

Thor Mining PLC

1.6p

26 October 2010

Placed to take advantage of a new global era of speciality metals and critical minerals

Share Price: 1.6p



12m High: 2.45p

12m Low: 0.63p

Market Cap: £8.0m

Shares in Issue: 438,559,912

438,559,912 fully diluted

Debt: Nil
Cash at Hand (01/08/10): £1.0m
Current Exploration Phase: approx £650,000

LSE Code: THR
Sector: Mining
Market: AIM
Website: www.thormining.com
Broker/NOMAD: Daniel Stewart & Co
Company Contact: John Simpson - 0207 776 6550

Description: Greenfields gold exploration in Australia with a fully permitted tungsten/molybdenum mine ready to finance

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Dual-listed Thor Mining (AIM, ASX:THR) has released its 2009-10 annual report. With no major surprises in the books we have decided to review the company's portfolio of non-gold projects in the context of reports in recent years by the US, EU, UK and Japan on what each considers the raw materials essential for continued economic and in the case of the US, military, success.

Hardman & Co consider these reports as primary evidence in reaching a long term view on materials that are often only traded in very small amounts, sometimes do not have an open market and, as we will discover, have been disregarded by policy makers when considering the materials needed for sustainable economic growth. Not only have they been disregarded by pragmatic policy-makers but they have been ignored by many of those demanding systemic macro-economic change from a hydrocarbon-based economy to an economy based upon renewable energy. There is now a growing realization across the political spectrum that changing the basis of our energy systems will change the nature of our raw material requirements and that does not necessarily mean fewer mines.

The US National Academy of Science identifies 5 minerals or mineral groups as critical to the US economy; Thor has active exploration on ground prospective for two of those groups (REEs & PGEs). The EU identify 14 minerals or mineral groups as critical, Thor has active exploration for 6 of them (REEs, PGEs, Tantalum, Niobium, Fluorspar & Tungsten). The Japanese mineral stockpiler, JOGMEC, currently holds 7 metals against supply shocks. Thor is currently developing or exploring ground prospective for 5 of these (nickel, chromium, tungsten, cobalt and molybdenum) with an additional 4 out of 10 on the JOGMEC 'watch list'.

At first this may give the impression of a scattergun approach, but when grouped by geological affiliation Thor is actually only looking at three broad geological exploration targets in addition to its Molyhil Mine. These are; mineralization associated with highly evolved granites, layered igneous intrusions and the Dundas orogenic gold prospects discussed at length in our previous note.

As the 'Critical Minerals' discourse starts to rise into the policy-maker's awareness to be seen in similar terms to 'Energy Security'. Thor is increasingly well placed with ground prospective for many of the most highly valued minerals for the new millennium. With a mine ready to roll and a fully-loaded project pipeline, investor sentiment has started to move back towards Thor after it successfully weathered the economic storm.

Y/E	Group Sales	Declared Profit	Adjusted Profit	Adjusted EPS	P/E ratio	Divi	Yield
	£ 000s	£ 000s	£ 000s	p/sh		£	%
2008A	0	(1,100)	(1,100)	(0.8)	N/A	N/A	N/A
2009A	0	(1,230)	(1,100)	(0.6)	N/A	N/A	N/A
2010A	0	(1,762)	(588)	(0.3)	N/A	N/A	N/A
2011E			No	Estimates			

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The Critical Minerals Discourse

Most readers will be familiar with Energy Security, Food Security and perhaps Climate Security as concepts that motivate policy makers. A more recent, and growing, policy level debate surrounds the supply of minerals to developed economies.

There is an increasing awareness outside the mining industry of the role that mining plays in the world economy, not only as a player in major international trade and local employer, but as an underpinning to techno-economic systems and the security of advanced economies. With the vast growth in dependence on technologies in everyday life, particularly electronic devices and computers, has come a realisation that removing those technologies is no longer an option and mineral security is now being framed in the same terms as food and energy security.

Increasing awareness of importance of minerals to technology

Indeed both food and energy security have acted as multipliers for the perceived importance of mineral security in the context of Climate Change and Peak Oil. Food security being heavily dependent on supplies of mined fertilizers and Energy Security being found in alternatives to hydrocarbons, mostly in the form of hi-tech devices that use a new set of metals and composite materials to harness renewable energy sources or in nuclear technologies that have always relied on a diverse set of rare minerals in small amounts.

Mineral security a threat multiplier

While mineral security has always been on the agenda (usually towards the bottom and framed in terms of Malthusian notions about absolute population carrying capacity) and has always been a focus for miners, it is only in the last 5-7 years that China's vast minerals demand really made policy makers sit up and take notice. It is only in the last 3-5 years that the right people have started to ask the right questions and some concerted study has taken place.

