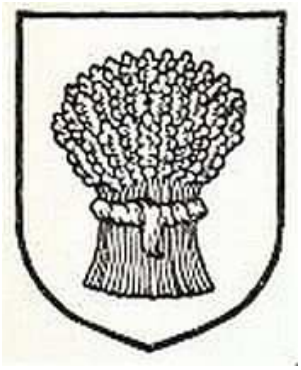
Thursday, July 28, 2016



HALLGARTEN & COMPANY

Initiation of Coverage

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Crystal Peak Minerals (CPM.v, OTCQX: CPMMF)
Strategy: LONG

Key Metrics				
Price (CAD)	$	0.255		
12-Month Target Price (CAD)	$	0.48		
Upside to Target		88%		
High-low (12 mth)		$0.13 - $0.42		
Market Cap (CAD mn)	$	50.1		
Shares Outstanding (millions)		196.4		
Fully diluted		204.4		
		2015	**2016e**	**2017e**
Consensus EPS			n/a	n/a
Hallgarten EPS			($0.03)	($0.02)
Actual EPS		($0.02)		
P/E		n/a	n/a	n/a

Crystal Peak Minerals

Potash – Hold the Salt!

- + The company's main product is Sulphate of Potash (SOP), the low-chloride fertilizer alternative to KCl
- + The company has a new core holder in the form of ERM Global Resources, supplanting India's Tata Chemicals
- + There are various chemical by-products of the process, including lithium, barites and magnesium, these have not been factored into revenue projections
- + The project is unobtrusive environmentally and relies upon solar power as its main energy source for evaporation
- + Bankable Feasibility Study commissioned to come out in first half of next year with a production start in 2020
- + With Sulphate of Potash as its prime output by value the company is positioned at the higher price, higher margin end of the fertilizer spectrum, think Saks versus Macys
- ✘ The capex amount required to be financed is sizeable at US$378mn
- ✘ There is a possibility of a creeping (or full) takeover by ERM once the standstill expires. Though this might not be a negative depending on the price offered
- ✘ Company should be redomiciled to a US exchange

Not all Potassium Fertilisers are the same

The tailwind behind projects such as that of Crystal Peak Minerals is fairly obvious in this day and age of rising global populations, rising economic standards and demands for higher-value foodstuffs (e.g. avocados, almonds). When combined with global warming trends and desertification in many areas the need for fertilizers, that do not degrade the soil of farmers, is massive and growing. Therefore the advantages of Sulphate of Potash (SOP) as the low salt/higher margin alternative to standard potash (KCl – Muriate of Potash – MOP) make companies that produce SOP into the premium end of the fertilizer market, though the vast mass of public shareholders do not seem to be able to discriminate between the two different products and their differing fortunes.

Crystal Peak Minerals (formerly EPM Mining Ventures and before that Emerald Peak Minerals) is a development-stage company with a primary focus on its SOP project on the Sevier Playa in southwestern Utah. Covering about 124,000 acres, the project intends to produce sulfate of potash and other beneficial minerals. The project is now advanced to the stage where planning for construction and the process of funding can begin.

If the company can overcome the capex hurdle on the Sevier Lake project, this could be one of the largest sources of fertilizers in the US within the next few years. Its process is relatively straightforward, it is located in a favorable jurisdiction (Utah) and it ticks the boxes on a number of fronts, including bringing environmental benefits to its surrounding area and major population centres in the state.

Sevier Lake

The key to CPM's project is its concession over Sevier Lake, an intermittent (though almost always dry) lake which lies in the lowest part of the Sevier Desert, Millard County, Utah. Like Great Salt Lake and Utah Lake, it is a remnant of Lake Bonneville which existed in the Pleistocene Age. The lake is fed primarily by the Beaver and Sevier rivers, and the additional inflow is from the lakes watershed that is part of the Escalante-Sevier hydrologic subregion. The lake has been mostly dry throughout recorded history and is a source of wind-blown dust in dust storms that frequently sweep the Wasatch Front.

The "lake" comes and goes depending upon the rainfall. The first recorded observation of the lake was in 1872, when the lake's surface area was 188 square miles (490 km^2), salinity was measured at 86 parts per thousand, two and a half times that of the ocean, and maximum depth was 15 feet (4.6 m). However a few years later in January 1880 the lake was nearly dry.

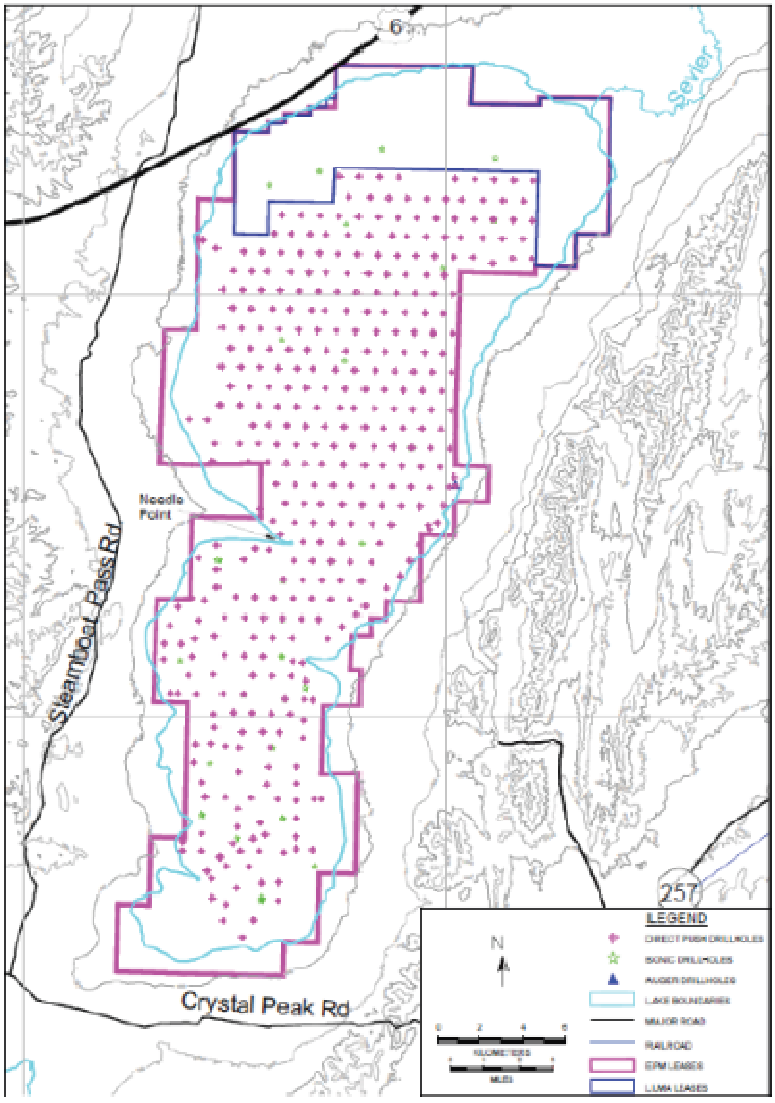
The Sevier River which once flowed to the lake is now largely diverted for irrigation and only when the amount of water is in excess of that able to be held by the irrigation systems does it flow back to the lake again. During late 2011, an unusually wet year, many man-made reservoirs in Millard County began dumping excess water through the Sevier River onto the Sevier Lake bed. Standing water existed on the playa for the first time since 1984 and extended down past Needle Point, which is the feature seen on the west edge of the lake. In the deepest points water levels were over three feet deep.

CPM's Concession

CPM directly controls almost 96,000 acres through its wholly-owned U.S. subsidiary Peak Minerals Inc. and has agreements to operate more than 28,000 additional contiguous acres.

The property is located in southwestern Utah, approximately 140 miles southwest of Salt Lake City, and is defined by the geographical boundaries of the Sevier Dry Lake. The property is situated between Delta, Utah, 30 miles to the northeast, and Milford, Utah 25 miles to the south-southeast. The lakebed covers an area of approximately 130,000 acres and is approximately 26 miles long by an average of 8 miles wide.

