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## THOR MINING PLC

Registered Numbers:  
United Kingdom 05276 414  
Australia 121 117 673

Registered Office:  
58 Galway Avenue  
MARLESTON, SA, 5035  
Australia

Ph: +61 8 7324 1935  
Fx: +61 8 8351 5169

Email:  
corporate@thormining.com

Website:  
[www.thormining.com](http://www.thormining.com)

Twitter  
[@ThorMining](https://twitter.com/ThorMining)

Enquiries: Mick  
Billing Executive  
Chairman Thor  
Mining PLC  
+61 8 7324 1935

Nominated Advisor  
Colin Aaronson  
Grant Thornton  
+44 (0) 20 7383 5100

AIM & ASX Listings:  
Shares: THR

Directors:  
Michael Billing  
David Thomas  
Alastair Middleton  
Richard Bradey

### Key Projects:

- Tungsten  
*Molyhil NT*  
*Pilot Mountain USA*
- Copper  
*Kapunda SA*

Company Announcements Office  
ASX Securities Limited,  
20, Bridge Street,  
Sydney, N.S.W. 2000

## UPGRADED FEASIBILITY STUDY - MOLYHIL

The Board of Thor Mining Plc ("Thor" or the "Company") (AIM, ASX: THR) is pleased to announce results of an upgraded Definitive Feasibility Study (DFS) for the Molyhil tungsten and molybdenum project in the Northern Territory of Australia.

The study outcomes show materially enhanced financial returns and early payback of capital as a result of process improvements and longer operating life at the Molyhil open pit, with significant further upside potential from subsequent underground mining at Molyhil and from the nearby Bonya tungsten deposits.

### Study Highlights

- Total project revenue of in excess of A\$500 million over the current seven year life of mine.
- EBITDA of A\$245 million with project payback period of less than 18 months after payment of royalties and taxation.
- All equity Net Present Value (NPV) of A\$101 million at a discount rate of 5% with an Internal Rate of Return (IRR) of 59%, both after payment of taxation and royalties.
- Project finance requirement of US\$43 million.
- Seven year mine life with first production targeted for early 2020, utilising simple open cut mining operation and conventional mineral processing techniques.
- Substantial upside potential from subsequent underground mining at Molyhil and from the nearby Bonya tungsten deposits.

### **Mick Billing, Executive Chairman of Thor Mining, commented:**

*"I am delighted to release the results of the Definitive Feasibility Study update that shows a Net Present Value exceeding A\$100 million and demonstrates the substantial value this project holds for the Company and its shareholders."*

*"Of particular note, the sole focus of this study is on the open pit operation outlined in the ore reserve, and does not account for what the board believe will be significant additional mine life generated from the potential underground mining operation and the additional ore potential from the nearby Bonya deposits, as previously announced."*

*"The Company now has an updated and upgraded Definitive Feasibility Study, incorporating the work over recent years at Molyhil with which it can continue to engage with third parties who have expressed a specific interest in the project."*

*“Molyhil is 100% owned by Thor Mining and is construction ready subject to submission of an acceptable Mining Management Plan and finalisation of project level mine construction financing. Upon finalisation of project level financing, (which the Company hopes to conclude in the next few months), the construction phase for Molyhil is estimated at 12 months.”*

