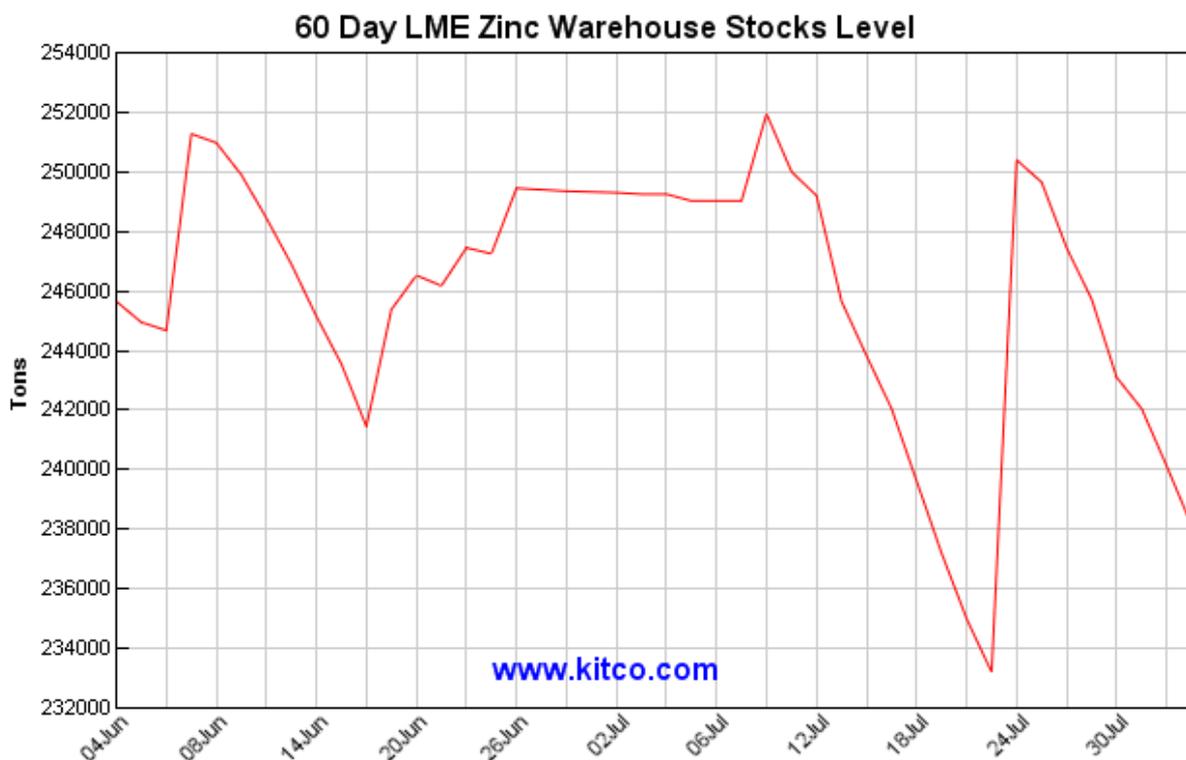


Our problem with this project can be summed up in two words “basalt cap”. If one can find another successful Lithium project that has Lithium clays under a basalt cap we would love to hear about it. Until such time (or its reaches our target price) then this remains a Short call in the Model Mining Portfolio.

Parting Shot

Every man, and his dog, is ascribing the woes of the base and precious metals markets to Trump’s “Trade War”. However to us this seems to be a combination of noise about the as yet unquantified effects of the trade war (Smoot-Hawley Mark II) and some real attempts at manipulation by either China or a big player in the metals space.

Let’s start with the latter factor. We have been watching the LME stocks of Zinc. Below can be seen the stocks in recent months. Some party or parties keeps wandering into the market and dumping large amounts of stocks into the warehouses with the effect of suppressing any Zinc price rebound.



It has been a pretty effective strategy because as we can see Zinc stocks are down from their levels of 60 days ago and the price is around \$1.17 per lb and yet the price was \$1.42 when stocks were at their higher level in early June. It is requiring increasingly large movements of metal into the warehouse to maintain this strategy. One wonders how long even a determined party can keep this up with only the likes of Glencore or China having the powder (pardon the pun) to maintain this momentum.