The property is accessed by paved US and state highways that travel west from Interstate 15, and then by generally improved gravel roads surrounding the lakebed. Lakebed travel is best approached with light-weight vehicles such as ATV's or wide-tread snow cats. The Union Pacific Railroad maintains a rail line between Salt Lake City and Las Vegas, which is located approximately 12 miles to the east of the lakebed. The Black Rock siding of the line is accessible by improved gravel road from the south end of the project area.



In 2008, Emerald Peak Minerals LLC formed to develop a project on the lake. After securing SITLA leases from the State of Utah, Emerald Peak Minerals partnered with EPM Mining Ventures to secure the financing necessary to obtain the federal leases from the Bureau of Land Management making a blind sealed bid of $19mn. EPM raised about CAD$30 million and won the federal acreage needed to define the project. Through subsequent negotiations, EPM increased its holdings to their current extent. The company changed its name to Crystal Peak Minerals in 2015.

Past Exploration

In the 1970's, a Utah geologist, Murray Godbe, began the first known systematic study of the Sevier Playa with the intention to

produce valuable minerals. Godbe and his team found indications of a vast pool of brine containing potassium and other important chemicals. He leased the majority of the dry lake's surface securing land from the BLM as well as from SITLA, a Utah state land agency. The team drilled hundreds of wells taking brine samples across the vast lake surface and from many depths. Godbe died suddenly (as did his principal backer) and, after a period, the leases returned to their respective government agencies.

Historic development efforts included the drilling of over 700 shallow auger holes across the lakebed with the goal of defining a brine resource within 20ft (6m) of surface. The work done in the 1970's and 1980's by Crystal Peak Minerals Corporation (CPMC) provided significant data on brine chemistry and sediment characterization, as well as data on evaporation ponds and brine phase chemistry. The project was fully permitted and a large solar evaporation impoundment was built and pilot scale precipitation of halite and potash conducted using fractional crystallization techniques. CPMC and a subsequent developer ultimately let their leases lapse back to the government.

A comprehensive exploration program was initiated once CPM gained control of the majority of the lakebed. A total of 426 drill holes were completed by CPM between August 2011 and April 2012, covering both federal and state leases. The drilling was conducted using direct push rigs that drilled to a nominal 15m depth and a mini-sonic rig that drilled to a nominal 30m depth. Brine sampling wells were established in both types of holes, the direct push holes being temporarily cased for short-term brine sampling and the mini-sonic holes mainly completed with a packed-well installation that will allow future hydrologic testing. Brine samples were collected and analyzed for key chemical constituents related to ionic components of potash and related compounds. Sediment cores were analyzed for moisture content and density for determination of interstitial brine volumes.

Geology

As mentioned earlier, gradual receding of Lake Bonneville and ultimately Sevier Lake, resulted in the accumulation of unconsolidated clay and marl in the down-thrown graben. The accumulation of minerals eroded from the drainage area supplying the lake, coupled with persistent drought conditions altered the chemistry of the groundwater in the dry lakebed sediments to that of a mineral-saturated brine.

The mineral chemistry of the brines in Sevier Lake indicates that potash can be extracted from them following precipitation of brine salts from solar evaporation ponds and subsequent plant processing. Other products derived from the brines using the same process include halite and bitterns (Magnesium-based chemicals). Magnesium chloride, and magnesium sulphate are probably the two most-readily extractable by-products. Mag chloride is used all over the West as de-icer on roads, as well as dust suppressant in places like the Bakken. Minor concentrations of bromine, borates and lithium have been noted in salts crystallised in playa sediments.

The top 100 feet of the deposit can be characterized as follows:

- Salt crust up to 18 inches thick
- Lateral zonation in crust mineral chemistry
- Variations in brine saturations both laterally and with depth
- Variation in sediment grain-size distribution

- Artesian brine flow in select areas
- Elevated concentrations of Na, K, Mg, Ca, Cl and SO_4 in the brines.

These features influence to varying degrees the target brine volume and potential for production of potash, halite, and bitterns from the brines. The focus of the efforts of CPM are two shallow brine horizons separated by a thin (~15 cm), relatively dry layer of stiff clay. The combined upper and lower aquifer horizons vary from 12 m to 30m in depth from surface and are limited at the base by another stiff clay horizon.

Resource

CPM commissioned Norwest Corporation in March 2012 to prepare a Technical Report for its potassium mineral leases at Sevier Lake Project. This was eventually published in late May 2012.

A PFS from November 2013 included an updated Mineral Resource Estimate that included 31.486 million tonnes of SOP in the Measured and Indicated categories, a 7% increase from previously published estimates. This increase was due primarily to the results of intermediate drilling. It should also be noted that all 124,200 acres were drilled and included in the resource statement.

Sevier Lake	**Metric Tonnes (millions)**				
	SOP	**Bitterns**		**Salt Cake**	**Halite**
	K2SO4	**MgCl2**	**MgSO4**	**Na2SO4**	**NaCl**
Measured	11.344	12.464	15.746	34.432	243.666
Indicated	20.142	22.641	28.604	61.335	416.176
Measured & Indicated	**31.486**	**35.104**	**44.35**	**95.768**	**659.841**
Inferred	2.56	3.111	3.931	8.051	51.113
Total	**34.046**	**38.215**	**48.281**	**103.819**	**710.954**

The mineral resource estimate is delineated within approximately the first 30m from surface, at an average resource depth of approximately 20m. The consultants also made the comment that mineralization continues to depth.

The EMR Transaction

In May 2015 the company finally managed to pull off a financing. This was made possible by abandoning some of the more unreasonable expectations that the management had previously harboured about the amounts of money potentially available and their ability to do a transaction that was not brutally dilutive for Tata Chemicals.

The transaction that was finally arrived at was with EMR Capital Resources Fund 1, LP ("EMR"). EMR Capital Resources is a specialist private equity manager. The firm has offices in Melbourne, Sydney and networks across the globe, including an office in the Cayman Islands. EMR had previously taken a stake in the potash space via an investment in 2013 in Highfield Resources (ASX: HFR), which has assets in

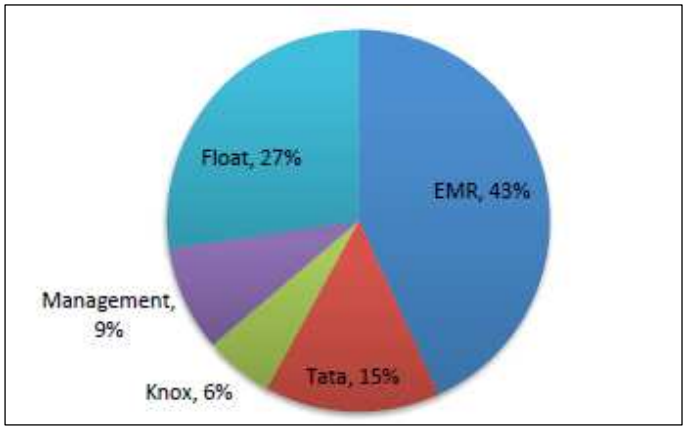
Spain. This stock was a high-flier in 2015.

Under the deal CPM issued to EMR 34,516,129 units of EPM at C$0.30 per Unit for gross proceeds of CAD$10,354,839. Each Unit was composed of one common share of CPM and one full warrant. Two EMR representatives joined the CPM board and EMR signed a standstill agreement which expires in early September 2016.

With regards to the warrants, these entitled EMR to subscribe for one common share at a price of CAD$0.4243 per Common Share for a period of 24 months following the closing of the offering. These were exercised in full in May 2016 for gross proceeds of CAD$14.65mn. Then later in the same month CPM announced that it had closed a non-brokered, private-placement with EMR issuing a further 12,620,331 common shares at a price of C$0.4243 per common share for gross proceeds of approximately CAD$5.35mn.

EMR has an additional investment commitment of not less than CAD$60 million, or one-third of the project equity commensurate with EMR's *pro rata* share of Sevier Playa project equity value based upon the net present value to be determined by a planned Feasibility Study.

In the wake of this series of transactions the stake of EMR looks like this:



Extract Capital Credit Agreement

It is worth mentioning the pre-existing relationship between CPM and Extract Capital LLC. This is a savvy long/short equity fund focused on the junior resource sector and has been an outperformer through the dark days of the mining slump.

