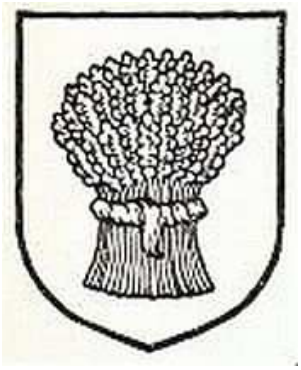
Tuesday, July 14, 2020



HALLGARTEN & COMPANY

Comparative Assessment

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American Rare Earths

(ASX:ARR)

Strategy: LONG

Key Metrics		
Price (AUD)	$	0.02
12-Month Target Price (AUD)	$	0.08
Upside to Target		371%
12mth hi-low		$0.01-$0.04
Market Cap (AUD mn)	$	4.47
Shares Outstanding (mns)		263.0
Fully diluted		47.0

American Rare Earths

Measuring up REE deposits in the US

- + The focus in the US has swung over the last year towards the vulnerability of the country to China dominance of specialty metals, in particular, Rare Earths
- + Even at the height of the Rare Earth boom of 2009-11 there were not a lot of REE projects in the US and now there are less than a handful still in active consideration
- + The La Paz project ticks a number of boxes to put itself in consideration for any government push to create an onshore REE supply chain
- + The low level of radioactive contaminants is a major plus at La Paz
- + Change of the company's name to American Rare Earth Limited has recently taken place
- ✘ Project is low-grade, but large in tonnage
- ✘ Current DoD strategy of picking "champions" is being muddied by unworthy companies pushing themselves into the frame
- ✘ The environment for funding projects is very tough at the moment and the over-the-top capex puts flashing warning lights over the stock

Rare Earths Begin to Buzz

Rare Earths have stirred from their long quiescence in 2019 with a flurry of talk related to resource security/nationalism and the perennial bugbear of Chinese dominance of the Rare Earth space. But how solid is that dominance? It is telling that the China is now a net importer of Heavy Rare Earths. Well, might we ask what might be the likelihood for China to eventually (and we mean within the next few years) become a net importer of Light Rare Earths? Already it is importing all the US's output of Rare Earths through its purchases of Mountain Pass concentrates.

The glacial pace of additions of Western capacity offers no threat of oversupply while the brutal overexploitation of China's in-country resources resents a picture of declining output and ever thinner grades. In a nutshell, Bayan Obo is not forever. Other areas, such as the ionic clays have been ravaged and it is difficult to see how Chinese production can be sustained, in many cases, with loss-leading exports to the West.

With China's mass adoption of the EV it has failed to be noticed that the only difficult-to-source input that China actually has a global dominance in is Rare Earths (for magnets in the motors). These markets rely upon Neodymium, Praseodymium and Dysprosium. Will China continue to fritter away its REE advantage by selling to the West at knockdown prices? We suspect a crunch moment is nearing. Only producers in the West will be there to partially patch a gaping supply hole if the Chinese decide to pull the plug on "charity" sales of REEs to Western users. The trade war adds extra piquancy, and it happens

to coincide with a period that we are calling “Post-Peak Chinese Rare Earths”. The Chinese need to conserve their supplies and accumulate offshore sources of REEs for their own contracting supply.

So with Chinese supplies under a cloud and the West having added no capacity in recent years, the scenario is one of shortages and rationing.

The New Paradigm

The main things that became apparent after 2011 were that overly big projects were fraught, that the market did not have the capacity to fund these projects (after the Molycorp debacle) and that there had to be a mid-stream processing option. On the latter point, just producing a concentrate did not cut it as more often than not, without a value chain, that concentrate would end up going to China (often at a knockdown price) and the value-added and control would still rest with the Chinese industry.

Lynas managed to be more of a mold-breaker than Molycorp. With its symbiotic relationship with the Japanese industry it managed to show that a non-Chinese chain was possible. The ultimate result of this was a recent Japanese government sponsored campaign to have the Japanese magnet-makers relocate their plants out of Mainland China into other “friendlier” locales.

The next step is seen as revival of a US-based supply-chain. To this end the surviving US developers are now jostling for funding from the Pentagon. In this note we shall look at the Rare Earth asset held by ARR and compare and contrast it with another developer, Texas Minerals Resources.

Morphing Towards the US

The company, formerly Broken Hill Prospecting Ltd, is in the throes of a transition away from Broken Hill to refocus on US operations, leading to a decision to change the company name to American Rare Earth Limited (with the ASX ticker code ARR).

The company has also recently sold its remaining equity interests in the Thakaringa Joint Venture in Broken Hill, NSW, to Cobalt Blue Holdings Ltd (ASX:COB) for AUD$6mn.

Its main goal now is the acceleration of the development of its La Paz Rare Earths project in Arizona, USA. To this end it closed a rights issue earlier this year, which resulted in the issue of 87.3 million shares raising a total of AUD$1.3mn.

The La Paz Project

ARR formed a 100%-owned US-based subsidiary called La Paz Rare Earth LLC to acquire and develop the La Paz project, located in La Paz County, Arizona, US in August 2019. The project lies approximately 170 km north- west of Phoenix.

La Paz covers over 890 hectares comprising 107 unpatented lode mining claims on federally controlled land and a prospecting permit over one section of Arizona State Trust land (259 hectares). The tenements are unencumbered and 100% controlled by La Paz Rare Earth LLC.

In 2019, the company moved to double its US footprint with the application to acquire a further 660 hectares directly adjacent to the existing tenements to secure the full rare earth potential of the region.

Exploration

In October 2019 ARR announced that its initial field activities including mapping, sampling and the review of historical datasets which identified mineralisation at a higher grade to the South East of the existing Resource.