Not surprisingly the USA was first to break cover with the National Defence Stockpile placed under scrutiny after decades of sell-offs and inefficient administration, often to the detriment of private production. From an original 95 minerals in 80 locations the NDS had been whittled down to 20 minerals in 10 locations. The US military was asked to look at its future requirements and a list of 11 minerals or mineral groups were identified as critical to US military-industrial, and therefore, economic function.

US National Defence Stockpile under review

The study, released in 2007, associated National Academy of Science publication and Senate hearings were very focussed on the needs of the US military and utterly committed to ongoing cutting edge technological development as a matter of national policy. This single-mindedness is to the detriment of some realities of mineral supply and geology, and to a large part disregards the real politique behind the mining industry. However it did serve to highlight real issues surrounding the supply of Rare Earth Elements and Lithium. The reports can be found on the National Academies Press website and downloaded for a fee.

US policy towards critical minerals is military driven

It is important to note that no immediate geological shortage is forecast for minerals identified as critical, the most immediate problems are in the security of the supply chains and degree of concentration of current extraction and processing. Of particular concern are supply chains where both production and onward processing facilities are concentrated in non-democratic or politically unstable nations, for example Rare Earth Elements in China.

Meanwhile in the EU the European Technology Platform on Sustainable Mineral Resources was gathering data and defining what it is about minerals that is critical to economic success and went on to place that in the context of a growing and successful European economy and a shrinking carbon footprint. The ETP on SMR started work at roughly the same time as the US started its work on Critical Minerals, However the EU has only just published its findings (June/July 2010). Where initial data discovery phases and reports used a great deal of information from the USGS, later reports increasingly use the EuroGeoSurvey's World Mining Data and geological survey data to arrive at independent, but broadly similar conclusions.

New EU report on Critical Raw Materials

With more time, more clarity of function and less focus on military requirements this is a much more useful document and we welcome the EU Commission acting immediately to move to a second phase whereby a set of policy actions are devised and implemented over the next two years as a result of the report's findings. The report and associated documents can be found at http://ec.europa.eu/enterprise/policies/raw-materials/critical/index_en.htm

Economic focus not military

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While the US and EU deliberate and formulate policy in their own fashions, Japan has been at the forefront of the debate with diplomatic action being taken to dissuade China from limiting exports of REEs. Japan's state stockpile operator, JOGMEC (Japan Oil, Gas and Metals National Corporation), holds 7 minerals on stock and is considering another 10 as potentially worth stockpiling. Japan's interest is currently in supplying its steel and heavy manufacturing industry, but the additional 10 materials are focussed on supply continuity for the electronics sector. Unfortunately we do not have access to an English version of JOGMEC's policies and procedures but we understand that it aims to keep a 42-day buffer supply of each material in stock, though in actuality this works out at 25-working days of normal national consumption.

Japanese stockpile 7 minerals with 10 more on a watch list

The UK's own report, 'Material Security – Ensuring resource availability for the UK economy', is flawed. It was carried out under auspices of the Resource Efficiency Knowledge Transfer Network, so has a focus on waste minimisation rather than the international trade in metals. It is simplistic in most sections and wrong in others. There is a second group that reported on UK mineral requirements at roughly the same time as the report mentioned above from the point of view of the manufacturing sector. Unfortunately despite repeated attempts we have been unable to gain access to that public report, made by the MaterialsUK research group comprising of leading industrial and academic bodies.

UK report in 2008 flawed

	USA	EU	Japan
Current Stockpiles	Aluminium oxide, beryllium, chromium, cobalt, columbium (niobium) , industrial diamond, fluorspar , germanium, lead, manganese, mercury, mica, PGMs , quartz crystals, talc, tantalum , tin, titanium, tungsten , zinc		Nickel, chromium, tungsten, cobalt, molybdenum , manganese, vanadium
Suggested Critical Minerals	Indium, manganese, niobium, PGMs, REEs	Antimony, beryllium, cobalt, fluorspar , gallium, germanium, graphite, indium, magnesium, niobium, PGMs, REEs, tantalum, tungsten	Palladium, platinum, niobium , antimony, zirconium, strontium, REEs

Table 1: Critical minerals by country/bloc. Shown in bold are elements that Thor has an active interest in. Note that PGMs, nickel, chromite & cobalt are by geological association with layered intrusion thought to have been located using geophysics. No drilling has yet taken place to confirm either the geological model or the occurrence of these elements.