In late March 2015, CPM and Extract agreed to amend the credit agreement dating back to May 2014 between CPM, certain of its subsidiaries, Extract Capital, and certain lenders from time to time. The amendment provided for a waiver by Extract Capital of a mandatory repayment covenant with respect to the initial equity investment by EMR of CAD$10,354,839. The debt owing to Extract Capital was eventually repaid in May 2016, though the original deal issued Extract shares and warrants as well, which it may well still hold. It also will receive a production fee of $1.70 per tonne of SOP (though this is repurchasable by the company for $1.5mn, with CPM forced to repurchase if there is a change of control).

Tata Chemicals - Down but Not Out

Until EMR appeared on the scene the largest shareholder was Tata Chemicals with a 25% stake. Tata Chemicals Limited has interests in chemicals (particularly soda ash, including production in Wyoming), crop nutrition and consumer products and is headquartered in Mumbai, India. The company is one of the largest chemical companies in India with significant operations in India and Africa. Tata Chemicals is a subsidiary of Tata Group conglomerate.

The holding dates from September 2011 when a subsidiary of Tata Chemicals acquired eight million units in a financing by CPM, consisting of 8,000,000 voting common shares and 8,000,000 warrants. The warrants were exercisable for a period of 12 months, so obviously have now expired. They had an anti-dilution option which enabled them to maintain their stake at future financings by being to step up to acquire sufficient shares in a placing to hold at the 25% mark. Clearly they waived this when EMR appeared on the scene. They had two representatives on the eight-person board of CPM and now appear to have only one.

The other major shareholder besides management insiders is the Knox Opportunity Fund LP managed by Knox Capital.

The Preliminary Feasibility Study (PFS)

In November 2013, CPM published a Preliminary Feasibility Study on the Sevier Lake Potash Project, which also contained the aforementioned resource estimate upgrade. This had been prepared by CH2M HILL Engineers, Inc., Agapito Associates, Inc., and Norwest Corporation.

The PFS forecast average annual SOP production of 300,000 tonnes with an estimated after-tax NPV of $629 million (at an 8% discount rate) and an estimated after-tax IRR of 20%.

The key metrics were:

- SOP Price assumption for 2020 of $721/t
- EBITDA at Nameplate Production $143 million
- After-tax NPV (8% Discount) of $629mn
- After-tax IRR of 20%
- Capex of $378mn
- Payback Period 5.5 years
- Effective Tax Rate 29%
- Production Royalty 5.61%

Capex - Sevier Lake

	USD mns
Playa Infrastructure	49
Plant facilities	167
Utility Infrastructure	45
Rail	31
Indirect costs	50
Contingency	36
Total	**378**

The table at the right shows the capex projections from the PFS. These numbers put Sevier Lake at the upper end of the mid-tier of projects, but are massively less that the underground projects in regions such as Saskatchewan where the capex never comes in below $1bn.

Unit Operating Costs

	$ per tonne
Labour	34.76
Power	13.97
Nat Gas	37.57
Reagents/Consumables	40.34
Salt Harvest/haul to rail	37.57
GS&A	16.7
Total per tonne	**180.91**

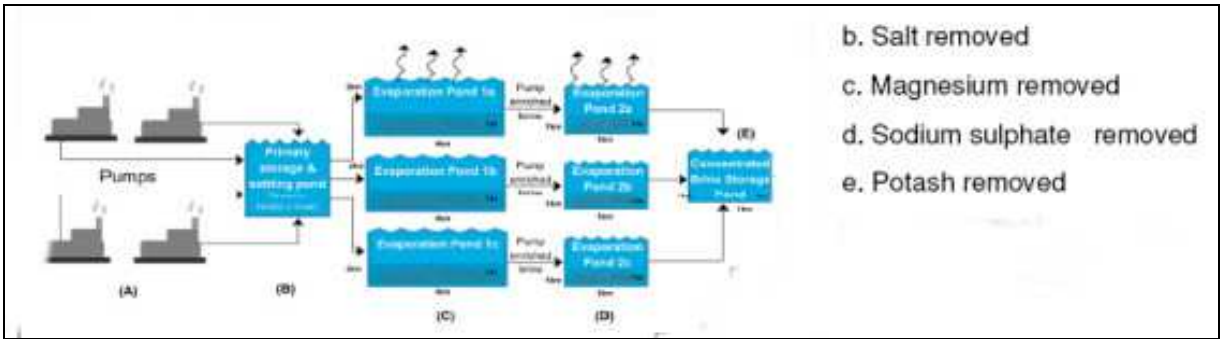
The financing plan at the current time is for the project to be debt-financed, with project debt expected to be in the region of 65% of the total. Added to this is the construction equity commitment from EMR, which is the larger of $60mn or 1/3 of project equity.

With such a large target production, the project would

seem to be scalable downwards, with potential to move up to the originally envisaged production goal later on. The rail expense would seem to be open to paring by relocating the loading facility to the main line rather than building a spur. If financing conditions are particularly propitious then the plan to go with full production might be achievable in the first instance.

Process

Below we can see an industry standard schematic of the process by which potash (and also lithium) is extracted from brines. The material from the dry lake is rehydrated and then passes through a series of evaporation ponds (phases B, C & D below). These are all of one metre in depth. Then the potash is extracted at the concentrated brine phase (E). Finally the ionization plant (at phase F) creates the finished chemicals for bagging and shipping.



In some brine lakes magnesium (at phase C) can be produced as a by-product. However in some cases this byproduct is of no economic value.

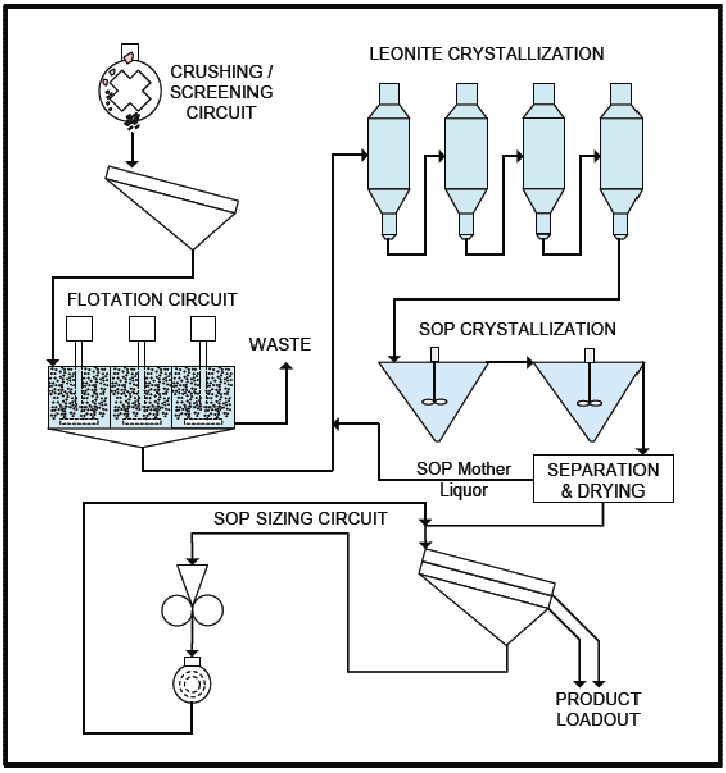
The proposed process for the conversion of the Sevier Lake Playa brine into SOP would use standard operations common to the potash or soda ash industries. The process would consist of the following steps:

1. Solar evaporation and precipitation
2. Product stockpiling
3. Conditioning
4. Flotation
5. Conversion to leonite (K_2SO_4-$MgSO_4$-$4H_2O$) (multiple-effect crystallization)
6. Conversion to SOP (SOP crystallization)
7. Drying and storage

The lake brine shall be collected in a trench (as at right) or from extraction wells and pumped into a series of three solar evaporation ponds. Water shall be evaporated from the brine and salts would be selectively precipitated onto pond floors. The potash salts would be

harvested and stockpiled.

The evaporative process is fairly standard practice when exploiting brine lakes and depending upon climactic conditions (days of sunshine per annum) can be low to almost no energy costs involved).



Flotation would separate the bulk of the potash salts from halite, epsomite ($MgSO_4$-$7H_2O$), and minor materials. Crystallization and evaporation steps would purify the potash salts ultimately producing SOP and related minerals.