The La Paz area was first shown to contain Rare Earth elements during exploration sampling programs in mid-2010. The area is located in western-central Arizona within the structural Detachment Fault Domain of the large Basin-Range Province.

Past Exploration

During 2011, Australian American Mining Corporation Ltd (on which we launched coverage around that time) drilled 195 percussion holes for 5,120 metres.

Composite and selected interval samples were submitted to leading independent groups at SGS Canada Inc (Vancouver) for mineralogical investigations (QEMSCAN, XRD and Electron Microprobe analysis) and the Saskatchewan Research Council (SRC, Saskatoon) for preliminary metallurgical test work (pre-concentration and leaching).

The maiden resource estimate and preliminary metallurgical test work formed the basis of an NI 43-101 resource estimate completed late 2011. Additional metallurgical test work was completed in early 2012.

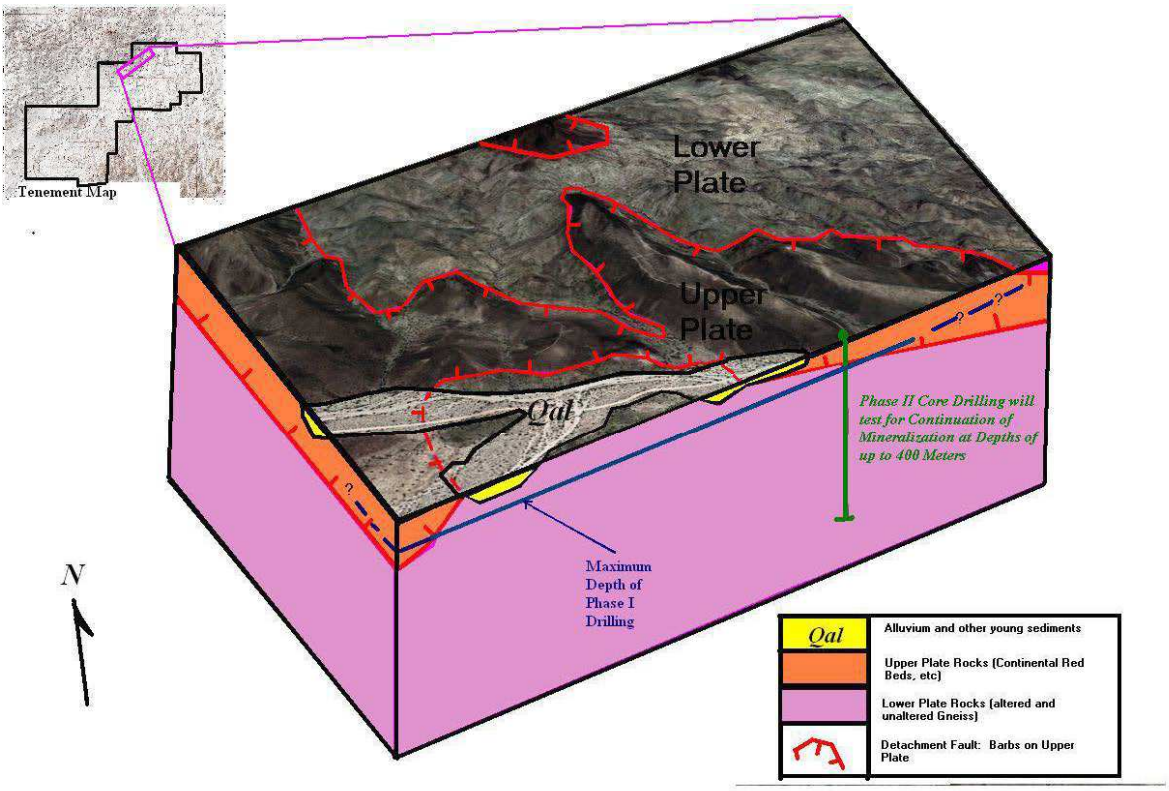
The resource displayed relatively uniform distribution of total Rare Earth elements (TREE) across and along strike covering a resource area 2.5 km by 1.5km. The entire deposit is exposed at surface, or lightly concealed by alluvial cover. It is open at depth and is currently defined to 30m below surface.

Geologic units in the project area may be combined into a minimum of three. Young alluvium and other sedimentary units are locally thick enough to obscure underlying geology, especially to the east and west.

There is an Upper Plate, which may consist of several rock units of differing character and age, but here are dominantly continental red bed deposits. And Lower Plate rocks, which here are dominantly

gneisses that have been altered to varying degree by epigenetic structural deformation and alteration.

Below can be seen a detailed diagram showing mineralised level to 30m (mineralisation is open to depth and laterally).