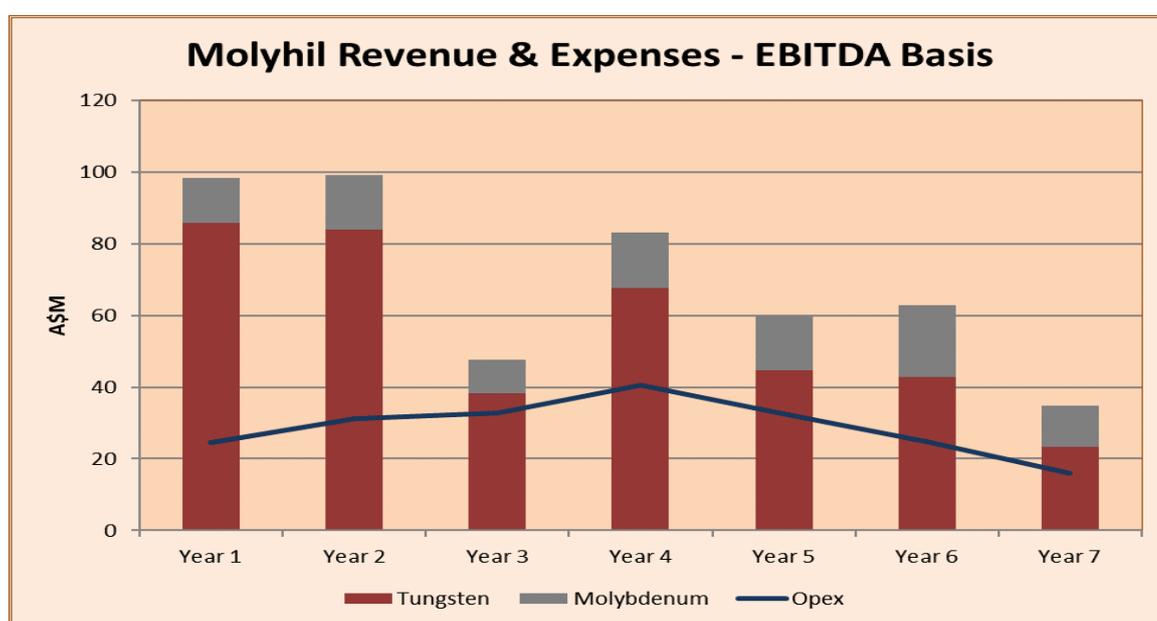
### **Molyhil Definitive Feasibility Study**

Following the publication in January 2018 of an updated Open Cut Ore Reserve Statement for Molyhil, Thor has completed the necessary mining and production schedules and capital and operating cost estimates, and incorporated these results into the feasibility model, along with previously published parameters (refer attachment “A”), to produce an optimised and positive feasibility study outcome with a mining and processing operation over a seven year life.

A full copy of the DFS shall be available on the Thor Mining website within one week of this announcement.

The results of the study show:

- EBITDA returns totalling A\$245 million along with post tax project payback period inside 18 months from first production, accelerated by very high tungsten grades in the first 2 years of open cut mining (Figure 1).
- All equity Net Present Value (NPV) of A\$101 million at a discount rate of 5% (A\$79million @ 10%) after tax and royalty payments.
- All equity Internal Rate of Return (IRR) of 59% after tax and royalty payments.
- Production cost of US\$90/mtu concentrate (after deduction of molybdenum bi-product credits), ensuring Molyhil will be a very low cost tungsten producer.
- Mine life of seven years, derived from the updated open cut ore reserve statement published in January 2018.
- A project finance requirement of US\$43 million comprising total capital expense of A\$69 million (US\$51 million), offset by approximately A\$11 million for mining and power generation equipment and camp facilities, which are suitable for capital finance. Discussions with providers of this style of finance are at an early stage.



*Figure 1: Molyhil Annual Revenue & Expenditure*

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The feasibility study has been prepared by Thor Mining PLC using data and information supplied by third party consultants and suppliers for key components, including:

Resource Estimates	RPM Global
Open Cut Ore Reserve Statement	AVCS Pty Ltd
Mine Planning	AVCS Pty Ltd
Capital Costs	Rosetta Stone Ops
Operating Parameters & Costs	Various Suppliers, Thor
Metallurgical Processes & Outcomes	KYSPY Investments Pty Ltd
Environmental Studies	Keith Lindbeck & Associates
Economic Model	Mazars Global Infrastructure Finance (Australia) Pty Ltd

The feasibility study uses the results and new input parameters generated by these additional and comprehensive workstreams conducted over the last 6 months.

While most of the consultants involved can be considered as independent, a portion of the Report, including the economic analysis, has been authored by the Company. The work as a whole is not considered independent.