Flotation concentrate solids would be sent to leonite multiple-effect crystallizers. The leonite crystals would be sent to SOP crystallizers where water would be added to dissolve out magnesium sulphate ($MgSO_4$) to produce SOP. The schematic at the left shows the crystallization processes.

Dried SOP crystals would be screened and sized to meet desired specifications. Oversize material would be combined with undersize product and load-out fines to be processed in a compaction circuit.

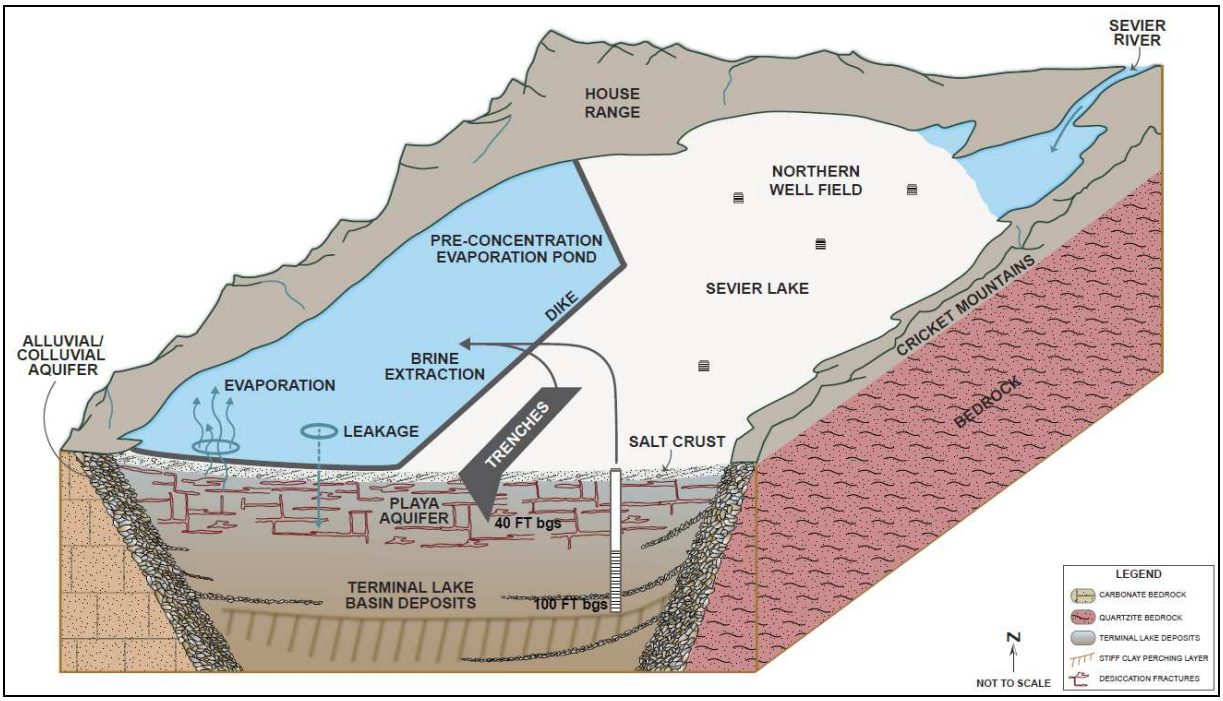
The leonite-to-SOP process was decided upon as it would yield higher potassium recoveries at lower energy costs and with lower estimated water losses than the alternative processes considered, including the mechanical vapor recompression (MVR) process that used MVR to evaporate water; and the water leach process that evaporated water with multiple-effect crystallizers at a lower temperature than the leonite-to-SOP process.

Process	Potassium Recovery %	Water Loss (ton H2O SOP)	Steam (MMBtu/ton SOP)	Electricity Use (kW hr ton SOP)	Power Cost ($/ton SOP)
Modified MVR	70.1	3.62	6.69	1,155	72.96
Water leach	78.9	5.56	9.5	0	35.62
Leonite to SOP	83.4	1.35	6.92	0	25.95

While extraction by evaporation is low-cost on the energy side it still requires significant capex for the establishment of the brine collection network and the evaporating ponds, particularly at the level of production that CPM envisages. The budget item in the PFS for "Playa Infrastructure", amounting to $49mn, covers:

- Brine Extraction Canal – approximately 17 km
- Brine extraction trench laterals for Phase 1 – approximately 130 km
- Solar evaporation pond system (includes pre-concentration ponds 1 through 4 and production ponds A through D)
- Brine lift pump station (barge) from extraction canal to pre-concentration ponds based on pump
- Brine lift pumping station (barge) from pre-concentration pond 4 to production pond pipeline based on pump
- Cost for a 20.1km aboveground pipeline

The image below shows an axonometric view of the Sevier Playa showing both trench and well extraction to the evaporating pond.



Infrastructure

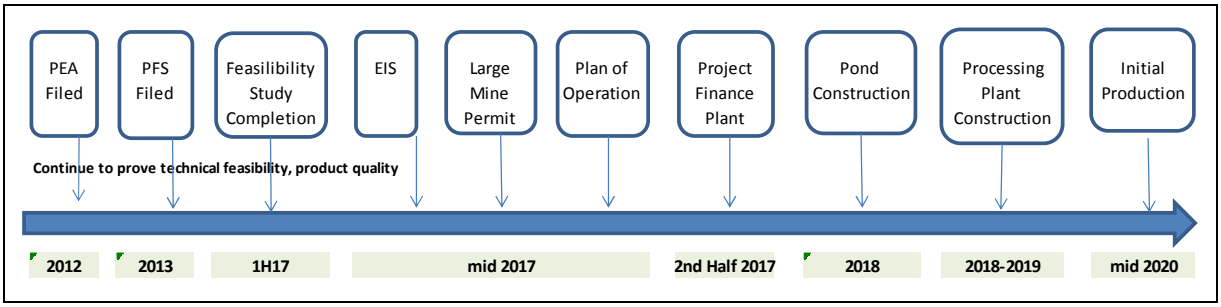
Rail site includes provision for 5.6 kms of rail spur and siding trackage, with one road. All foundations estimated based on building specifications and preliminary drawings. The rail infrastructure alone for the project has a capex of around $31mn. Bizarrely this spur only covers half the distance from the mainline to the site.

The potable water system in the PFS is based on two small bore wells 4.5 km south of main site. The operation would require approximately 1,100 litres per minute of fresh water for processing and other uses, including fire suppression. The company has permits in place already for its water supply.

The natgas supply is based on 8 inch high-density polyethylene pipeline 56 km long and installation of metering facility.

Timeline

Things are running two years behind the hoped for schedule due to the financing conditions having been so tough in recent years. The BFS that was originally mooted for the start of 2015 will now not be seen until the first half of 2017. That has pushed everything else back. As the timeline below shows the next phase after the publication of the BFS is the approval of the EIS. Then the company must obtain its Large Mine Permit and register its plan of operations with the Bureau of Land Management. At that point (or hopefully before) the company will be well on the way to having the project financed.



The key thing to note from the evaporative method of extracting chemicals from brine solutions is that time and weather are the two key factors. Initially the evaporation ponds are constructed, which is a relatively simple and not costly exercise. Then the ponds are filled and the process begins. As mentioned earlier the process involves a series of ponds. Therefore the first pond's initial batch cannot move to the second pond until its contents have been fully evaporated. The whole process can take eighteen months to two years from the first filling. This is why the first filling in the timeline below takes place in 2018 and yet first production does not occur until somewhere in mid-2020.

By-Products

By its very nature the evaporation then crystallization process throws off by-products along the way.

Several potential by-products, co-products, or opportunities for improved recovery, have been identified during the process development work. These include:

- Halite would be generated during the early stages of evaporation in the pre-concentration ponds. The amount of halite is estimated to be about 14% of the starting weight of the brine. The material might be sold for ice melting or as road salt without reprocessing. For other applications, a processing facility would be needed to clean the halite prior to sale.
- Sodium sulphate is mainly used for the manufacture of detergents and in the Kraft process of paper pulping. This mineral would be precipitated in the mixed salts pond. Additional ponds and pond control might allow recovery of the salt with limited impurities. Potential recovery could be up to 300,000 tpy but would require crushing, flotation, and drying to separate the sodium

sulphate from the other salts. Chilling of brine in the preconcentration ponds in the winter could also cause sodium sulphate crystallization.

