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HALLGARTEN & COMPANY

Portfolio Strategy

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Model Mining Portfolio:
Lithium's Mood Swings

Performance Review – January 2018

Model Mining Portfolio

Lithium's Mood Swings

- + **Lithium left its aficionados floundering when the inevitable pullback came out of leftfield because they had failed to keep their eye on Chile**
- + **China appears to be disciplining the Copper price to not allow it to get over-heated. Those positing $4 per lb in the short-term will be disappointed**
- + **After a brief swoon in late 2017 the recovery in Tungsten resumed**
- + **Zinc made one of the best starts to the year moving into virgin territory above $1.60**
- ✘ **Gold and silver have gone nowhere in the first part of 2018 showing that the late 2017 action was a ramp**
- ✘ **The recovery of WTI continues apace which is going to start to impact margins for miners with high oil dependency**
- ✘ **Poor adoption levels of solar and wind energy alternatives by the mining industry are an indictment of troglodytic managements/consultants**

Lithium – An Inevitable Letting off of Steam

One of the inevitable results of the election victory of Sebastian Piñera in the Chilean presidential race was that peace would break out in the ongoing tensions between SQM and the Chilean government. In mid-January this is exactly what happened and the listed Lithium universe was briefly turned upon its head. The panic merchants became confused by what is likely to be a long-term Chilean challenge to the easy ride that Argentine contenders have enjoyed over the last 18 months. They conflated it into a massive rout of the Lithium price imagining a fanciful avalanche of extra product out of Chile. This concept is ludicrous as the demand dynamics have not changed, it just means that marginal projects will be knocked out of contention.

To begin with the harsh reality of all lithium *salar* projects also rules in this case. SQM cannot have a massive surge in production in the short term because it takes 18 months to two years for the evaporation process to yield extra production, presuming that SQM do decide to max out their potential at Salar de Atacama. Additionally they will need to have the pondage to do so, which implies also a build-time.

Another factor that has not been considered is that Albemarle, when it came to its recent accommodation with the Chilean government, committed to allocate a large proportion of its output for further up-processing within Chile. The implication of this is that SQM will also have to make a similar commitment which implies processing plant build-time for SQM, or its onshore processor, and commensurately less unelaborated product for the export market.

This latest "upset" frankly came at a time when various over-hyped projects, particularly in Argentina and Australia, were starting to have valuation issues raised by investors. The latest news thus was an overdue letting off of steam. However, due to the ignorant nature of the markets on most Lithium matters, stocks like **Lithium Power International** (one of our Lithium Longs) were also caught in the downdraught that took down the likes of **Lithium Americas** (one of our two Lithium Shorts) and Neolithium that were ripe for correction.

Rare Earths – Sleep No more

One of the fallacies of the last decade has been that because the collapse of the first Rare Earth Boom was so wrenching that there was no need for any extra production and therefore nothing more would be developed in the space. The handful of surviving REE developers were regarded as indulging in a quixotic hunt for something no-one wanted.