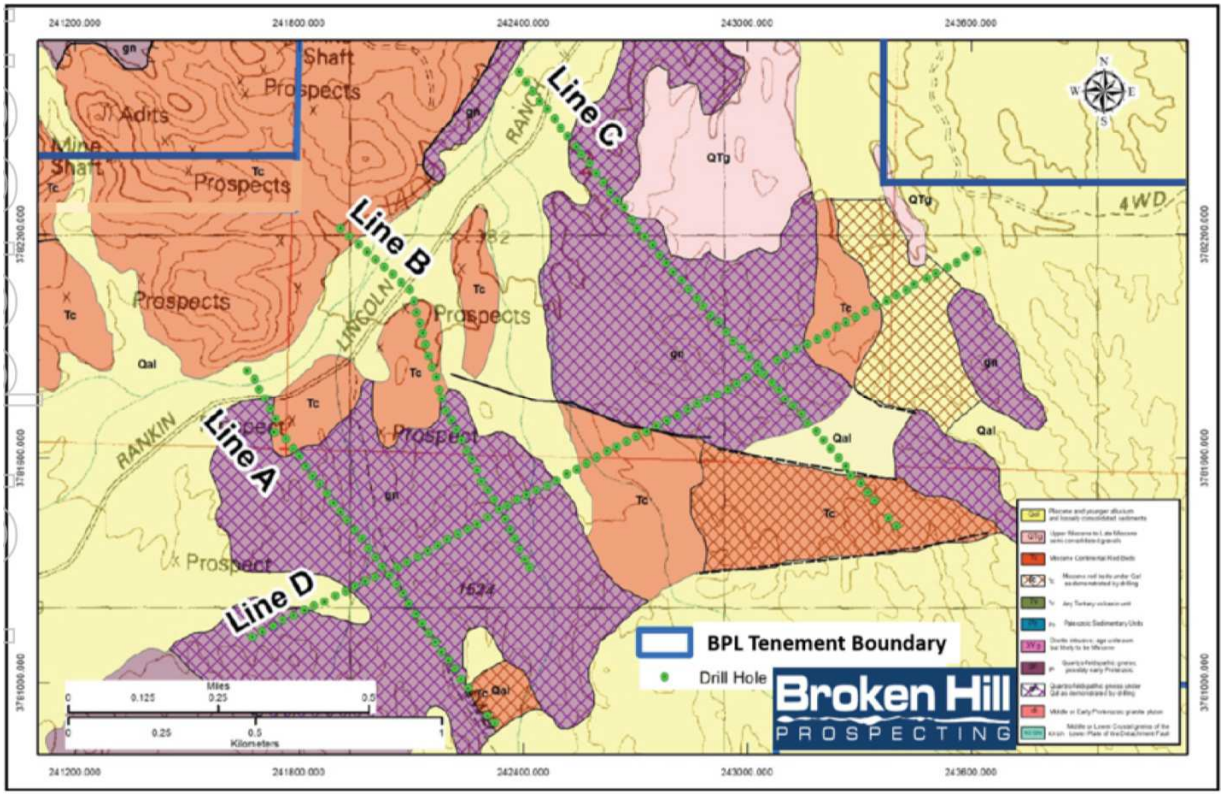
The planar surface between the Upper and Lower Plates is a fault. This fault in the La Paz area is merely a small portion of the regional detachment fault of mid-Tertiary age. The Detachment Fault System on a regional scale is known to be associated with various ore deposits. It is best known for gold deposits, but may also carry a variety of other metals including copper, silver, lead, barium, zinc, and manganese.

The potential of the Detachment Fault System for Rare Earth Elements had not been recognized and likely no large number of analyses for REE's was made before those in July, 2010. Even if there had been such analyses in gold-enriched portions of the system there appears to be a mutual exclusion between REEs and gold.

The factors which are most important in control of Rare Earth (and all other) mineralizations include the detachment fault itself, which caused significantly thick breccias at and below the fault surface and provided a conduit for the movement of mineralizing solutions. Host rock lithology played an unknown

role in the mineralizing system since both the red beds and gneiss are hosts to REE's despite differing significantly in character. In fact, other similar mineralizations explored by AusAmerican in the immediate area include limestone host rock. In the case of La Paz there is also an upwarp of the detachment fault that conceivably played a localizing control during the time of mineralization.

The initial outcrop sampling at La Paz resulted in recognition of a gradual transition from relatively unaltered gneiss at the margins to strongly affected gneiss in the central portions of the deposit. Subsequent shallow drilling has found the REE mineralization to be remarkably uniform in the hole through the upper 30 meters of its extent. Such differences in grade that seem to have significant lateral extent have a layered appearance that may reflect original compositional layering or second-order control by faulting.



The lateral extents of mineralization to the North, East and West have not yet been determined although reconnaissance sampling to the west has discovered a possible re-emergence of REE mineralized rock from beneath alluvial cover. In this area, the Upper Plate consists of a variety of volcanic rock units, that are, nonetheless, REE-mineralized. Nor has the depth extent of mineral yet be determined as numerous of the shallow drill holes not only ended in mineralization, but quite often ended in the highest grade found in the hole.

Resource Estimate

The original NI43-101 was published in December 2011 and was prepared by David Boyer, M.Sc.. The parameters were derived from 195 drill holes selecting 12 intervals. The analytical results of 3,274 bed rock samples delivered by ALS-Chemex in Reno and Vancouver served as a basis for metal grades in ppm.

ARR is currently investigating the conversion of the NI 43-101 Report and supporting data to JORC 2012 standards.

La Paz - Resource Estimate

Cut-off = 0.03%

	Tonnage mns	Grade ppm	Contained REE lb
Indicated			
TC	0.4	337.7	300,000
Lower Plate	15.8	373.4	11,800,000
	16.2	373.4	12,100,000
Inferred			
TC	7.2	369.8	5,400,000
Lower Plate	104.8	371.6	77,900,000
	112.0	371.5	83,300,000

In the first couple of months of 2020, before the global virus lockdown was instituted, the company's technical team completed importing the base data into a GIS model, which is the first of several key components in adopting all the known datasets into a single database.

The analysis of both the existing area and recently granted expanded footprint where samples were taken in 3Q19 is complete and confirms the extension of the resource. A trenching program, which aims to confirm the continuity of the two resource areas, is targeted as one of the first key activities to be undertaken.