- Magnesium sulphate, which is otherwise known as Epsom Salts and has fertilizer usages of its own, could potentially be recovered from three areas. Thermodynamic modeling of the solar ponds suggests that it may crystallize in the second or third production pond. The salt is also dissolved in the bitterns that are removed from the final production pond. According to the process model, the process purge stream from leonite crystallization contains 34% magnesium sulphate and 4.5% SOP. Recovery of SOP from any of these streams would require process development testing to evaluate the technical and economic feasibility.
- Magnesium chloride, which is a dust suppressant and also is used as snow melt, is present with magnesium sulphate in the bitterns. Recovery of lithium, discussed below, will require removal of those salts. This may present an opportunity to recover the magnesium chloride. Test work will need to be performed to determine if a process is economically feasible.
- Lithium, with its important usages in high-tech batteries and cermaics, is a common by-product of brine lakes. However it does not appear to be crystallized in any of the solar evaporation ponds. In pond simulation work, carried out at Hazen Labs, lithium was concentrated to 0.136% (about 2 grams/L) in the final pond. There are a number of processing options that have the potential of recovering the lithium.

The important thing to note though is that the economic models take NO account of potential revenue streams from these substantial (by volume if not by unit value) by-products.

Not to be overlooked - the "green" side-effects

Utah takes dust seriously, and it is probably no surprise given the desert-like nature of the State and its growing population. Indeed any project or permanent operation disturbing an area larger than ¼ acre that has potential to generate dust emissions is required to have a Fugitive Dust Control Plan (FDCP) that describes how the applicant will control its dust emissions. Examples include: construction projects, road construction, utilities installations, sand and gravel operations, drilling operations, blasting operations, earth moving/excavation, material handling/processing/transfer. Those areas requiring FDCPs are all regions of Salt Lake and Davis counties; all portions of the Cache Valley; all regions in Weber and Utah counties west of the Wasatch mountain range; in Box Elder County, from the Wasatch mountain range west to the Promontory mountain range and south of Portage; and in Tooele County, from the northernmost part of the Oquirrh mountain range to the northern most part of the Stansbury mountain range and north of Route 199.

Of course this deals with dust that is generated by human intervention but the problem with air quality in Salt Lake City's vicinity is that the presence of large dry lake beds, such as Sevier Lake mean that windborne particulates swept off the surface of the dry lake are largely uncontrollable and not the fault or responsibility of anyone *per se*.

During winter, the Wasatch Front suffers from multi-day wintertime air pollution episodes in which the concentrations of aerosols or fine particulate matter with diameters less than 2.5 micrometers, called PM2.5, rise above the National Ambient Air Quality Standards, which were established to protect human health. The Wasatch Mountains east of the valley, the Oquirrh Mountains to the west, and the Traverse Mountain to the south form a basin-like topography, that traps cold air and shields the valley from the

generally stronger winds aloft. The valley is open to the Great Salt Lake to the northwest. Weak nighttime down-valley drainage flows often carry polluted air over the lake. Here, it is sometimes stored overnight and then carried back into the valley as a lake breeze the following day.

The interesting side benefit of the CPM project is that the sizeable evaporation ponds that the company will construct on the lake surface reduce the potential area from which dust can be uplifted and wafted towards urban areas. This is an important feather in the cap of CPM's "green" credentials.

Potash – Can't Live Without It

The past decade has seen a wild ride in sentiment towards potash. The initial move up was prompted by the rush into agricultural commodities at the very peak of the generalized global asset boom. Unlike much of the other speculative activity, the push in wheat, corn and soy prices had a strong grounding in rising demand in Asia and other emerging economies (though with the somewhat bogus ethanol frenzy underlying corn's rise).

Potash is fertilizer found primarily in two forms: Muriate of Potash (KCl) and Sulfate of Potash (K_2SO_4). Both forms provide potassium (K), a necessary nutrient for plant and animal life with no known substitute. About 90% of all potash produced is used as fertilizer with the remainder being used in the chemical industry.

For many applications including most fruits and vegetables, sulfate of potash is the preferred product. There are few places on earth where this form of the nutrient is found naturally including the Great Salt Lake; the Atacama desert in South America; the Luobupo project in Xinjiang, China; and at the Sevier Lake in Utah, where CPM is at work.

Death Throes of the Cartel

Cartels seem to have a limited life-span before events, or their own over-reaching, lead to their downfall. The fall is quite often related to pushing prices too high to protect the margins of weaker members, or attempting to stockpile output to maintain "orderly markets". Attempts to exclude new participants to an industry rarely work for more than a short period before the cartel gets swamped or attracts the scrutiny of national or supra-national competition authorities.

The most spectacular downfall of a cartel is that of the International Tin Council that came to grief in the 1980s. One of the more interesting examples is the pre-WW1 German Thorium Cartel that drove early development of Rare Earth mines. In recent times we have had cause to look at the machinations of the Lithium cartel and that in the Potash space. The Lithium cartel is currently trying to circle its wagons but finds that the "enemy" has more wagons (though less money) than the cartel does. It tried to buy Talison but that went to the Chinese Tanqi group and then the cartel elbowed its way in as "partners" to the Chinese.

The heavyweight participants in the potash industry would vigorously deny they are a cartel. In some ways this is true as world potash production is dominated by two main producing regions and each of these has its dominant "marketing group". The best way to understand this is to regard potash production as being divided in thirds:

- One third of production concentrated in Saskatchewan, Canada –marketed by Canpotex
- One third of production concentrated in the FSU –marketed by BPC
- One third of Production spread between Germany, Chile, China, Israel, Jordan

We are expected to believe that these first two marketing groups do not collaborate together. For the purposes of understanding the space though one should view them as moving (traditionally) in lockstep and thus we prefer to call them the Potash Cartel. This cartel indulged in an opportunistic price push in 2008 on the back of the China growth story which only succeeded in bringing into public focus the hitherto low profile practice of price-fixing in the commodity.

This attracted the unwelcome attentions of BHP-Billiton that made an offer Potash Corp. of Saskatchewan (POT), the world's largest crop nutrient company and a key component of the defending group, with the stated intention being the cartel's break-up which it imagined would be music to the ears of the regulators. At least in Saskatchewan, enthusiasm for breaking up the cartel was not welcome news in government circles. The price hike though, as always, focused attention on the commodity amongst capital market promoters and a slew of new fertilizer plays appeared on the scene. Even more embarrassing was the fact that these new players came up with potash and phosphate deposits in locations such as Utah, Eritrea, Brazil, Botswana and Ethiopia that were near or at surface which much lower capex and opex than the traditional extraction methods in deep underground mines in the Canadian plain states or in ex-CIS states.

With the financing markets having been in the doldrums and the Potash price off the boil the newcomers have had a harder time than they deserved but the hard slog is now bearing fruit with projects like CPM's moving into the realms of the doable. This has caught the cartel off-guard because it has the funds to potentially snap up all these juniors (and K&S did acquire Potash One) but with regulators already casting a beady eye at the Cartel they could not afford to attract more attention by hoovering up potential cheaper sources of supply particularly when the countries needing the fertilizers include some of the poorest nations in sub-Saharan Africa. That is before we even consider the powerful farmer lobbies in the Western economies that have now tasted the advantages of cheaper fertilizers and don't want a drift back to the bad old ways.

Inevitably the frictions created by all these events led to a breaking of ranks. In late July 2013 the Russian-based Uralkali announced it was withdrawing from the Belarusian Potash Company, the Minsk-based venture of Uralkali and Belaruskali, claiming Belarus was delivering potash outside their joint agreement. Uralkali announced it would operate its plants at nearly 100% capacity. The price of potash plunged. This joint-venture had essentially been a cartel within the bigger global cartel.

This withdrawal was disastrous for the larger cartel and prompted a change of owners – the previous shareholders were replaced by Uralchem [the world's second largest ammonium nitrate producer] and interests of Mikhail Prokhorov, a Russian oligarch/politician. The new owners of Uralkali announced in May 2014 that they would resume cooperation with Belaruskali of Belarus, which means the cartel that used to control about 40% of world potash exports would be back in action.