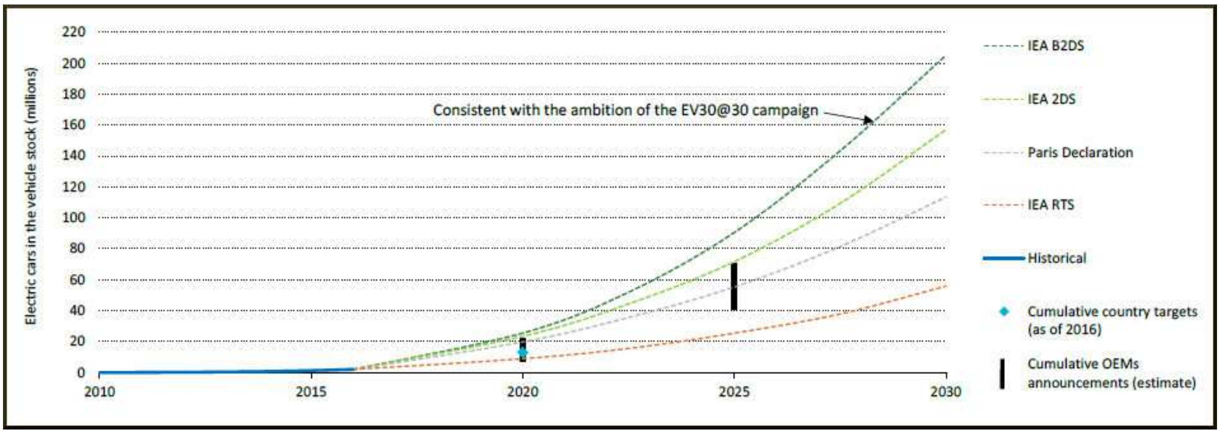
What investors have failed to grasp is that the Rare Earth scene will repeat what has happened in the Lithium space. Just as there was a Lithium 1.0 moment back in 2009-2010 that was driven by the first hopes of the EV/HEV revolution and now there is Lithium 2.0, so there will be a parallel Rare Earth 2.0 moment due to the mirroring requirement for a massive extra amount of Rare Earth production to meet the needs of EV/HEV engine production over the period to 2030. Mass adoption of EV/HEV will turn into the new normal with EV's being the dominant vehicle type on the roads. This surging demand will need a surging supply and the Chinese are not positioned to meet that challenge.

The prices of most Rare Earths have stirred from their long slumber. The past two years have seen the selective reawakening of various metals after the brutal 2011-15 period and, comparatively speaking, Rare Earths and Uranium have been the laggards in this process. Finally, in 2017 a few of the more sought-after REEs have started to move higher.

This dynamic is a combination of a Chinese willingness to see prices rise in the space now that the Western "threat" has been beaten and the nascent perception that Rare Earths might start to be driven by the same dynamic as Lithium, i.e. the EV/HEV Great Leap Forward. The first element we shall deal with anon while the latter is a crucial new(ish) factor in calculations of REE demand.

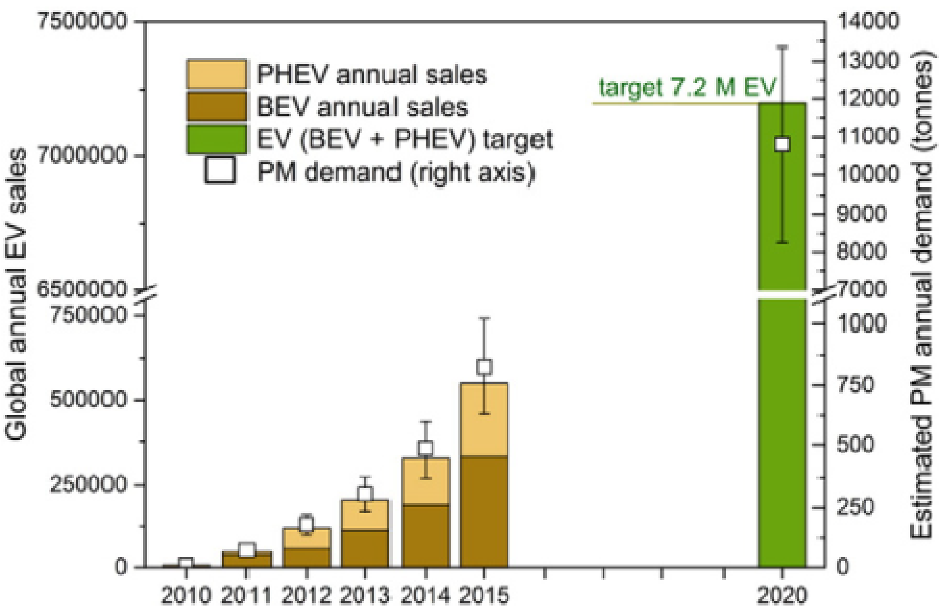
In their Global EV Outlook survey for 2017 published by the OECD/IEA the authors commented that "signs of continuous improvements from technologies currently being researched confirm that this [growth] trend will continue, narrowing the cost competitiveness gap between EVs and internal combustion engines (ICEs). Assessments of country targets, original equipment manufacturer (OEM) announcements and scenarios on electric car deployment seem to confirm these positive signals, indicating a good chance that the electric car stock will range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025".