There are obviously some common materials across the three assessments, but it is perhaps more interesting to note where the differences are. For example; mica, quartz, industrial diamond, lead, mercury and talc are all relics of old technologies and indicative of the conservative bureaucracy behind the American military. The inclusion of graphite, beryllium and fluorspar by the EU suggests a strong influence from the nuclear industry, while the dominance of speciality steel additives in Japan may indicate the strength of the automotive export business when coupled with the platinum and palladium included on JOGMEC's watch list.

Discussion of the Implications

All the major technologically advanced economies have now considered their positions on the critical minerals issue and to a certain extent decided their forward strategy. The EU is the exception, but its report gives some very strong hints on what may be coming over the next two years.

The major technological economies have now all reported on Critical Minerals

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In the USA an amendment to the National Materials and Minerals Policy, Research and Development Act of 1980 has been introduced by Republican Congresswoman Dahlkemper of Pennsylvania. Passed on 29th September 2010, The Rare Earths and Critical Materials Revitalization Act 2010 allocates \$70m of core funding over the next 5 years to set up an R&D centre to collect and collate data about critical minerals, and especially REEs. The funds will also be available to support primary research into extraction and processing technologies as well as examining the possible alternatives to and recycling of REEs. We understand (from the Wall Street Journal) that the Department of Defense is expected to publish a comprehensive report on the national security implications of REE dependence in October 2010.

Japan has already acted and is in the middle of the fourth review of its stockpiles. The current diplomatic spat with China over REEs appears as much a leveraged border dispute as a genuine trade dispute, but we expect JOGMEC to continue to encourage investment in extraction and processing capacity of minerals on its watch list. We also expect JOGMEC to start serious work on recycling of electronic devices to recover speciality metals, particularly from printed circuit boards. At present most of the academic work being undertaken in this area is being done by the Chinese as they start to automate what has historically been the manual process of breaking down consumer electronics to their component parts before recycling. An efficient, automated recycling technology for e-waste has game-changing potential for several critical mineral supply chains and could reach as far as the copper and gold markets.

Japan acting already and looking towards e-waste recycling

As mentioned the EU has yet to formalise its policy position but some actions are clear from the eight recommendations that its working group makes.

EU report recommends 8 actions

The EU intends to carry out materials flow analysis on the major non-fuel raw materials and publish details of mining, processing and recycling industry performance in a new yearbook. This will directly compete with the USGS publications which, whilst reasonably complete are subject to strategic release and have sometimes been criticised for their reliability. This may well require a pan-European materials monitoring function, using national geological surveys to collect data and a centralised function to collate, analyse and present it. This has been on the cards for several years and it is likely that the British, French and German geological surveys will take the operational lead as the organisations with most capacity in this area. However, the administrative lead could become a political prize for one of the smaller countries. It is highly likely that the collective materials intelligence capacity of the EU will exceed that of the USGS in a relatively short period of time (3-5 years) simply by aggregating current resources of the 32 members of EuroGeoSurveys.

EU raw materials intelligence gathering body

A group will be established, possibly within EuroGeoSurveys, to assess, monitor and make recommendations regarding on-going minerals criticality, and to report every 5 years in the context of changing raw material supply and demand, particularly in the context of changing demands of emerging technologies. This is a natural extension of the minerals statistics gathering function and is a step forward from the ad hoc nature of US reporting.

A group to analyse and report on changing resource needs

Access to raw materials within the EU through mining and recycling will be promoted in conjunction with building capacity in monitoring and governance for developing countries involved in mineral extraction and processing. In particular mineral exploration should be considered as 'research' throughout Europe and treated as such both legally and financially. Finally, the findings of this new materials intelligence community will inform on-going trade negotiations and are likely to be up-taken into general EU trade and development policy.

Resources integral to trade discussions

Where the US report in 2007 was an interestingly gung-ho opening salvo in the Critical Minerals debate that isolates its own interests in terms of military strength, the EU report has a rigorous approach to this cross-border issue and an authoritative weight about its deliberations that persuades us that the bloc is serious about the issue and we recommend that those interested in the sector read it and its appendices. Hardman & Co know of at least two UK-based academic research groups also looking into the security of mineral supply chains and have been in contact with both.

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What does this all mean for Thor Mining ?

In practical, everyday terms not a great deal at this precise moment. We don't expect US or the EU to be waving their chequebooks around anytime soon. But what it does mean is that many minerals previously relegated by government to being of minor importance are now being recognised as integral to economic success. This is a change of mind-set for the EU and, in time, potentially a game-changer for companies involved in the supply chain for these Critical Minerals as EU policy starts to get integrated. Specifically we consider a unified approach to waste electrical goods and critical minerals as a genuine threat to mined supplies of some critical minerals, though not of Thor's primary interests in molybdenum and tungsten, and not within the next five years or so, as recycling of REEs is not well advanced.