Despite the coming together again of the two ex-CIS producers, the Potash Cartel is a soufflé that, we believe, will not rise twice.

Prices

As already noted in its 2008-9 heyday, potash prices made a bigger jump than many of the agricultural products that use potash as a fertilizer. A report by Resource Investor (and some broker upgrades) in March 2008, set off a chain reaction in the price of major stocks in the sector propelling the industry leader Potash of Saskatchewan to a market cap of over $75bn.

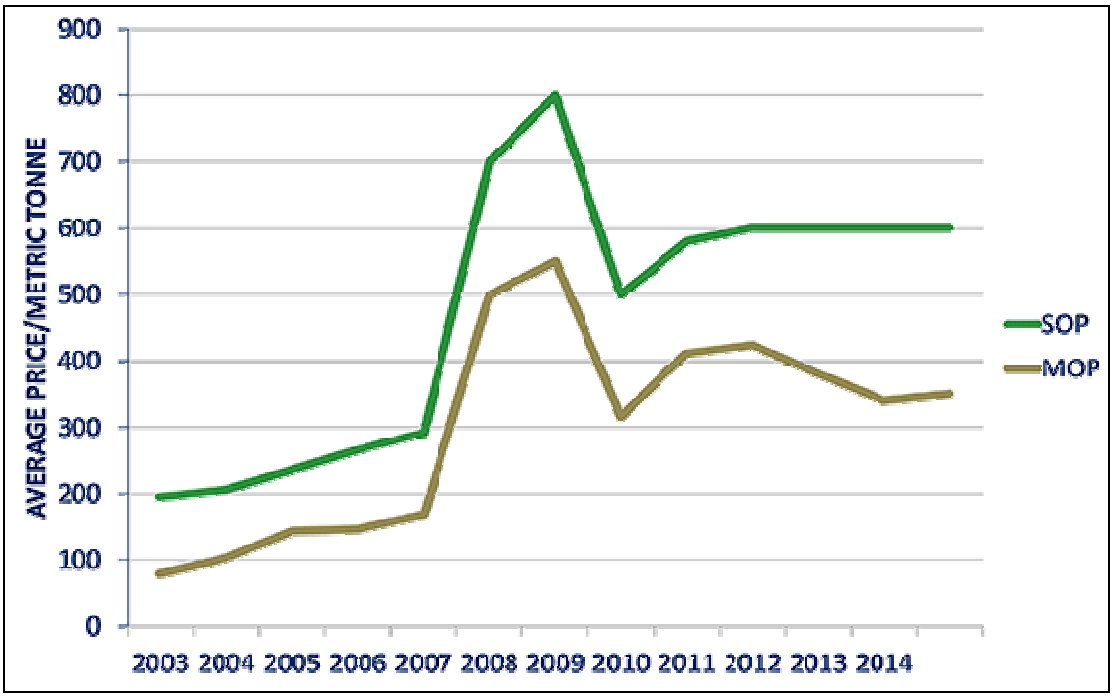
The party rapidly ground to a halt when the global financial crunch descended. Speculators offloaded stockpiles they had been hoarding, some countries reduced their imports and the price tumbled**.**

As for price trends the cartel was very successful in pushing the envelope in 2008 and getting away with it. However the demand side was impacted very negatively with the International Fertilizer Industry Association stating that demand fell 5.1% in 2008-09. While demand slackened off prices did not respond proportionately to the downside until the broader financial crisis's effects were felt. Presumably that was the discipline of the cartel at work. An aspect of this fall off and delay were also that India a large consumer of potash stopped subsidizing potash for its farmers, so farmers utilized the potash they had for the growing season, then when the next growing seasons came simply did not apply because they could not afford it, especially at the newer higher prices.

While fertilizer demand can be fairly non-responsive to price trends in the West where the commodity is a smaller part of the price composition of a grain harvest, in many developing economies the hike in

prices tends to prompt small-scale farmers to cut usage, with effects on yields but reducing their upfront capital commitments towards a season's planting.

Interestingly SOP prices have exhibited better stability since the breakup of the Belarus Potash Cartel in 2013 as the chart below shows. Compass Minerals claimed to be selling (in 4Q15) its SOP output for a price between US$750-800 per tonne.



Additionally, the SOP market is influenced more by direct shipments (spot pricing) vs. MOP's contractual nature (i.e inventory management by large distributors and sovereigns influences pricing). And the nature of the goods that SOP services (tobacco, fruits and vegetables etc) have more stable first world demand.

MOP versus SOP

The production profile of CPM is massively skewed towards production of the higher-margin Sulphate of Potash. There are good reasons that SOP trades at a significant premium to MOP. The principal use of SOP is as a fertilizer, as it does not contain chloride, which can be harmful to some crops.

Characteristics of SOP versus MOP

	SOP (K_2SO_4)	MOP (KCl)
Chemical Compounds	50% K_2O and 17.5% sulfur	60% K_2O
Fertilizer Market %	10%	86%
Plant Use Specialty	High-value crops	Standard row crops
Characteristics	Lowest Salt Index	High Salt Index

Potassium sulfate is preferred for those crops that are harmed by chloride, which include tobacco and some fruits and vegetables. Crops that are less sensitive may still require potassium sulfate for optimal growth if the soil accumulates chloride from irrigation water.

The main points in SOP's favour are:

- Used on chloride-sensitive and high-value crops
- Advantageous in saline and arid soils
- Sulfur deficiency is a growing issue
- Enhances nutrient uptake, plant health and drought tolerance
- Improves taste, crop yield, quality and shelf life
- Estimated 4-6% CAGR for consumption to 2020, depending on region

Country	Nutrient Depletion (kg per hectare)	Country	Nutrient Depletion (kg per hectare)
Benin	44	Liberia	66
Burkina Faso	43	Mali	49
Cape Verde	n.a.	Niger	56
Cote d'Ivoire	48	Nigeria	57
Gambia	71	Senegal	41
Ghana	58	Sierra Leone	46
Guinea	64	Togo	47
Guinea-Bissau	73	West Africa (average)	55

Source: Henao and Baanante 2006.

Sub-Saharan Africa is the poster-child for the environmental problems of desertification and salt build-up, which are further compounded by burgeoning populations. The table above shows the serious need for fertilizers in light of past over-cropping, climate change and associated problems.

While the first instinct is to think of this in terms of basic crops (and thus use of KCl) the area however is so damaged that SOP is a more suitable choice for these regions. Moreover the area is also host to some high value export crops, most notably it's the centre of global cacao production and important for groundnuts (i.e. peanuts).

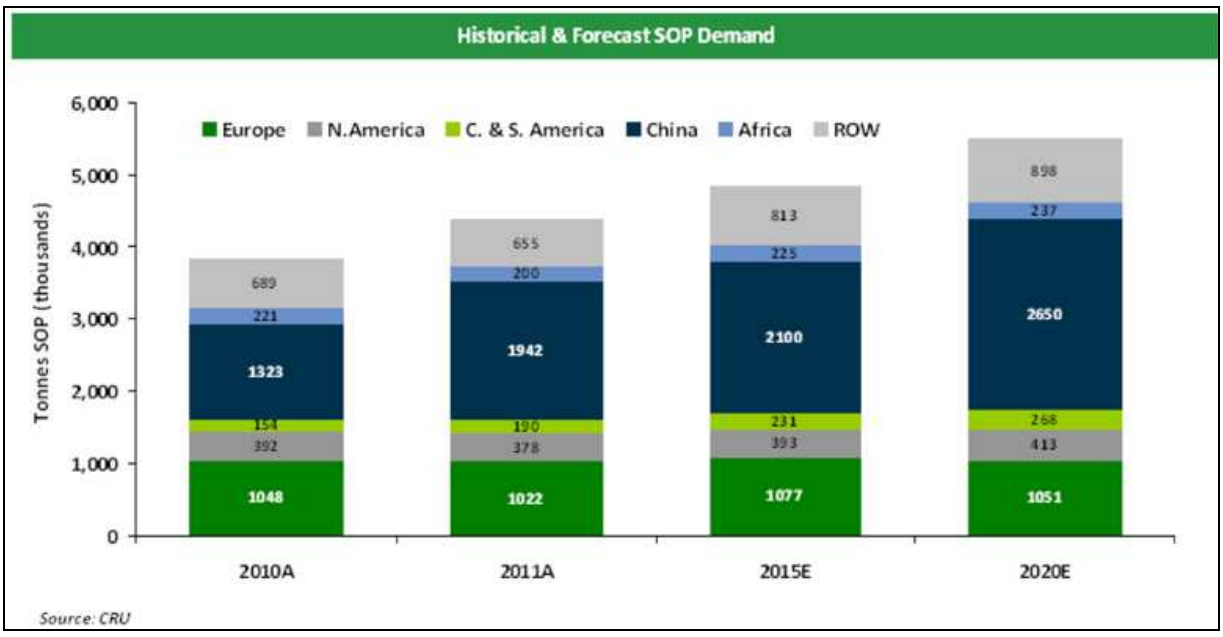
The table below shows the major high-value agricultural commodities for which SOP is the preferred fertilizer to be applied.