Below can be seen the IEA's deployment scenarios for the stock of electric cars to 2030.



Source: International Energy Agency

It is useful to refer to the paper entitled "Role of substitution in mitigating the supply pressure of rare earths in electric road transport applications" written by C. Pavel et al.. In this paper the authors state that: "In 2020, EV, HEV and e-bike applications combined could require double the amount used in 2015. To meet the global deployment target of 7.2 million EVs sales in 2020 proposed by the International Energy Agency, the demand for NdFeB in the EV sector might increase by up to 14 times in only 5 years (2015–2020)". They accompany their assertion with this chart below:



The chart makes frightening reading for those automobile manufacturers that have blithely assumed that "China will provide" while forgetting that China will provide for itself first and for others if they have any surplus. Conversely the chart is gladdening to those in the Rare Earth mining space or claimants thereto, because it shows a massive uplift in demand for those REE magnet metals.

In 2014 the global annual production of Rare Earths (in metal form) was estimated to be around 21,000 tonnes Nd, 6,300 tonnes Pr and 1,400 tonnes Dy. The NdFeB magnet is the major application for all three Rare Earths.

As the REE component in an average NdFeB magnet is 29-30% of the total metal content, one could project that if an incremental 12,000 tonnes of permanent magnets will be required in 2020 for EVs then around 4,000 tonnes or extra magnet REE metals will be required by just 2020. However beyond that the demand continues to expand exponentially out to 2030.

In the case of our favoured Rare Earth stock, **Northern Minerals** (NTU.ax), to put even the lower number of 4,000 tonnes in perspective, the Neodymium output of NTU in its Phase One would only be a minute contribution (10.6 tonnes) to this required increment. It would only be satisfying the market with 49.4 tonnes per annum of Dysprosium. This debunks totally the arguments of those that claim that any new mines would upset a supposed delicate supply/demand balance. It is more likely that Northern will be marketing small amounts into a market that will be veritably ravenous for extra supply.

While two other companies look like they might reach production in the next three years, Northern Minerals is indubitably ahead of the pack. It was the first to grasp that small is beautiful capitalizing upon the lessons learnt by the wounded (Lynas) and slain (Molycorp) behemoths that arose from Rare Earths 1.0. With a staged approach to production and a focus on slashing capex that would make Jack the Ripper proud, Northern has cut its coat to suit the very skimpy cloth available in capital markets. It has also managed to get itself a real offtaker so when the production rolls it will have a taker and at an identifiable price. This is no mean feat considering how the odds were stacked against any wannabe producer.

Portfolio Changes

There were two portfolio changes during the month of January.