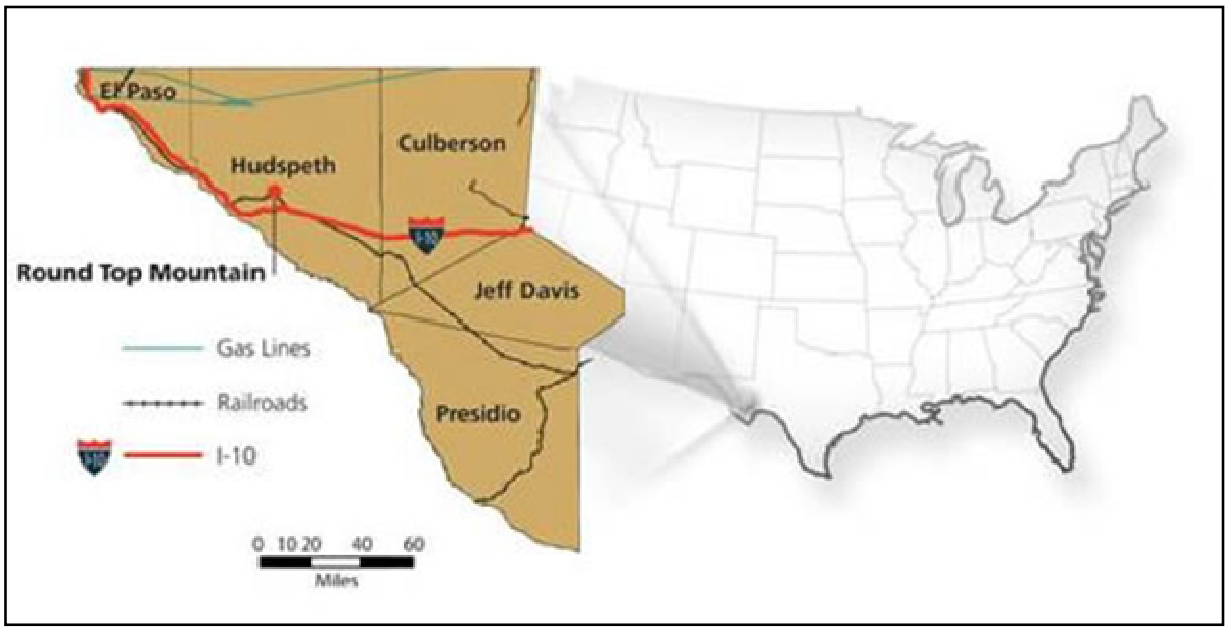
Currently work is underway to analyse the inclusion of Scandium (another metal on which we have written extensively) with the aim of an updated resource estimate in the fourth quarter of 2020.

Whilst the initial resource provided a solid base case, the increasing of grades at depth, which were identified in several of the initial drill results, will be targeted as part of the exploration program underway. Upon completion of that exploration program and publication of an updated resource estimate, a scoping study will be commenced with the aim of accelerating the project into development and subsequent production.

Round Top

The Round Top Project of Texas Minerals Resources is located approximately eight miles northwest of Sierra Blanca in Hudspeth County, Texas; and approximately 85 miles southeast of El Paso, Texas. The

Round Top Project consists of two 18-year Mining Lease Agreements with the General Land Office of the State of Texas (GLO). Mining Lease No. M-113629 consists of 860 acres on land that is owned by GLO, and Mining Lease No. M-113117 consists of 90 acres on land the surface of which is owned by TMRC.

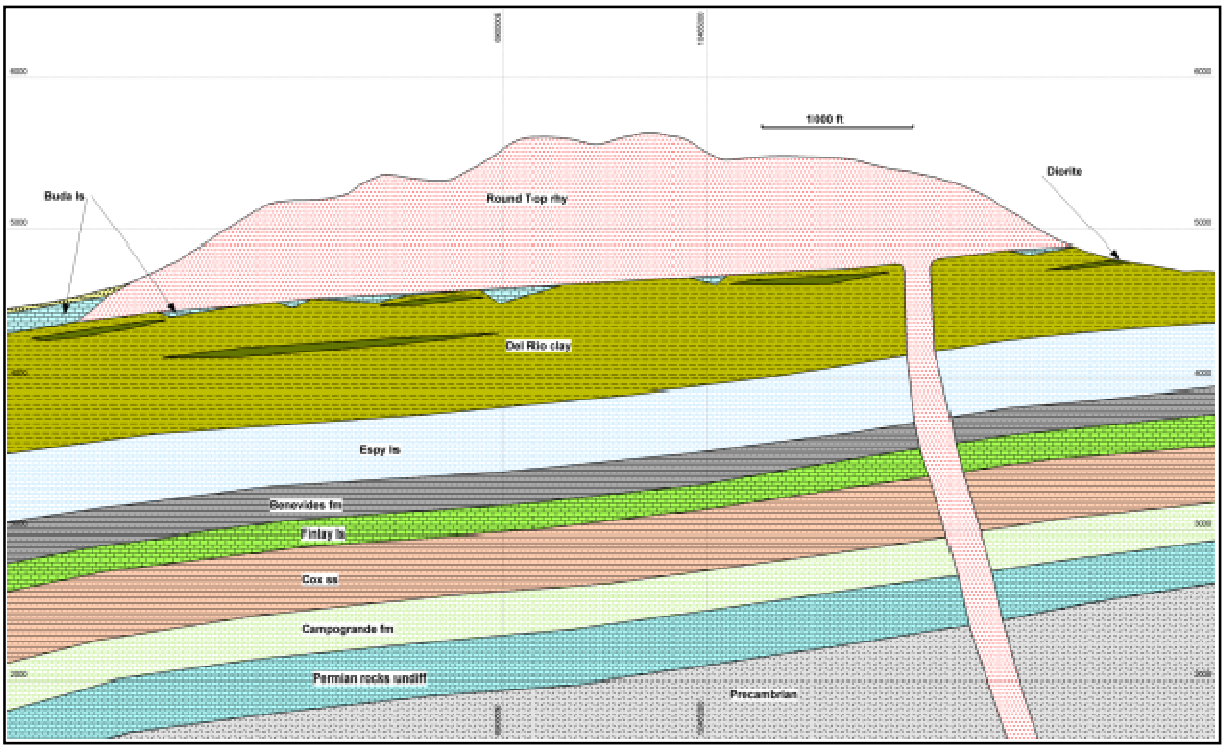


The zone is made up of the five mountains Triple Hill, Sierra Blanca Peak, Little Blanca, Round Top, and Little Round Top, which form the Sierra Blanca. They were intruded into Cretaceous age sedimentary rocks. The peaks are widely covered by colluvium and surrounded by alluvium but the Cretaceous rocks can be seen in arroyos along the flanks of the mountains and in outcrop to the north of the peaks.