Fruits	Vegetables	Tree Nuts etc
Citrus Fruit	Tomatoes	Almonds
Mangoes	Potatoes	Cashews
Cherries	Avocados	Pistachios
Pineapples	Peas	Tea
Grapes	Beans	Tobacco
Apples		Coffee
Melons		Alfalfa
Strawberries		Cacao

Supply & Demand

The biggest factor though in the potash dynamic is the China (and India) possibilities. In a meeting we had with Potash One, before it was taken over, they stated to us that they felt that China was using 8 mn tonnes per annum of potash but they really needed to be using around 20 mn tpa.

The chart below shows the level of demand growth that is foreseen from the main developing economies.



In response to this perceived demand growth potash capacity has continued to be developed worldwide, but at a slower pace since 2011 with a number of expansion projects being carried out by established producers.

Since 2012 only around six million tonnes (KCl) of new capacity has been brought on-line, mainly as a result of completion of brownfield projects by Uralkali (Berezniki-4), Potash Corp (New Brunswick, CorryII and Allan) and Mosaic (Colonsay).

According to Fertecon, a total of 17 million tonnes of KCl capacity is forecast to be constructed over the next 11 years, composed of:

- Brownfield expansion representing around 6 million tonnes
- Possible greenfield developments representing the balance

In contrast, according to the International Fertiliser Industry Association (IFIA) global potassium capacity is forecast to increase from 49.7mn tonnes of K_2O in 2013 to 60.7mn tonnes in 2018. This would represent only an 11mn tonne net increase.

Looking at various projections for new projects can be frustrating and confusing. Most of the commentators are totally over-looking the mid-tier projects and are only focusing on the mega-projects. Thus one source claimed "Only three greenfield projects are planned for completion before 2019, in Canada and Russia". This is plainly wrong and anyone basing their premises upon that type of thinking is bound to be disappointed. Seemingly, not only is Potash a cartel of product but also a closed circle of ideas and perceptions as well. The medium sized players are therefore advancing stealth-like (though anyone doing the vaguest investigation would know they are progressing). The implication is that if several of the smaller projects get to production then they would make less viable one or more of the major projects. Calculations of major greenfield projects include Vale's Rio Colorado (in Argentina) and BHP's Jansen (in Saskatchewan) remain uncertain (but are included in forecast greenfield capacity increase). With Rio Colorado alone predicted to cost $11bn in capex, one can see that one tenth of the capex would move three of the mid-tier projects to production.

World Potash
Potential Supply/Demand Balance
(million metric tonnes K_2O)

	2014	2015	2016	2017	2018
Supply					
Capacity	50.53	54.69	56.70	60.26	60.72
Potential Supply*	**43.57**	**45.17**	**46.97**	**49.74**	**51.44**
Demand					
Fertilizer Demand	30.79	31.58	32.36	33.17	33.99
Non-fertilizer Demand	2.84	2.92	3.01	3.10	3.19
Distribution Losses	0.99	1.02	1.04	1.07	1.10
Total Demand	**34.62**	**35.51**	**36.41**	**37.34**	**38.28**
Potential Balance	**8.95**	**9.66**	**10.56**	**12.40**	**13.16**
% of Supply	***21%***	***21%***	***22%***	***25%***	***26%***

ource: IFIA, 2014

To further confuse matters, in IFIA's projections, North America and EECA should account for 88% of world incremental supply between 2013 and 2018. Global potential potassium supply would increase to 51.4 Mt K_2O in 2018, representing an overall increment of 8.8 Mt, or 20.7% growth over 2013. We had to do a double take on this but in fact they are discriminating between capacity and supply.

Three regions would account for nearly all the projected increase of potential supply: North America (mainly Canada), would contribute 4.6mn tonnes of K_2O, followed by Eastern Europe and Central Asia (EECA) (Russia and Belarus) with 3.4mn tonnes and East Asia (China) with 0.8mn tonnes. Expansions in

the first two regions are earmarked for the export markets.

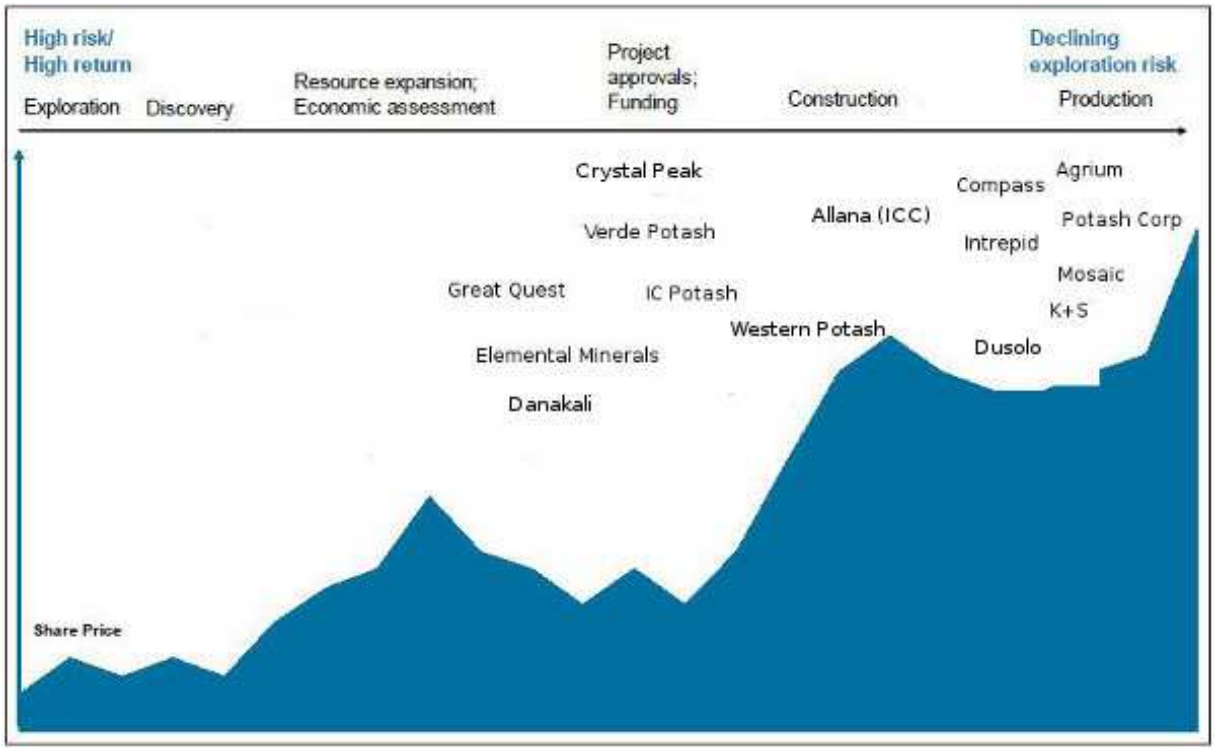
IFIA estimates global demand for potassium at 38.3mn tonnes K_2O in 2018, equating to an average annual growth rate of 3% between 2013 and 2018. IFIA also projects that world potash demand should expand at an average annual rate of 1.6mn tpa of MOP between 2013 and 2018.