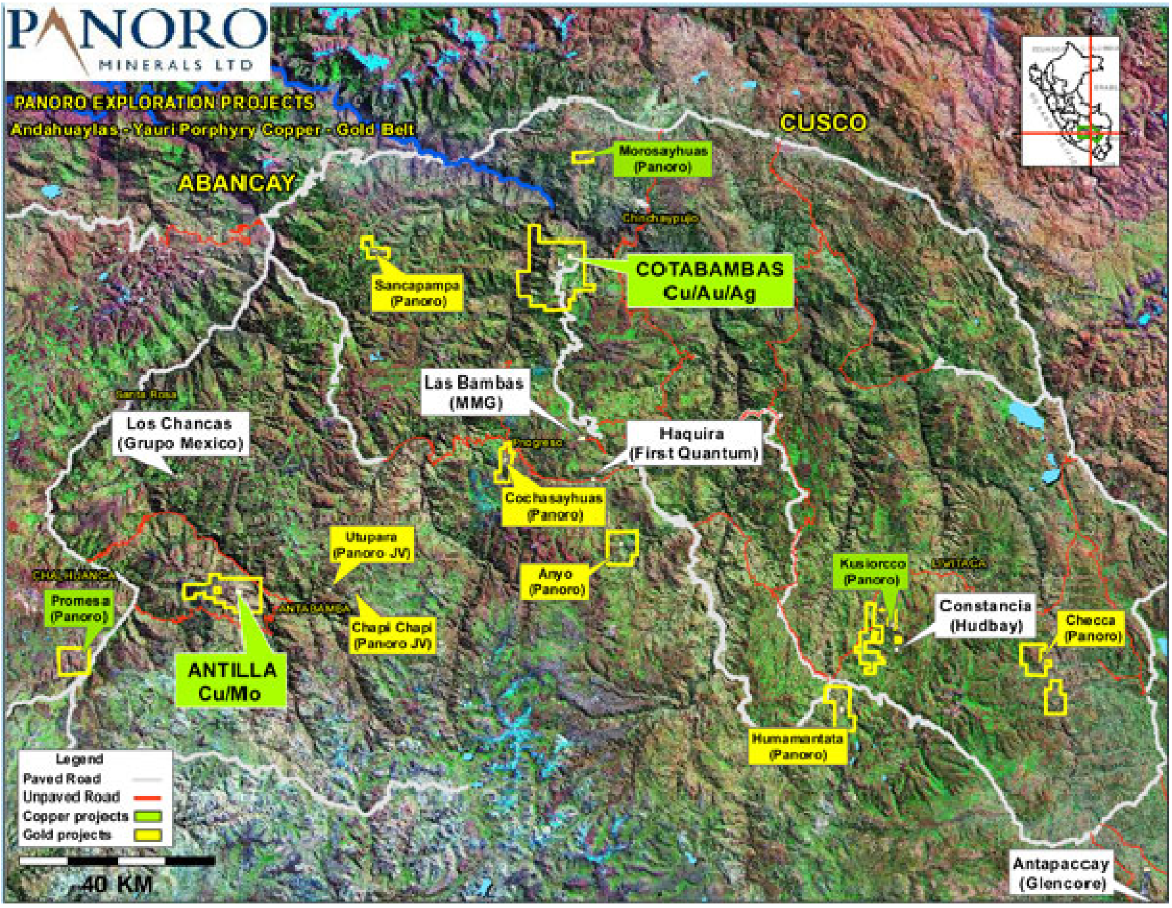
- Added a Long position in Panoro Minerals. Bought 300,000 shares in PML.v at CAD 36.5 cents per share on the 22nd of January
- Added to our Long position in Northern Minerals. Bought 500,000 shares in NTU.ax at AUD 9.1 cents per share on the 19th of January

The Portfolio Move

January displayed a certain flaccidity in the Model Mining Portfolio with the total value sliding back from December’s $5,296,791 to $5,220,659 at the end of January. Cash declined to $756k from $880k due to the two Long additions during the month.

Panoro Minerals – Playing a Waiting Game

Usually we eschew the "build (a resource) and they will come" school of explorers. Panoro (PML.v) is an interesting case. It has a certain strategy that replicates the views of many Vancouver explorers but we suspect that it will be forced to change that strategy. The idea that there is a buyer lurking behind every corner is *so 2007*. Chesapeake Gold, that we have covered in the past, seemed to have a destiny as a target for Goldcorp and yet the years have gone by and Goldcorp has done a string of "other deals" and the target on CKG has gone rusty and fallen off from long disuse. Investors are tired of the mantra that an asset must sit around catching dust waiting for a buyer.



Panoro consists of a number of exploration projects in south central Peru. Its zone (shown on the map above) is highly prospective being in close proximity to the massive Las Bambas project of MMG, HudBay's Constancia and other mines and mine-builds by First Quantum, Grupo Mexico and Glencore.

The company's argument goes that "the smart guys will buy us" but then again after looking around the mining space one sees that smart guys are in short supply and moreover somewhat rarer amongst the heights of mining space (i.e. amongst the bigger stocks that would be likely predators). When the words "takeover" and "Kinross" are mentioned in the same sentence listeners usually start to snigger.

Panoro has a great asset (indeed, a basket of assets) and has dressed them up with a bow for a buyer but what then happens when the product sits on the shelf? Sure, companies can comfort themselves that the copper price is rising but it was rising back in the 2005-2008 and 2009-2012 periods and then was sawn off at the knees. Those companies that had not found a buyer plunged into a slough of despond from which some never recovered and others were picked off by carrion-eaters.