The Round Top Peak laccolith was intruded into limestone and sandstone layers. The Cretaceous sediments were domed upward by the rhyolite intrusion and later eroded, exposing the Round Top Peak rhyolite.

The rhyolite itself comprises the REE mineralized body. Magmas with a peralkaline composition are known to have high concentrations of incompatible elements such as U, REE, Th, and Zr. Incompatible elements that occur at the project were reported to be Li, Be, F, Zn, Rb, Y, Zr, Nb, Sn, REEs, Th, and U.

These elements formed a variety of accessory minerals disseminated throughout the rhyolite intrusion with the REE-bearing minerals being the most important. QEMSCAN analysis by Hazen Research have pointed to yttrium-rich fluorite as a major host of Yttrium and REEs. Subsequent synchrotron studies demonstrate that essentially all of the Yttrium and Heavy Rare Earths reside in yttrium-bearing fluorite.



The rhyolite magma that developed Round Top Peak probably cooled too quickly to develop a coarse-grained texture or to develop zones with high REE concentrations. A quick cooling rate would cause a fine-grained texture of the rhyolite and even distribution of the REE minerals. The rhyolite magma was saturated in fluorine, which is reflected in the high percentage of fluorine accessory minerals that are distributed throughout the rhyolite mass. As the magma cooled, fluorine saturated fluids exsolved from the crystallizing magma. These fluorine rich fluids accumulated in interstices and vugs between the earlier crystallized minerals and deposited REE minerals and other accessory minerals in the interstices.

The REE deposit at Round Top Peak can be classified as quartz saturated peralkaline (A-1) granite with a rhyolitic texture and a composition similar to certain pegmatites.

Resource Estimate

The PEA from August 2019 published one of the most curious resource statements we have ever seen. This updated a more conventional resource statement from 2014 (which can be seen at Appendix B). In particular, it is novel that, for a project that wishes to be regarded as a Rare Earth project, it totally omits the Lanthanum and Cerium elements of the deposit. However as is well-known these elements must be extracted in sequence (before) all the other REEs can be extracted.

Table 16-1: In Pit Resource Estimate

		Measured	Indicated	M+I	Inferred
TONNAGE	*Metric Tons*	116,400	27,800	144,200	14,250
Dy	*ppm*	29.69	29.84	29.72	29.84
Lu	*ppm*	8.80	8.71	8.78	8.72
Li	*ppm*	446.55	421.80	441.78	436.68
Hf	*ppm*	79.69	79.55	79.66	79.33
Zr	*ppm*	1,115.32	1,135.46	1,119.20	1,108.85
Al	*%*	6.64	6.58	6.63	6.74
K	*%*	3.32	3.36	3.33	3.37
Pr	*ppm*	10.25	10.14	10.23	10.13
Nd	*ppm*	27.75	27.39	27.68	27.32
Sm	*ppm*	9.94	9.83	9.92	9.82
Tb	*ppm*	3.39	3.39	3.39	3.35
Y	*ppm*	212.08	210.97	211.87	209.03
Sc	*ppm*	0.67	0.68	0.67	0.67
U	*ppm*	31.77	31.21	31.66	35.13
Be	*ppm*	36.09	36.13	36.10	32.31
Ga	*ppm*	73.62	73.09	73.52	73.54
Sn	*ppm*	138.86	136.98	138.50	140.01
Nb	*ppm*	186.52	192.35	187.64	192.13
Fe	*%*	1.08	1.09	1.08	1.09
Mg	*%*	0.04	0.04	0.04	0.06
Mn	*ppm*	538.15	539.52	538.41	543.07
Na	*%*	4.21	4.28	4.22	4.10

Rather mind-bogglingly, the above table includes 22 of the 103 elements in the periodic table, which with the other seven REEs, means that TMRC is claiming that it will be extracting one quarter of the periodic table's constituents from this one deposit.

Further on in the PEA the fate of the "other" REEs becomes evident, as the table below shows, that more than half of the Rare Earth elements (those not shown in the resource) are to be warehoused.

Comparatives

It is said that comparisons are odious but to get a measure of the worth of La Paz one is almost compelled to look to the project which has the closest parallels, which is the Round Top project of Texas Mineral Resources. That said, there a myriad of differences between the two projects.

Radioactivity

It is not a truism to say that radioactivity comes with the territory in regard to Rare Earth projects. While many projects or indeed a majority have radioactive components (the presence of Uranium or Thorium) there are some that have little to no radioactivity. When it comes to dealing with these elements a host of challenges are thrown up. These cannot be ignored or willed away by wishful thinking.

We would note that effectively Solvay's La Rochelle refinery has been neutralized as a force in processing due to an excessive build-up of thorium stockpiles, which no-one wants to buy off them. Thus the French government will not let them process any radioactive REE ore, at what was the largest non-Chinese processor when it was owned by Rhodia-STER.