Then back to the supposed Trade War. Some of the more academic are making comparisons to Smoot-Hawley however these analyses are way off due to not only different times but different strategies and different philosophies. Smoot-Hawley posited the US as some sort of natural autarky. Trump, at least as far as we have heard, is not anti-trade per se, but rather on a crusade for a level-playing field. Indeed it might be argued that he is a trade purist, the diametric opposite of Smoot-Hawley's intentions.

The chief problem is that victory in this battle requires the Chinese to lose face... and bigtime. The US has nothing to offer in exchange for this loss of face because everything was given to China already. The levelling of the playing field involves removing voluminous advantage from the goals at the Chinese-end of the pitch. How the Chinese leadership sells losing face to themselves, let alone their own people, is the question and seemingly an imponderable one.

Just as Chairman Kim in North Korea conceded to Trump (in exchange for not getting nuked) the Chinese will have to concede in exchange for not getting economically nuked. China has all to lose in its largest export market. It has not developed its own economy enough that it can walk away from the challenge. The suggestion that China can financially nuke the US is being made to the wrong challenger of the existing order because Trump is prepared to stare down such threats and moreover go *mano-a-mano* with all the tools in his financial arsenal .. and what a stare he has. If the Chinese are prepared to risk escalation then may just have met their match. With the US dollar riding high and the yuan looking like a sick parrot, it's not hard to guess who the markets think will win this shoving match.

So far most of Trump's policy gambits seem to have paid off so he is unprepared to ruin his winning streak by folding his cards. When he is sanguine with even iconic names such as Harley-Davidson as collateral damage then there are few things that might stand in the way.

Why base metals should be collateral damage is not clear to us. Whatever is displaced from being supplied by China (if the Chinese don't give in) will be supplied from elsewhere or made in the US. The supply of copper, zinc and a swathe of other base metals is not dependent upon Chinese sources/mines. Our suspicion is that as this crisis either grows tired, or is resolved, the prices of these metals will start to trend higher again. This is NOT the end of the latest commodity cycle.