Under a slow-growth scenario, the five-year global supply and demand would show relatively stable potential surpluses of 9-10mn tonnes of K_2O between 2013 and 2017, followed by an increase to 11.5mn tonnes in 2018. This implies a 23% idling factor in the industry. It is therefore no wonder that Vale desisted with its Argentine project (though Marubeni were said to be considering picking it up).

The Association of course largely represents the establishment (read the Cartel) and thus it has a vested interest (particularly at this time) in putting the frighteners on potential interlopers with a grim demand scenario. Therefore we take the 3% growth scenario with a pinch of salt (to mix allusions).

The Potash Lifecycle

Unlike other specialty metal "lifecycle" charts we have produced, the one for potash/phosphates has long had a well-populated (and profitable – immensely so) right side with the cartel members firmly in control of production.



In many mining sub-sectors, this chart tends to have almost no producers and a plethora of wannabes over to the left. However in the potash space there is a healthy pack of 800lb gorillas bunched on the right, with the potential should they so choose to discipline all the other players. If we had looked at this

chart two or three years ago most of those now in funding/permitting mode would have been in discovery mode.

Management

The board is certainly filled with heavyweight players with a wide skillset. At the current market capitalization, eight is a rather large number of directors though.

The CEO (and a director) is Lance D'Ambrosio. He has over 25 years of experience in sales, marketing, finance and management having begun his career working for companies such as Xerox, Savin and Paine Webber. He founded two start-up telecommunications companies; Transworld Telecommunications (TTI), a wireless cable operator; and Convergence Communications (CCI), a facilities-based communications company. Sprint acquired TTI in 1999 for US$210 million and Comsat International, a subsidiary of Lockheed Martin, acquired CCI in 2003.

Daniel W. Basse, a director, is also President of AgResource Company, an international agricultural research firm located in Chicago which forecasts domestic and world agricultural price trends. Mr. Basse is an agricultural economist and has been in the commodity business since 1979.

Theodore Botts, a director, is a member of HSW International, Inc.'s board of directors as well as the chairman of its audit committee. He is also President of Kensington Gate Capital, LLC, a private corporate finance advisory firm.

Thomas Pladsen, a director, is a Chartered Accountant having started his career at KPMG in Toronto in the mid 1980's and has since held various financial positions with TSX listed, TSXV-listed and private mining and technology companies. These positions included CFO of resource companies Katanga Mining, Andina Minerals and Merc International Minerals as well as consulting work for TSXV-listed junior mining companies. Since September 2009, he has been the CFO of Atacama Pacific Gold Corporation (ATM.v). He holds a BBA from Wilfrid Laurier University.

De Lyle Bloomquist, a director, is the President of Global Chemicals Business at Tata Chemicals. He has also been the President/CEO of its US subsidiary, General Chemical Industrial Products, since April 2004, prior to which he was the Vice-President and COO, since April 1999.

Don Carroll is a director who came in with the investment by EMR. He is a mining engineer and a Senior Advisor to EMR Capital and was appointed in 2011. Prior to that, he was a senior executive with BHP Billiton for more than 30 years where he held a number of roles across different business units, both in operations (technical, mining, marketing, and ocean freight) as well as in management (strategy, investor relations, M & A, divestments) in different regions and commodities.

His roles included President BHP Billiton Japan, President BHP Billiton India, Group General Manager Marketing Asia (based in Hong Kong), Marketing Director for Mt Newman Iron Ore Sales, Chief Development Officer for the Aluminium Group, Vice President Corporate Strategy, and Vice President Investor Relations. Prior to BHP Billiton, he worked for Utah International, initially at the Blackwater coal mine in Queensland and later based in the San Francisco head office. He commenced his career as a mining engineer working at the Rio Tinto Iron Ore operations at Dampier and Tom Price in Western

Australia.

Rob Curtis, a director, is a geologist with more than 19 years' experience in exploration, business development, and investments at Rio Tinto, Oxiana and OZ Minerals. He has worked on and assessed resources opportunities in many parts of the world including Australia, Indonesia, India, Laos, Papua New Guinea, parts of Africa, and North and South America. His transaction experience includes execution of investments in Sandfire Resources, IMX Resources, Toro Energy, Beadell Resources, Royalco Resources, Minotaur Resources, Golden Grove, Martabe, and many others. He was also involved in a number of successful investment exits including Sepon, Wafi, and Hidden Valley.

The remaining representative of Tata Chemicals on the board is John Mulhall. He has been the Chief Financial Officer of Tata Chemicals since October 2015. He joined the group in 2007 as European Finance Director of the UK subsidiary and served there until 2010. Subsequently he was VP Finance and Chief Financial Officer of Tata Chemicals North America until 2013, and Chief Financial Officer of Tata Chemicals International PTE Ltd, based in Singapore until 2015. He is a graduate of The University of Strathclyde

Risk Factors

Specialty minerals always bring the danger of wider price oscillations than larger-volume traded minerals. Most critical though is the lingering tough environment for project finance.

- Weakness in SOP price either from potential over-supply or cartel actions to punish/discourage new entrants
- Financing difficulties for the project buildout
- Budget overruns and/or construction delays
- Mother Nature has long had a way of snaffling the best laid plans of miners. The biggest risk at Sevier lake is a year (or years) of outsize rainfall that produces a significant flooding of the lake.
- Uncertainty of weather conditions must be considered as the operation uses solar evaporation in its extraction process. Adverse weather conditions that affect the net evaporation rates cannot be predicted
- Revival of interest by community groups in blocking the project on environmental grounds

Financing looms as the most obvious potential pitfall for projects at this time. While an element of financing outlook is dependent upon price, this can be obviated in some circumstances with financing supported by ERM and an offtaker. Then again CPM has Tata Chemical as a major supporter and an obvious offtaker.

Conclusion

The School of Hard Knocks with a healthy dollop of reality has corrected whatever errors that CPM's management may have made back in 2014 when they unrealistically expected some sort of massive rally in their stock that would mean a financing could be done that saved (some) face for Tata, after they overpaid so badly at their initial entry. Added to that was the concept that, at the depths of the mining slump, they could raise all or most of funds needed to get their big-ticket operation on the road to production. It has taken the passage of time and a long period in the doldrums for this illusion to finally

pass away. With its passing the company was finally able to do the deal with ERM Resource Capital that has put it back in contention of the Sulphate of Potash mine-building game and restored it as an object of potential interest to us.

CPM may be seen as a miner, but might best be seen as an agrochemicals producer, and thus as an agricultural play. There is no underground mine here, nor is there an open pit. The processing is largely powered by solar forces and the collateral benefit of dust suppression in the urban areas of Utah almost makes CPM worthy of being classified a "green stock". Will the world be a better place for CPM's endeavours…? The answer is indubitably "yes".

The potash cartel has been broken in recent years and that is a good thing. It has caused woes for the MOP price (comparing it to the China-scare induced highs) but potassium based fertilizers should NOT be a luxury item but freely available at a reasonable price to deal with the agricultural demands of feeding the global population. If anything the moderation in the price of the main potassium based fertilizers has played into the hands of those with at-surface deposits, such as CPM, because it makes pursuing the deep underground projects far less viable. Thus the next ten to twenty years in the fertilizer markets will be dominated by new entrants with at-surface deposits.

With a chemical process that is relatively straightforward, the path to production for CPM has few potential pitfalls. Finance is always an issue and particularly so in the recent tough times for the mining sector. The company has found itself a sugar-daddy in ERM, but this may turn into a predatory relationship if the stock stays as cheap as it is at the moment past the imminent standstill expiry date. While the company does not speak of scalability (upwards or downwards) that is definitely something that this project needs to consider in its upcoming BFS.

We regard Crystal Peak at current levels as a **Long** call and our twelve-month target price of CAD$0.48.


Historic Chart for Cdn:CPM by Stockwatch.com 604.687.1500 - (c) 2016
Wed Jul 27 2016 Op=0.26 Hi=0.28 Lo=0.255 Cl=0.255 Vol=33,425 Year hi=0.42 lo=0.13
Cdn:CPM
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0.18
0.16
0.14
Volume
450 k
300 k
150 k
ul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul
2015
2016

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