Then there are the on-going travails of Lynas. Much of its grief in Malaysia has to do with the radioactive component in the ores that it brings in for processing from its Mt Weld mine in Western Australia. This delayed completion of the initial plant build and has been continuous source of trouble with local residents, politicians and NGOs.

The latest PEA from Texas Minerals Resources sets aside US$9mn for a plant to extract the Thorium and Uranium from their production.

Below can be seen the widely differing ppm rates for the main "name" mines/projects in the Rare Earth space at the current time. A large number of the REE projects in the first boom were repurposed Uranium projects (as were the corporate vehicles they were housed in). This factor was ultimately the demise of many a project.

REE Projects - Radioactive Elements Comps

Project	Jurisdiction	Owner	TREO %	Cut-off	U3O8 ppm	Thorium ppm
Mountain Pass	US	JHL Capital	7.98%	5.00%	n/a	250
Browns Range	Australia	Northen Minerals	0.63%	0.15%	26	28
(Dazzler)			2.33%	1.15%		
Mount Weld	Australia	Lynas	5.40%	2.50%	20	700
Round Top	US	Texas Mineral Reources	0.06%	NSR US$16/t	37	179
Bear Lodge	US	Rare Element Resources	3.05%	1.50%	31	134
La Paz	US	American Rare Earths	0.04%	0.03%	1.2	6
Nolan's Bore	Australia	Arafura Resources	2.60%	1.00%	22	328
Norra Karr	Sweden	Leading Edge	0.61%	0.40%	13	6
Nechalacho	Canada	Avalon	1.27%	NMR US$320/t	28	139
Bokan Mountain	US	Ucore Resources	0.60%	0.40%	77	155

Beryllium – Handle With Care

We have written much on Beryllium in recent ears. It is a metal that we find exciting yet one with associated health considerations that must be addressed.

One of the products main products in Round Top's mine plan is beryllium, which Cyprus Minerals was pulling out of Round Top Mountain in the 1980s. In fact Round Top has only ever been a (trial) Beryllium mine. The Pentagon has Beryllium noted as its key strategic metal and it is the only element in which the US has over-riding global dominance, with almost all the production coming from the Spor Mountain open-cut mine, of Materion (NYSE:MTRN), which is located in Utah.

The chief drawback from pursuit of this metal is that Beryllium is extremely carcinogenic and Center for Disease Control (CDC) website relates what has happened to workers that worked around processing facilities, mines etc.. The culprit here is *berylliosis*, a condition related to fine beryllium dust particles which when breathed in can produce lung cancer. In a recent article in the El Paso Inc. website a former worker at Round Top noted that "Even the security guards and secretaries have come down with cancer".

One concern of those in the vicinity is that the 20,000 tons to be crushed per day would be laid out over an area the size of five football fields and soaked with sulfuric acid to leach-mine out the beryllium. The crushing activity is worrying because local residents are downwind of the mine in Sierra Blanca, Beryllium particles are small and super light and can lodge very deep in the lungs with even small amounts inhaled causing health problems, including chronic beryllium disease and lung cancer.

This may be a major impediment to development at Round Top. Materion deals with airborne particles at its mine with constant hosing down of the dust with water, but such a solution is unlikely to be viable when it is a vast acreage of leach piles that will need dust-suppressing measures at Round Top.

Other Issues

Firstly, we should reiterate the fundamentals of Round Top in that it is "several mines in one" with different areas of mineralisation throughout the "hill". There are REE zones, a Uranium zone, a Lithium zone and Beryllium zone. Such is the nature of a rhyolite dome.

More critically we would note that the project needs substantial financing to move forward.

Thirdly, there is the reputational risk. We had long favoured TMRC (but chiefly it was the Beryllium that caught our attention). While the company has been called a *gerontocracy* we are now far more concerned by "the company it keeps". The company seemingly is not. While the personalities involved with its erstwhile partners and their processing plant are largely unknown in Texas (or Colorado) their

activities are all too well known in Australia. We would strongly recommend that TMRC get up to speed on the past history of corporates like Legend Phosphate and Merlin/North Australian Diamonds.

Fourthly the "black box" nature of the Colorado processing operation begs more questions than it answers.

Financial Comparisons

Below can be seen comparative valuations of the Rare Earth (plus Scandium) component of the two properties. This was calculated using the stated resource estimate of the two companies and the prices used in TMRC's 2019 PEA (see Appendix A).

	Round Top	La Paz	Price	Round Top	La Paz
			as per TREM PEA	$mn	$mn
M&I Tonnage	144,200	112,000			
	ppm	ppm			
Lanthanum (La)	20.00	56.60	$1.68	$4.85	$10.65
Cerium (Ce)	79.30	120.40	$1.90	$21.73	$25.62
Praseodymium (Pr)	10.25	14.00	$54.50	$80.55	$85.46
Neodymium (Nd)	27.68	54.40	$44.00	$175.62	$268.08
Samarium (Sm)	9.92	2.60	$1.83	$2.62	$0.53
Europium (Eu)	0.14	2.60	$33.50	$0.68	$9.76
Gadolinium (Gd)	10.24	9.10	$28.46	$42.02	$29.01
Terbium (Tb)	3.39	1.30	$575.50	$281.33	$83.79
Dysprosium (Dy)	29.72	7.00	$270.50	$1,159.26	$212.07
Holmium (Ho)		1.40			
Erbium (Er)	32.58	3.80	$27.00	$126.85	$11.49
Yttrium (Y)	211.87	36.10	$3.60	$109.99	$14.56
Scandium (Sc)	0.67	14.40	$1,040.76	$100.55	$1,678.54
Total				$2,106.04	$2,429.55

It can be noted that full two/thirds of La Paz's revenues are expected to come from Sc using this relatively recent price deck. It is then worth noting that the market cap of TMRC is currently US$99.5mn and that of ARR is AUD$4.5m.