After a series of recent meetings with the company we remain unconverted to the "build (the resource) and they will come" theory and yet feel the company may be compelled to move towards a more realistic position. For a start it should be restructured into different listed entities to reflect potential different strategies or buyer profiles. It is this thought that has prompted us to add this company to our Model Mining Portfolio. Here we shall outline some of the rationale.

The main two projects are the very substantial Cotobambas property and the smaller (though still decently sized) Antilla project. Both are advanced on the resource and economics fronts to the extent that there is not much left to do which would aid in making an investment decision. In our view the company should (at least) be split into two vehicles with one (probably Antilla) moving towards production and the other (Cotobambas) being worked into a state for sale. Instead the company is focusing on selling Antilla to get cash to develop Cotobambas's economics further. This strategy is the wrong way around.

Cotabambas is a 100%-owned porphyry copper-gold-silver project. In September 2015 the company announced the results of an updated PEA on the project. The results show strongly improved economics compared with PEA results announced in April 2015 mainly due to an optimized mine plan and processing cut-off grade strategy along with associated improvements to waste rock and tailings management.

Project	**Resource Classification**	**Million Tonnes**	**Cu (%)**	**Au (g/t)**	**Ag (g/t)**	**Mo (%)**
Cotabambas Cu/Au/Ag	Indicated	117.1	0.42	0.23	2.74	0.001
	Inferred	605.3	0.31	0.17	2.33	0.002
	@ 0.20% CuEq cutoff, effective October 2013, Tetratech					

Despite the fact that it was three years ago that this came out the prices mainly approximate the current situation utilizing the prices of copper at $3.00/lb, gold at $1,250/oz and silver at $18.50/oz. As a result the after-tax economic metrics came out as:

- NPV (at a discount rate of 7.5%) of US$683.9mn
- IRR of 16.7%
- Payback of 3.6 years

- The revised PEA decreased the average direct cash costs (C1) to $US1.22 per pound of copper, net of by-product credits

The average annual payable metal was estimated at:

- Copper 155.1 million lbs
- Gold 95,100 ozs
- Silver 1,018,000 ozs

The capex came out at $1.533bn thus limiting the number of potential acquirers that could eventually play in this sandbox. The mine-life is 19 years.

On to Antilla. This beast is much more bite-sized. The Antilla Copper-Molybdenum project is located 140 km southwest of the City of Cusco in the Apurimac Region of Southern Peru. The project is accessed via the main Cusco to Nazca highway and the unpaved main access road to the small village of Antilla. The project was acquired by Panoro in 2007 and is 100%-owned.

The Antilla project has an indicated resource estimate as shown below. The strip ratio of the conceptual pit shell used to constrain the mineral resource is reduced to 1:1.

Project	**Resource Classification**	**Million Tonnes**	**Cu (%)**	**Au (g/t)**	**Ag (g/t)**	**Mo (%)**
Antilla Cu/Mo	Indicated	291.8	0.34	-	-	0.01
	Inferred	90.5	0.26	-	-	0.007
	@ 0.175% CuEq cutoff, effective May 2016, Tetratech					

The PEA for Antilla dates from May 2016, so of relatively recent vintage. Project economics were estimated on the basis of long term metal price forecasts of copper at $3.00/lb, and molybdenum at $12.00/lb using conventional open pit mining and flotation processing. The economics could be summarized as:

- Pre-tax NPV (at a discount of 7.5%) is US$ 491mmn, IRR is 22.1% and payback is estimated at 3.3 years
- After-tax NPV (also at 7.5%) is US$225mn, IRR is 15.1% and payback is estimated at 4.1 years
- Design throughput of 40,000 tonnes per day with an operational life of mine of 24 years
- There is a low waste to mill feed ratio of 0.85:1
- Average annual payable copper of 81 million pounds

- Average annual payable molybdenum of 1.9 million pounds
- Average direct cash costs (C1) of US$1.83 per lb of payable copper, net of by-product credits
- Initial project capital costs of US$603mn, including contingencies

With sizeable annual production and a 24-year LoM, Antilla in itself would be a company-maker. Yet Panoro wants to sell it. Sigh….