No immediate impact for Thor

In another sense we see this move towards supply chain diversification and risk reduction as a very positive move for the consumer and the smaller miner as competition for concentrates drives down processing costs and drives up systemic efficiency. Historically the smelters have usually had the upper hand with only a minority of mines large enough or rich enough to justify building a processing plant to deliver metals to the open market, especially within the speciality and minor metals sector where processing to a finished product is sometimes long and tortuous.

Likely policy-led increase in diversity of processing capacity

A policy-led move to add new specialist processing capacity in a very restricted and localised market would change that dynamic and shift the balance towards the consumer and the miner by forcing relative reductions in smelter charges as a new and more efficient generation of smelters joins the fray. Of course as smelters have their profits trimmed they may increasingly look towards part-ownership of mining assets to try and retain end-to-end margins and we have seen some evidence of both traders and smelters taking an interest in relatively early-stage development projects.

Should drive down smelter costs

Much is being said about the possible re-entry of the US National Defence Stockpile into the market place, especially with regard to REEs. We see this as a negative and unwarranted move given that the US already has onshore REE mines, albeit not active ones, and has maintained the Mountain Pass mine as a strategic resource. If its military is so anxious about the REE supply chain the easiest long-term answer is to restart that mine and its processing plant. Of course that may or may not be possible for environmental reasons (one of the reasons it was shut down in the first place was the amount of thorium being stored in the tailings compound), but to establish a government sponsored stockpile that will distort the tiny REE market (around \$2bn pa) still further doesn't make sense in macro-economic terms as it may drive un-supported independent production out of business. This makes absolute sense in strategic and military terms but none whatsoever in an era of shrinking government.

NDS REE stockpile would distort this tiny market

A Very Quick Review of Thor's Non-gold Properties

Our last note covered the Dundas gold prospects in some detail and while we understand that the next move will be approximately 5,000ft of shallow RAB drilling over a relatively wide area in the December 2010 quarter (subject to permitting) the context of this note is more directed towards Thor's other properties and prospects.

Expect 5,000ft of shallow RAB drilling on Dundas

Molyhil Mine

Hardman & Co believe that this remains Thor's core asset and one that is very close to production in terms of permitting and engineering. How close to production in terms of timing depends almost entirely on the price of molybdenum. All fundamentals point to the moly price recovering in the mid-term though we will not predict when. While we believe that the project is economic significantly below \$25/lb Mo (57% roasted concentrate), a sustained price somewhere above \$25/lb may be needed to renew serious interest in financing the mine's development given the current weakness in the Australian dollar. Moly prices have been wandering between \$15/lb and \$20/lb for almost a year, while tungsten prices are now back to pre-crash levels and looking strong at \$270/mtu Ammonium Para-Tungstenate (APT).

Molyhil may need sustained moly price of \$25/lb to gain finance, less to run profitably

Both tungsten and moly are identified as 'critical minerals' by one or more of the reports cited above. By-product magnetite for coal washing is a useful addition to the product list, both minimising the amount of waste and maximising the percentage of payable material moved. There is a ready coal washing market within Australia that should mitigate some of the global currency instability that is being predicted.

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Oorabra Reefs

This is an early stage fluorite prospect close to the Molyhil Mine. Once in production the geologists, drillers and lab that will be at Molyhil can be used to explore this area. We don't expect significant movement on this property until then.

Fluorite is identified as a critical mineral by the EU for its use in production of hydrofluoric acid which in turn is used as a flux in the production of high quality steels, in production of synthetic cryolite for aluminium smelting, as a chemical feedstock for plastics and in production of nuclear fuel.

Most of the world's fluorite (>70%) is currently produced by China.

Hatches Creek

Hatches Creek is a historic tungsten mining field. Old brown-field sites all around the world provide significant exploration opportunities for explorers using new technologies. They also provide challenges due to the amount of workings and sometimes poor record keeping by previous owners.

Tungsten is rarely found in isolation and at Hatches Creek the mineralised quartz reefs have shown copper is also present, though again this is probably a property for detailed work once Molyhil is up and running.

Hart's Range

Hart's Range has some fascinating geology with two major metamorphic events overprinted on basement gneiss almost 1.8bn years old. Early volcano-sedimentary primary lithologies, rifting and plutonism associated with the Strangways event were later thermally and structurally altered in the Cambrian and then finally uplifted in the Alice Springs Orogeny at 300-400Ma.