**Table A: Key Production Metrics**

		Total	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
<b>Mining</b>										
Ore Mined	'000t	3,543	488	499	315	982	566	692	-	-
Waste Mined	'000t	27,053	3,542	3,898	7,734	6,528	4,330	1,021	-	-
<b>Processing</b>										
Ore Crushed & Sorted	'000t	3,543	358	531	377	531	531	531	531	153
Ore treated	'000t	2,152	256	350	225	329	314	313	283	82
Feed Grade WO <sub>3</sub>	%	0.29	0.68	0.42	0.25	0.29	0.22	0.21	0.12	0.12
Feed Grade Mo	%	0.12	0.15	0.12	0.11	0.12	0.12	0.16	0.09	0.09
WO <sub>3</sub> Recovered	t	8,583	2,043	1,857	786	1,299	988	943	517	149
Mo Recovered	t	3,133	382	462	292	476	461	613	347	100

**Cautionary Statement:**

The Ore Reserve estimate does include minor quantities of Inferred Resources and unclassified mineralisation that have resulted from the formation of an SMU and/or inclusion of edge dilution across the Indicated Resource block boundary. This additional material is ~ 4% of the estimated reserve mass. There is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of indicated mineral resources or that the production target itself will be realised.

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## Commodity Outlook

**Tungsten** (chemical symbol W) is a vital mineral with multiple applications & few substitutes and is considered a strategic commodity in the USA, China & the European Union. It is used in manufacture of hard metals, steels, alloys and mill products.

In February 2018 the United States Department of the Interior confirmed that tungsten remains on the Federal Register of commodities classified as critical by the United States Government.

The outstanding & unique physical properties of tungsten (melting point/hardness/tensile strength) and lack of substitutes, makes tungsten critical in industrial, oil & gas, mining and agricultural applications.

Tungsten is typically priced according to metric tonne units (mtu) of APT, where one mtu is equal to 10 kg of  $WO_3$ . APT and concentrate prices are mainly based on quotations published twice weekly by London's Metal Bulletin, Argus Metals and other trade journals (ITIA).

**Molybdenum** (chemical symbol Mo) is a key component of many of the higher quality stainless steels, along with nickel, and can be substituted for portion of the nickel component when nickel prices are elevated. In consequence, when nickel prices climb, often molybdenum pricing will follow.

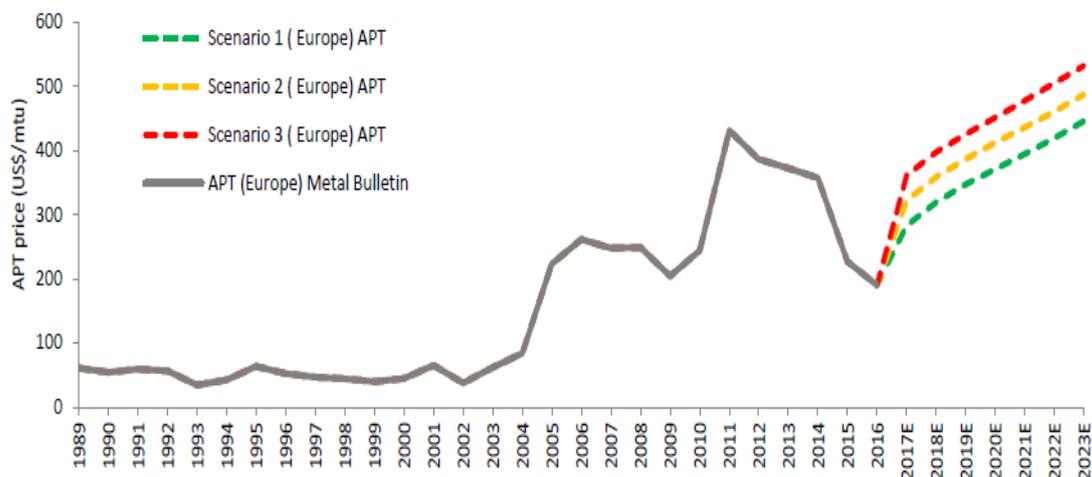
Much of global molybdenum supply is as co-product from a number of large porphyry copper mining operations. Supply, therefore, can be somewhat non-elastic with over-supply in times where demand is weak, and conversely under-supply when demand is high.