The company feels the stock might have a five-fold uplift from where it is to where it gets "taken over". We feel the company needs to make its own opportunities not just sitting around "Waiting for Godot". First out of the gate a demerger of Antilla (and the other projects) from Cotobambas would set the ball rolling and most likely produce a one plus one equals three type outcome in the stockprice. We have added a **Long** position in Panoro to the Model Mining Portfolio with a 12-onth target price of 65cts. We might review this upwards if we start hearing the right noises.

Parting Shot

Our highlighting of the failings of Canadian regulators have been frequent over the years. Our complaints have been generalized even though based upon specific instances we knew of but didn't care to elaborate.

Recently though we have had cause to communicate directly with the TSX over a specific case. Naively we thought that the TSX had got its act together during the Great Slump and that the matter might be given more deep investigation. We were wrong.

In the case of the specific stock, we knew of the company having liabilities that it chose to ignore in the filing of its accounts. These liabilities dated back to a company that it had taken over in 2015. Indeed back in the case of the previous company we had complained and obtained a rectification with the company being forced to amend its SEDAR filings to reflect the debt. Then the takeover occurred and the acquiring company chose to NOT show the rather substantial debt in its on-going accounts while still making an (inadequate) offer to the debtholders, thus recognizing the debt.

Fast forward to late 2017 and the company (which was in default to even the creditors it did admit to having) decides it is going to convert itself to a Blockchain story and raise around $40mn. We write to the regulators and highlight the audit trail of debt and its recognition and past regulator action. What happens? The TSX allows the company to go ahead with its corporate machinations (i.e. its private placement) and continue deceiving the market as to what its debt situation actually is. In the meantime yet another creditor pops up (a party that had made an advance on an announced subscription of the original company who had never been issued his shares or repayment).

Basic commercial rules are being flaunted here by the regulators. If companies owe debt that debt is not washed away by, takeovers, consolidations or rebrands. During the Great Slump many creditors were forbearing in prosecuting their claims but that does not mean that their liabilities went away. In the eyes of the TSX the smooth functioning of it collecting listing fees on placements ASAP seems to take priority over accurately-formed balance sheets. Ever was it thus…