The interaction between these multiple tectonic and thermal events has left the area with a rich variety of mineralisation as rock types were successively partially melted and elements mobilised by fluids permeating the fractured strata.

Over the years there has been a significant amount of academic work carried out on the surrounding area, so it will be a matter of piecing together the evidence with the results of airborne survey, surface sampling and drilling before a really good picture of the complex geology is formed.

Thor mentions seven E-M conductors associated with a layered amphibolite in their annual report. Sivell & Foden (Precambrian Research, Vol 38, 1988) conclude that there are two chemically distinct amphibolite suites present in the Enita Gneiss of the Hart's Range. The first suite was emplaced during continental rifting as a result of a mantle plume punching through existing meta-sediments. The second suite consists of meta-cumulates emplaced at 20-25km depth after a collisional event and are similar in composition to Cordillieran intrusions. It's too early to tell which of the two suites Thor has found, if either (there is no guarantee that Sivell & Foden found and identified all the layered amphibolites present), but what is known is that layered igneous intrusions of similar settings have been mined for nickel, copper, PGEs and gold. Chromium and cobalt are also potential products from layered intrusions, though they are unlikely to be sufficient in grade or volume to support a mine on their own.

The next stage for the seven prospects generated by the airborne E-M survey will be a more focussed ground-based geophysical survey to define the aerial extent. Such a survey may be relatively low power since these conductors are less than 100m deep, cutting down on cost. A drill program can then be designed to test them. Thor estimates assay returns in the first half of 2011 if all goes to plan.

Daicos

In the September 2010 Quarterly report the company announced that it had restarted its exploration and evaluation program on the Daicos high grade uranium and REE prospect. Daicos is an early stage prospect that has shown spectacular grades in grab and chip samples from an exposed pegmatite vein system over some 300m by 400m.

Oorabra Fluorite prospects for when Molyhil is activated

Hatches Creek brown-field but interesting

Hart's Range a geologist's playground

Need to collate all available academic work

Promising signs of layered intrusions

7 priority conductors at 100m or less

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As well as uranium grades up to 20%, niobium has been seen at 28% in assay and tantalum up to 25%. REE combined grades average 3.5%. Most REE mines operate at between 2 and 4% combined REE grades. Whether Daicos shows most promise as an REE prospect, a niobium-tantalum prospect or as a uranium prospect is too early to tell, but the grades do certainly warrant further examination.

Conclusions

The Critical Minerals discourse will continue to influence investor sentiment and we welcome the interest that policy-makers are now taking in what miners have always known were essential raw materials for all industrial activity, irrespective of whether it bears a 'green' label. We would caution against taking the US stance of considering any mineral supply in military terms alone as this brings with it a cartload of emotive issues and could obscure the most rational way forward.

While Molyhil Mine remains core to Thor's value, as a small explorer/developer it's diversification into gold is fully justified by the acquisition of some prime exploration ground in the form of the Dundas project. With market sentiment strongly behind gold and still weakly behind fundamental economic growth Thor has built in a hedge against both sides of the argument. We look forward to good news from Dundas later in the year.

With strong Chinese steel growth forecast by many in H1 2011 and depleting stocks of steel additives, production will need to be satisfied somehow. The mega-miners seem less interested in true diversification than ever, selling off the variety that was their strength in preference for conditional economic power that they are finding increasingly difficult to wield. There is the growing global realisation for the need to radically improve mineral processing technologies so that smaller deposits can be exploited profitably, not simply to continue as we have done but to manage a necessary transition to a lower energy metal cycle. The smaller miner is part of this movement, as is the recycler and the minerals technologist.

Management		Major Shareholders (pre-placement)		
Exec Chairman	Mick Billing	Western Desert Resources Ltd	47,217,974	12.37%
CFO/Secretary	Laurie Ackroyd	Vidacos		
Non-exec Director	Michael Ashton	Nominees Ltd	15,988,167	4.19%
Non-exec Director	Norman Gardner	TD Waterhouse		
Non-exec Director	Greg Durack	Nominees (Europe) Ltd	10,281,616	2.69%
Non-exec Director	Trevor Ireland	PW Askins	9,675,000	2.54%
Exploration Mgr	Stuart Till			
Key Dates		Key Milestones for 2010		
Quarterly Reports	31 st March,	-	5,000ft RAB drilling on Dundas Gold Project	
September 30 th				
Half Yearly Report	31 st December			
Annual Report	30 th June			
Full Year Results	31 st October			

Table 2: Key company data.

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