Mining Model Portfolio as at: 1-Aug-18

| Security | | Initiated | Currency | Price | | Portfolio | Increase | Target |
|------------------------------|-------------------------------------|------------|----------|-------|---------|------------------|----------|---------|
| | | | | Avg. | Current | Weighting | in Value | |
| Long Equities | | | | | | | | |
| Various Large/Mid-Cap | Teck Resources (TECK.B) | 5/29/2009 | CAD | 22.46 | 33.93 | 10.40% | 51.10% | \$38.00 |
| | NevSun (NSU) | 3/23/2012 | CAD | 3.45 | 4.83 | 5.70% | 40.00% | \$5.00 |
| | Sherritt International (S.to) | 7/11/2013 | CAD | 1.78 | 0.97 | 3.40% | -45.50% | \$2.50 |
| | Metals X (MLX.ax) | 29/5/2014 | AUD | 0.98 | 0.67 | 2.00% | -31.50% | \$1.00 |
| Trading House | Noble Group (CGP.SG) | 15/11/2017 | SGD | 0.20 | 0.13 | 2.00% | -34.70% | \$0.30 |
| Uranium | Uranium Participation Corp (U.to) | 10/20/2010 | CAD | 7.01 | 4.42 | 2.60% | -36.90% | \$6.00 |
| | GoviEx (GXU.v) | 6/29/2015 | CAD | 0.08 | 0.20 | 5.60% | 143.40% | \$0.50 |
| Zinc/Lead Plays | Zinc ETF (Zinc.L) | 1/15/2010 | USD | 7.04 | 7.55 | 2.30% | 7.20% | \$11.00 |
| | Canadian Zinc (CZN.to) | 12/9/2011 | CAD | 0.82 | 0.14 | 0.40% | -82.90% | \$0.70 |
| | Ascendant Resources (ASND.v) | 10/31/2016 | CAD | 0.49 | 1.00 | 6.80% | 104.50% | \$1.70 |
| | Telson Mining (TSN.V) | 3/19/2018 | CAD | 0.79 | 0.65 | 5.20% | -17.70% | \$2.00 |
| | Southern Silver Exploration (SSV.v) | 8/25/2016 | CAD | 0.25 | 0.49 | 2.80% | 94.00% | \$0.94 |
| Gold Producers | Para Resources (PBR.v) | 2/17/2017 | CAD | 0.23 | 0.19 | 2.20% | -17.40% | \$0.58 |
| | Westgold (WGX.ax) | 12/6/2016 | AUD | 2.01 | 1.60 | 3.30% | -20.40% | \$2.40 |
| Copper Producer | Coro Mining (COP.to) | 2/23/2015 | CAD | 0.03 | 0.10 | 2.30% | 233.30% | \$0.30 |
| | RNC Minerals (RNX.to) | 11/17/2016 | CAD | 0.33 | 0.09 | 0.60% | -72.70% | \$0.60 |
| Coking Coal | Colonial Coal (CAD.v) | 6/4/2018 | CAD | 0.35 | 0.31 | 2.90% | -11.40% | \$1.10 |
| Royalty Trust | Abitibi Royalty (RZZ.v) | 5/31/2017 | CAD | 9.10 | 10.00 | 2.60% | 9.90% | \$18.00 |
| Beryllium | IBC Advanced Alloys (IB.v) | 4/29/2016 | CAD | 0.30 | 0.30 | 0.70% | 0.00% | \$1.40 |
| Driller | Cabo Drilling (CBE.v) | 9/28/2016 | CAD | 0.03 | 0.01 | 0.50% | -60.00% | \$0.08 |
| Tungsten Producer | Almonty Industries (All.v) | 7/31/2015 | CAD | 0.36 | 0.90 | 10.60% | 148.30% | \$1.00 |
| Copper Explorer | Asiamet Resources (ARS.v) | 4/28/2016 | CAD | 0.05 | 0.11 | 3.80% | 113.00% | \$0.12 |
| | Panoro Minerals (PML.v) | 1/22/2018 | CAD | 0.25 | 0.37 | 2.60% | 46.00% | \$0.65 |
| | Western Copper & Gold (WRN.to) | 4/25/2017 | CAD | 1.57 | 1.05 | 2.50% | -33.10% | \$2.74 |
| Lithium | Neometals (NMT.ax) | 7/31/2014 | AUD | 0.04 | 0.29 | 3.30% | 683.80% | \$0.45 |
| | Lithium Power Intl (LPI.ax) | 10/25/2017 | AUD | 0.44 | 0.30 | 2.00% | -31.80% | \$1.38 |
| Scandium Explorer | Scandium International (SCY.to) | 8/23/2016 | CAD | 0.14 | 0.17 | 2.40% | 21.40% | \$1.00 |
| Gold Explorer | Banyan Gold (BYN.v) | 11/14/2017 | CAD | 0.07 | 0.05 | 1.50% | -28.60% | \$0.25 |
| Graphite Producer | Elcora Resources (ERA.v) | 29/5/2014 | CAD | 0.20 | 0.21 | 2.50% | 5.00% | \$0.64 |
| Graphite Developer | Talga Resources (TLG.ax) | 8/25/2016 | AUD | 0.27 | 0.53 | 3.00% | 100.00% | \$0.90 |
| REE Explorer | Northern Minerals (NTU.ax) | 6/9/2011 | AUD | 0.23 | 0.10 | 1.50% | -57.40% | \$0.28 |
| NET CASH | | | | | | 1,433,014 | | |
| Short Equities | | | | | | | | |
| Shorts | Bacanora (BCN.L) | 12/4/2015 | GBP | 0.825 | 0.647 | 34.70% | 21.60% | £0.60 |
| | Lithium Americas (LAC.to) | 10/25/2017 | CAD | 10.10 | 5.01 | 36.60% | 50.40% | \$5.00 |
| | Galane Gold (GG.v) | 4/28/2016 | CAD | 0.06 | 0.05 | 28.70% | 16.70% | \$0.03 |

| | |
|--|------------------|
| Current Cash Position | 1,433,014 |
| Current Liability on Shorts Not Covered | 147,340 |
| Net Cash | 1,580,354 |
| Current Value of Bonds | 0 |
| Current Value of Long Equities | 3,276,531 |
| TOTAL VALUE OF PORTFOLIO | 4,856,885 |

Important disclosures

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