Figure 2: Tungsten & molybdenum Pricing History (Argus Metals)

## Forecast Commodity Pricing

CHART 20: FORECAST EUROPEAN APT PRICES



SOURCE: Northland Capital Partners estimates - 2017-2023 and Metal Bulletin 2017 – 1989-2016

Figure 3: Tungsten Pricing Forecast - Northland Capital Partners

APT tungsten price forecast used is the the low end forecast by Northland Capital Partners Limited between 2019 and 2023 base case (Scenario 1), after which the Company has used an arithmetic average of the period from 2019 to 2023.

Expected future pricing for molybdenum is forecast to be in the US\$10 to US\$15 range, with occasional incursions either side.

Table B: Tungsten and Molybdenum pricing forecast.

	Unit	2019	2020	2021	2022	2023	2024	2025	2026
Tungsten APT	US\$/mtu	347	371	394	419	445	395	395	395
Molybdenum	US\$/lb	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50

### Mining

Mining is planned using conventional open cut mining methods; contract drill & blast, followed by owner operated excavation and haulage.

An average pit slope of 48° currently provides for a waste to ore ratio of 7.6:1. There may be an opportunity to improve this ratio during operations and via targeted geo-technical drilling. Additionally, prior to the third (final) pit cutback, the Company will assess the potential to bring forward the timing of underground mining, to reduce significantly the amount of waste removed (approximately 55% of total waste compared with 38% of payable ore), also reducing the footprint of the waste storage dump.

The Mineral Resource estimate extends below the level of the open cut ore reserve used in this study, with portion of that estimate identified as potentially economic for subsequent underground mining. If feasible, this would extend the operational life further, with studies for this purpose to be conducted during the open cut phase.

## Processing

Mineral processing involves:

- Two stage crushing to -55mm:
- X-Ray (XRT) ore sorting at two sizes, initially set at -55mm to +25mm, and -25mm to +10mm
- Tertiary crushing
- Two stage grinding using a rod mill, followed by a ball mill
- Four stage flotation circuit
  - » Molybdenum flotation, to recover saleable molybdenum
  - » Sulphide flotation, to remove minerals which would otherwise interfere with scheelite flotation,
  - » Calcite flotation, to remove minerals which would otherwise interfere with scheelite flotation
  - » Scheelite flotation, to recover 85% of this tungsten bearing mineral
- Magnetic separation as a final dressing stage for the scheelite concentrate.

## Project Infrastructure

Molyhil is located 220 kilometres north-east of Alice Springs in Australia's Northern Territory. Access is via the Plenty Highway a partially sealed road off the Stuart Highway which connects Alice Springs and Darwin.

The project will operate as a fly-in fly-out operation with provision for camp and electricity generation facilities provided in the cost estimates.

The project has ample water from underground aquifers nearby.

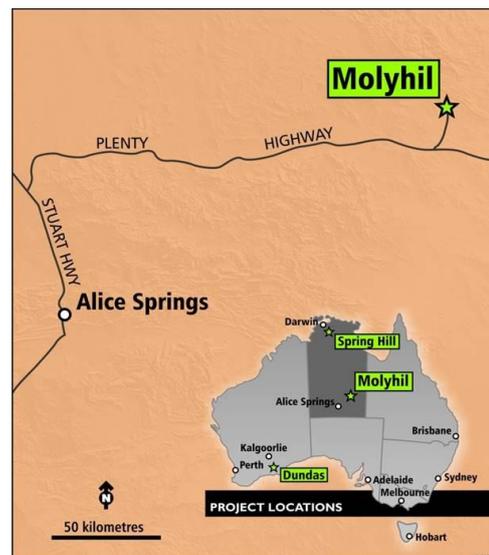


Figure 3: Molyhil Location

## Project Permitting

The Company has received environmental approval to proceed with the development from the Northern Territory EPA, and has agreement with traditional owners for the development. The final permitting requirement is for the Mining Management Plan which is to be submitted along with the bond for mine closure costs upon receipt of project finance approval.

## Next steps

The next steps for the Molyhil project involve securing the balance of concentrate sales (off-take) agreements and finance for the project development, after which it is planned to commence detailed engineering studies, along with completion of the Mine Management Plan and onsite civil works in preparation for mine and process plant construction and development.