The DoD's "Champions" Strategy

The US government's pivot towards the domestic production of Rare Earths has finally happened, albeit

10 years after the urgency of such a move was signaled. The DoD's Phase 1 funding will support detailed planning and design of a U.S.-based Heavy Rare Earth separation facility. The DoD will provide funds to undertake Phase 1 work as part of the US Defense Production Act.

The two beneficiaries of the move to promote alternatives to Chinese dominance of Heavy Rare Earths were LynasBlue (a joint venture between Blue Line Corporation and Lynas Corporation, with a proposal for downstream processing in Texas) and the other party chosen was the Mountain Pass mine (of the partly-Chinese owned MP Materials) in California. The key determinant was current production. It was regrettable that Northern Minerals (NTU.ax) was not in on this deal as it is the best- weighted producer towards the Heavy Rare Earths with its Brown's Range mine in Western Australia. It was unable though to make a strong case for the downstream element of the proposals.

A number of other REE wannabes were left waiting at the altar largely because they had no prospect of production in the short-term. One in particular started agitating, in a campaign against Lynas's foreignness, and touting their own virtues as, sometime, Texans. The fact that their own partners are sometime Antipodeans seemed to elude them. With Lynas's proposed plant in Texas the decision makers at the Pentagon had the choice between a real company with a real mine or the alternative of a project on a drawing board partnered with a putative downstream "plant" in Colorado.

Risks

The prime risks we can envision at this stage are:

- Weak demand for Rare Earths as a result of global recession
- Rare Earth price weakness
- Financing problems
- An outbreak of internecine fractiousness between those anointed by the DoD and those on the outside, making it all "too difficult" for the politicians pushing the issue

Rare Earths are very linked to the fortunes of wind turbines and EVs for the bulk of their upside demand. The latter, in particular have a checkered outlook in the wake of the economic damage from the Virus Crisis.

Prices in the space are manipulated by the Chinese for both short-term and long-term strategy considerations. The most desirable and hard to find (in the US) Rare Earths are the "heavies" and all US projects are skimpy in this regard.

The company undertook a financing in early 2020 and that suffices for now. Raising the profile in the US should make it more tempting to foreign investors than a Cobalt project in mid-NSW would have been.

The backbiting behaviour of the spoilsports in the Texan space risks derailing the whole DoD initiative (which ARR was never in the running for anyway). Additionally a loss at the next President elections by Trump would result in a less REE-focused administration to a party well-known for pandering to China.

Conclusion

From over 300 claimants to be potential Rare Earth producers in 2011, at the end of the last Rare Earths boom, the number of developers has shrunk to less than twenty survivors. Of those fifteen, only five have properties in the United States. These assets are the La Paz property of ARR, the Bear Lodge property (controlled by General Atomic), Mountain Pass in California (the sole producer, controlled by MP Materials, with a minority Chinese ownership), and Bokan in Alaska (owned by UCore) and the aforementioned Round Top. We would note though that the number of prospective properties in the US has not shrunk to an appreciable extent since 2011, but rather the attrition has been in Canada, Australia and elsewhere.

Nevertheless, Mountain Pass was advanced to production when the curtains came down in 2011 and all the rest have been marking time. While La Paz existed back at the earlier time it was not really on the radar and has surfaced in the current revival as a somewhat "fresh face" on the landscape. Mountain Pass died (and has been reborn) and the others went through a long somnolence (from which Bokan still has not awoken).

The brave plans of the DoD to sponsor a Rare Earth revival in the US have fallen afoul of the backbiting initiated by scorned parties in the bidding process. As yet it's not clear if this will get back on track. This makes us believe that if a REE recovery is in train then the players themselves (and offtakers) will have to fund the process. Waiting for the government could be a long wait indeed.

With such a small number of names to conjure with inside US borders, these Rare Earth players have scarcity value. Inevitably promoters will attempt to create new "stories" in the space but the embedded advantage lies with those projects, like La Paz, that have historic exploration work done and resource estimates to hand. If then one applies a filter that excludes projects that radioactive (literally or metaphorically) then the universe is less than a handful.

It has been said that history does NOT repeat itself, but that it rhymes and clearly the future in Rare Earths will not be a repeat of 2009-11 as the importance of mid-stream processing is now recognized. ARR is uniquely positioned sit at the table when the next REE recovery gains traction. The task now is to upgrade the resource while working on securing the all-important relationship with a processor.

We are particularly struck by the vast disparity between the market capitalisations between ARR and TMRC. While the former has a low grade deposit and a weighting towards Scandium in the economics, the latter has more problems/challenges than one can poke a stick at. They should have closer market capitalisations and that implies TMRC coming down (hence its SHORT status) in our Model Mining Portfolio) while ARR should be rising.

Thus we have given ARR a **LONG** rating with a 12-month target price of 8 cts.


AU:ARR Daily
7/09/20
0.05
0.04
0.03
0.02
0.01
Volume
©BigCharts.com
6
4
2
0
Millions
Aug
Sep
Oct
Nov
Dec
20
Feb
Mar
Apr
May
Jun
Jul

APPENDIX A:

Round Top price assumptions for Rare Earth Oxides from the 2019 PEA. Note the number of Lanthanide Series metals that are warehoused in their production scenario.