Mining Model Portfolio as at: 3-Feb-18

	Security	Initiated	Currency	Price Avg.	Current	Portfolio Weighting	Increase in Value	Target
Long Equities								
Various Large/Mid-Cap	Capstone Mining (CS.to)	5/29/2009	CAD	2.32	1.29	1.20%	-44.40%	$2.00
	Teck Resources (TECK.B)	5/29/2009	CAD	22.46	35.19	8.70%	56.70%	$38.00
	NevSun (NSU)	3/23/2012	CAD	3.45	2.51	2.40%	-27.20%	$5.00
	Sherritt International (S.to)	7/11/2013	CAD	1.78	1.22	3.50%	-31.50%	$2.50
	Metals X (MLX.ax)	29/5/2014	AUD	0.98	0.96	2.40%	-1.90%	$1.00
Trading House	Noble Group (CGP.SG)	15/11/2017	SGD	0.2	0.22	2.80%	10.60%	$1.35
Uranium	Uranium Participation Corp (U.to)	10/20/2010	CAD	7.01	3.87	1.80%	-44.80%	$6.00
	Western Uranium (WUC.cx)	7/5/2016	CAD	2.25	0.68	0.80%	-69.80%	$4.80
	GoviEx (GXU.v)	6/29/2015	CAD	0.08	0.22	5.00%	167.70%	$0.50
Zinc/Lead Plays	Zinc ETF (Zinc.L)	1/15/2010	USD	7.04	10.19	2.40%	44.70%	£11.00
	Canadian Zinc (CZN.to)	12/9/2011	CAD	0.82	0.14	0.30%	-82.90%	$0.70
	Ascendant Resources (ASND.v)	10/31/2016	CAD	0.48	1.06	4.00%	123.20%	$1.70
	Nyrstar (NYR:BR)	9/28/2009	Euros	65.1	6.24	3.20%	-90.40%	€ 11.00
	Southern Silver Exploration (SSV.v)	8/25/2016	CAD	0.28	0.485	2.30%	73.20%	$0.94
Gold Producers	Patagonia Gold (PGD.L)	10/2/2013	GBP	3.60	1.2	0.80%	-66.70%	£4.00
	Komet Resources (KMT.v)	11/25/2016	CAD	0.47	0.36	1.40%	-23.40%	$1.28
	Para Resources (PBR.v)	2/17/2017	CAD	0.23	0.2	1.90%	-13.00%	$0.58
	Westgold (WGX.ax)	12/6/2016	AUD	2.01	1.62	2.60%	-19.40%	$2.40
	Eldorado Gold (EGO)	6/21/2012	USD	9.12	1.51	1.10%	-83.40%	$5.50
	Teranga Gold (TGZ.to)	6/21/2012	CAD	1.57	3.26	7.40%	107.50%	$3.80
Copper Producer	Coro Mining (COP.to)	2/23/2015	CAD	0.03	0.14	2.70%	366.70%	$0.30
	RNC Minerals (RNX.to)	11/17/2016	CAD	0.33	0.26	1.50%	-21.20%	$0.60
Royalty Trust	Abitibi Royalty (RZZ.v)	5/31/2017	CAD	9.1	9.75	2.00%	7.10%	$18.00
Processor	IBC Advanced Alloys (IB.v)	4/29/2016	CAD	0.3	0.28	0.50%	-6.70%	$1.40
Driller	Cabo Drilling (CBE.v)	9/28/2016	CAD	0.025	0.01	0.40%	-60.00%	$0.08
Tungsten Producer	Almonty Industries (AII.v)	7/31/2015	CAD	0.36	0.59	5.60%	62.80%	$1.00
Copper Explorer	Asiamet Resources (ARS.v)	4/28/2016	CAD	0.05	0.1	2.80%	94.60%	$0.12
	Panoro Minerals (PML.v)	1/22/2018	CAD	0.35	0.37	2.10%	4.30%	$0.65
	Western Copper & Gold (WRN.to)	4/25/2017	CAD	1.57	1.13	2.10%	-28.00%	$2.74
Nickel Explorer	Sama Resources (SME.V)	23/2/2015	CAD	0.16	0.37	5.60%	131.30%	$0.30
Lithium	Neometals (NMT.ax)	7/31/2014	AUD	0.04	0.39	3.60%	954.10%	$0.45
	Lithium Power Intl (LPI.ax)	10/25/2017	AUD	0.44	0.5	2.80%	13.60%	$1.38
Scandium Explorer	Scandium International (SCY.to)	8/23/2016	CAD	0.14	0.18	2.10%	28.60%	$1.00
Gold Explorer	Banyan Gold (BYN.v)	11/14/2017	CAD	0.07	0.09	2.20%	28.60%	$0.25
Graphite Producer	Elcora Resources (ERA.v)	29/5/2014	CAD	0.2	0.37	3.50%	85.00%	$0.64
Graphite Developer	Talga Resources (TLG.ax)	8/25/2016	AUD	0.27	0.7	3.30%	164.20%	$0.90
REE Explorer	Northern Minerals (NTU.ax)	6/9/2011	AUD	0.23	0.1	1.20%	-57.40%	$0.28
	NET CASH					**756,522**		
						Weighting		
Shorts	Bacanora (BCN.v)	12/4/2015	CAD	1.53	1.85	40.20%	-20.90%	$0.80
	Lithium Americas (LAC.to)	10/25/2017	CAD	10.1	7.86	39.90%	22.20%	$5.00
	Galane Gold (GG.v)	4/28/2016	CAD	0.06	0.05	19.90%	16.70%	$0.03

Current Cash Position	**756,522**
Current Liability on Shorts Not Covered	**222,613**
Net Cash	**979,135**
Current Value of Bonds	**0**
Current Value of Long Equities	**4,241,524**
TOTAL VALUE OF PORTFOLIO	**5,220,659**

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