**Table C. Molyhil Key Features**

Project NPV (@5%) post tax & royalties	A\$101 million	All Equity Case
Project IRR post tax & royalties	59%	All Equity Case
Project finance requirement	US\$43million	
Project Capex	A\$69 million	
Break even tungsten price	US\$230/mtu	
Life of Mine C1 Cash Cost	US\$90/mtu	
Life of Mine EBITDA	A\$239 million	
Payback from 1 <sup>st</sup> production	< 18 months	
Project Life	7 years	
Average feed grade	0.29% WO <sub>3</sub>	0.48% WO <sub>3</sub> after ore sorting
	0.12% Mo	0.20% Mo after ore sorting
<b>Operating throughput</b>		
Crushing & Sorting	531,000 tpa	
Milling/Flotation etc	324,000 tpa	After ore sorting
Annual Production Average	125,000 mtu *	Approximately 1.2% of global market
		* 1mtu = 10Kg of contained WO <sub>3</sub>

**Project sensitivities**

The financial outcomes for Molyhil fluctuate with various input sensitivities, as follows:

		NPV A\$M	IRR %
Base Case		A\$100.8	58.9%
Revenue	+10%	A\$122.2	71.3%
	-10%	A\$79.3	46.7%
Scheelite Recovery	75%	A\$79.1	46.7%
Operating Costs	-10%	A\$110.4	63.4%
	+10%	A\$91.29	54.4%
Discount Rate variation	8%	A\$86.0	58.9%
	10%	A\$77.4	58.9%

For further information, please contact:

**THOR MINING PLC**

Mick Billing Executive Chairman  
+61 8 7324 1935

**Competent Persons Statement**

The information in the feasibility study reported that relates to Technical Assessment and Valuation of Mineral Assets reflects information compiled and conclusions derived by various consulting practitioners referred to earlier in this report. This report has been reviewed by Richard Bradey who has found it to be based on and fairly reflects the information and supporting documentation prepared by the practitioners.

Richard Bradey is a Member of The Australasian Institute of Mining and Metallurgy and is a permanent employee of Thor Mining PLC. Richard Bradey has sufficient experience relevant to the Technical Assessment and Valuation of the Mineral Assets under consideration and to the activity which he is undertaking to qualify as a Practitioner as defined in the 2015 edition of the 'Australasian Code for the Public Reporting of Technical Assessments and Valuations of Mineral Assets'. Richard Bradey consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Updates on the Company's activities are regularly posted on Thor's website [www.thormining.com](http://www.thormining.com), which includes a facility to register to receive these updates by email, and on the Company's twitter page, [@ThorMining](https://twitter.com/ThorMining).

#### About Thor Mining PLC

*Thor Mining PLC (AIM, ASX: THR) is a resources company quoted on the AIM Market of the London Stock Exchange and on ASX in Australia.*

*Thor holds 100% of the advanced Molyhil tungsten project in the Northern Territory of Australia, for which an updated feasibility study in 2015<sup>1</sup> suggested attractive returns.*

*Thor also holds 100% of the Pilot Mountain tungsten project in Nevada USA which has a JORC 2012 Indicated and Inferred Resources Estimate<sup>2</sup> on 2 of the 4 known deposits. The US Department of the Interior has confirmed that tungsten, the primary resource mineral at Pilot Mountain, has been included in the final list of Critical Minerals 2018.*

*Thor is also acquiring up to a 60% interest Australian copper development company Environmental Copper Recovery SA Pty Ltd, which in turn holds rights to earn up to a 75% interest in the mineral rights and claims over the resource<sup>3</sup> on the portion of the historic Kapunda copper mine in South Australia recoverable by way of in situ recovery.*

*Thor has a material interest in USA Lithium Pty Limited, an Australian private company with a 100% Interest in a Lithium project in Nevada, USA.*

*Finally, Thor also holds a production royalty entitlement from the Spring Hill Gold project<sup>4</sup> of:*