Rare Earth Oxide Pricing			
Element	**Source**	**FOB China $/kg July 2019**	**Marketed/ Warehoused**
La	Asian Metal Pages, 24 July 2019	$ 1.68	Warehoused
Ce	Asian Metal Pages, 24 July 2019	$ 1.90	Warehoused
Pr	Asian Metal Pages, 24 July 2019	**$ 54.50**	**Marketed**
Nd	Asian Metal Pages, 24 July 2019	**$ 44.00**	**Marketed**
Sm	Asian Metal Pages, 24 July 2019	**$ 1.83**	**Marketed**
Eu	Asian Metal Pages, 24 July 2019	$ 33.50	NA
Gd	Asian Metal Pages, 24 July 2019	$ 28.46	Warehoused
Tb	Asian Metal Pages, 24 July 2019	**$ 575.50**	**Marketed**
Dy	Asian Metal Pages, 24 July 2019	**$ 270.50**	**Marketed**
Ho	Asian Metal Pages, 24 July 2019	$ 58.59	Warehoused
Er	Asian Metal Pages, 24 July 2019	$ 27.00	Warehoused
Tm	No Quote		Warehoused
Yb	Asian Metal Pages, 24 July 2019	$ 16.08	Warehoused
Lu	Asian Metal Pages, 24 July 2019	**$ 618.63**	**Marketed**
Y	Asian Metal Pages, 24 July 2019	**$ 3.60**	**Marketed**
Sc	Asian Metal Pages, 24 July 2019	**$ 1,040.76**	**Marketed**

APPENDIX B:

ROUND TOP – Mineral Resource (as at April 2014)

All Rhyolites with 428 gpt Cutoff

	Element Symbol	Conversion Factor (wt %)	Short Tons / Kilotonnes / Element Oxide	Measured (x 1000) 230,984 / 209,502 gpt (elem.)	Measured oxide (kg)*	Indicated (x 1000) 297,960 / 270,250 gpt (elem.)	Indicated oxide (kg)	Measured + Indicated (x 1000) 528,944 / 479,752 gpt (elem.)	Measured + Indicated oxide (kg)	Inferred (x 1000) 376,955 / 341,898 gpt (elem.)	Inferred oxide (kg)
Lanthanum	La	1.1728	La_2O_3	19.9	4,889,520	20.1	6,370,672	20.0	11,260,192	20.3	8,139,857
Cerium	Ce	1.1713	Ce_2O_3	78.7	19,312,214	79.8	25,260,171	79.3	44,572,385	79.9	31,997,181
Praseodymium	Pr	1.1703	Pr_2O_3	10.32	2,530,265	10.4	3,289,242	10.37	5,819,507	10.43	4,173,288
Neodymium	Nd	1.1664	Nd_2O_3	28.203	6,891,789	28.482	8,978,075	28.360	15,869,864	28.613	11,410,579
Samarium	Sm	1.1596	Sm_2O_3	10.23	2,485,267	10.32	3,234,098	10.28	5,719,365	10.35	4,103,414
				Total LREO	**36,109,055**	**Total LREO**	**47,132,258**	**Total LREO**	**83,241,313**	**Total LREO**	**59,824,319**
Europium	Eu	1.1579	Eu_2O_3	0.13	31,536	0.14	43,809	0.14	75,345	0.14	55,424
Gadolinium	Gd	1.1526	Gd_2O_3	10.19	2,460,605	10.27	3,199,001	10.24	5,659,606	10.27	4,047,118
Terbium	Tb	1.151	Tb_2O_3	3.52	848,804	3.54	1,101,143	3.53	1,949,947	3.55	1,397,013
Dysprosium	Dy	1.1477	Dy_2O_3	30.93	7,436,995	30.96	9,602,727	30.95	17,039,722	30.83	12,097,586
Holmium	Ho	1.1455	Ho_2O_3	7.84	1,881,483	7.87	2,436,324	7.86	4,317,807	7.82	3,062,659
Erbium	Er	1.1435	Er_2O_3	32.63	7,817,042	32.55	10,058,945	32.58	17,875,987	32.28	12,620,207
Thulium	Tm	1.1421	Tm_2O_3	7.13	1,706,015	7.14	2,203,777	7.14	3,909,792	7.09	2,768,517
Ytterbium	Yb	1.1387	Yb_2O_3	56.99	13,595,562	56.91	17,513,105	56.94	31,108,667	56.52	22,004,336
Lutetium	Lu	1.1371	Lu_2O_3	8.89	2,117,823	8.89	2,731,906	8.89	4,849,729	8.79	3,417,310
Yttrium	Y	1.2699	Y_2O_3	219.2	58,317,548	219.5	75,330,231	219.4	133,647,779	217.3	94,346,555
				Total HREO	**96,213,413**	**Total HREO**	**124,220,968**	**Total HREO**	**220,434,381**	**Total HREO**	**155,816,725**
				Total REO	**132,322,468**	**Total REO**	**171,353,226**	**Total REO**	**303,675,694**	**Total REO**	**215,641,044**
Niobium	Nb	1.4305	Nb_2O_5	383.29	114,869,448	381.12	147,338,029	382.07	262,207,477	376.44	184,111,291
Hafnium	Hf	1.1793	HfO_2	86.7	21,420,647	86.3	27,504,284	86.5	48,924,931	85.6	34,513,965
Tantalum	Ta	1.2211	Ta_2O_5	67.3	17,216,921	67.1	22,143,130	67.2	39,360,051	66.4	27,721,460
Tin	Sn	1.2696	SnO_2	138	36,705,842	139	47,692,157	139	84,397,999	138.4	60,075,833
Uranium	U	1.1792	U_3O_8	45.43	11,223,270	45.03	14,350,091	45.20	25,573,361	45.15	18,202,960
Thorium	Th	1.1379	ThO_2	179.13	42,703,317	178.29	54,827,234	178.66	97,530,551	176.13	68,522,662

* To calculate oxide kilograms: convert gpt to wt%, multiply wt% element by conversion factor to get wt% oxide, divide that by 100 and multiply by kilotonnes times 1,000,000.

Important disclosures

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