- *A\$6 per ounce of gold produced from the Spring Hill tenements where the gold produced is sold for up to A\$1,500 per ounce; and*
- *A\$14 per ounce of gold produced from the Spring Hill tenements where the gold produced is sold for amounts over A\$1,500 per ounce.*

#### Notes

- <sup>1</sup> Refer ASX and AIM announcement of 12 January 2015
- <sup>2</sup> Refer AIM announcement of 22 May 2017 and ASX announcement of 23 May 2017
- <sup>3</sup> Refer AIM announcement of 10 February 2016 and ASX announcement of 12 February 2018
- <sup>4</sup> Refer AIM announcement of 26 February 2016 and ASX announcement of 29 February 2017

**Attachment A: Molyhil Feasibility Study Input Parameters**

1. Mineral Resource estimate of 4.7 million tonnes averaging 0.28% WO<sub>3</sub> & 0.13% Mo in Indicated and Inferred categories
2. Open Cut Ore Reserve for the Molyhil deposit of 3.5 million tonnes averaging 0.29% WO<sub>3</sub> & 0.12% Mo categorised as Probable
3. Revenue factors:
  - Revenue / mtu scheelite concentrate = US\$345/mtu after concentrate discount
  - Revenue / pound molybdenum concentrate = US\$11:00/lb
  - Exchange Rate A\$1.00 = US\$0.74 over life of mine

APT Tungsten Price Forecast	2019	2020	2021	2022	2023	2024+
US\$/mtu	346	371	394	419	445	395

4. Metallurgical recovery (post ore sorting)
  - Tungsten = 85%
  - Molybdenum = 77.8%
5. Capital cost = A\$69 million
6. Operating Factors
  - Mining waste to ore ratio = 7.6 : 1
  - Mining costs = A\$20.87 / tonne ore crushed
  - Crushing & Sorting Costs = A\$3.46 / tonne ore crushed
  - Processing & admin costs = A\$56 / tonne ore milled
  - Ore Sort reject = 39% of ore crushed

The Molyhil Mineral Resource is summarised in Table 2 Below:

**Table 2: Summary of Molyhil Mineral Resource Estimate: (Reported on 30 January 2014)**

Classification	Resource Tonnes	WO <sub>3</sub>		Mo		Fe
		Grade %	Tonnes	Grade %	Tonnes	Grade %
Indicated	3,820,000	0.29	10,900	0.13	4,970	18.8
Inferred	890,000	0.25	2,200	0.14	1,250	15.2
<b>Total</b>	<b>4,710,000</b>	<b>0.28</b>	<b>13,100</b>	<b>0.13</b>	<b>6,220</b>	<b>18.1</b>

Notes

- Thor Mining PLC holds 100% equity interest in this reserve.
- Mineral Resource reported at 0.1% combined Mo + WO<sub>3</sub> Cut-off and above 200mRL only.
- The Company is not aware of any information or data which would materially affect this previously announced resource estimate, and all assumptions and technical parameters relevant to the estimate remain unchanged.
- The Indicated Mineral Resources are **inclusive** of those Mineral Resources modified to produce the Ore Reserves.

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The Molyhil Open Cut Ore Reserve Statement is summarised in Table 3 below

**Table 3: Molyhil Open Cut Ore Reserve Statement** (Reported on 8 January 2018)

Classification	Reserve		WO <sub>3</sub>		Mo	
	'000 Tonnes	Grade %	Tonnes	Grade %	Tonnes	
Probable	3,500	0.29	10,200	0.12	4,300	
Total	3,500	0.29	10,200	0.12	4,300	

Notes:

- Thor Mining PLC holds 100% equity interest in this reserve.
- The Company is not aware of any information or data which would materially affect this previously announced reserve statement, and all assumptions and technical parameters relevant to the estimate remain unchanged.
- All estimates are on a dry tonne basis.
- The reserve estimate extends to a maximum depth below surface of 185 metres.
- The Ore Reserve estimate does include minor quantities of Inferred Resources and unclassified mineralisation that have resulted from the formation of an SMU and/or inclusion of edge dilution across the Indicated Resource block boundary. This additional material is ~ 4% of the estimated reserve mass and but makes no contribution to the recovered WO<sub>3</sub> and Mo.

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