

# PacMag Metals Limited

## ASX ANNOUNCEMENT

### SENTINEL PROJECT, INITIAL CHURCH BLOCK RESOURCE ESTIMATE AND SCOPING STUDY RESULTS

**ASX:PMH**

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#### SUMMARY

12<sup>th</sup> August 2009

- Initial insitu Inferred Resource for the Church Deposit, the first area drill tested within the Sentinel Project in North Dakota USA, representing only 1/5 of the total prospective project area on PacMag's 100% owned leases:

Cut-off Grade	Wet Tonnes	Dry Tonnes	U <sub>3</sub> O <sub>8</sub> (%)	MoO <sub>3</sub> (%)
50 ppm U <sub>3</sub> O <sub>8</sub>	3,439,000	2,353,000	0.0165	0.0221
200ppm U <sub>3</sub> O <sub>8</sub>	841,000	580,000	0.035	0.039

- The Company believes that there is considerable upside in both grade and tonnes reported as the initial Resource estimate involved a conservative approach of inserting half below detection grades (0.0005% U<sub>3</sub>O<sub>8</sub>) for all un-assayed portions of the host lignite unit (601 of 1279 composite samples), resulting in a significant reduction in average resource composite grades (by 46% for uranium).
- Broader Exploration Target for the Company's current regional landholdings of between 3 to 6 million dry tonnes at grades of 0.05% to 0.1% U<sub>3</sub>O<sub>8</sub> and 0.05% to 0.1% MoO<sub>3</sub> (5 – 10 million pounds U<sub>3</sub>O<sub>8</sub>).
- Within the Church resource area only and based on the same drilling and modelling techniques as used for the uranium and molybdenum resource reported above, there is a germanium Exploration Target of:

Cut off Grade	Wet Tonnes	Dry Tonnes	GeO <sub>2</sub> (g/t)	Tonnes GeO <sub>2</sub> (median values)
25ppm GeO <sub>2</sub>	5.9Mt - 10.9Mt	4.0Mt - 7.5Mt	40 - 70	287
50ppm GeO <sub>2</sub>	2.4Mt - 4.3Mt	1.6Mt - 3Mt	50 - 100	171

- Broader Exploration Target for the Company's total regional landholdings of 6 to 18 million tonnes of germanium rich lignite at grades of 65 to 100 g/t GeO<sub>2</sub> (450 – 1350 tonnes GeO<sub>2</sub>).
- The uranium and molybdenum resources and the Exploration Targets are reported in accordance with the JORC code. Upon further analytical check assay work, the germanium Exploration Target may be upgraded to resource status, but until that time the Exploration Targets remain conceptual in nature.
- Further drilling of regional targets is planned to expand the resource base, along with re-drilling of selected Church resource holes to test unassayed lignite sections to better establish grades.
- Development of initial process flow-sheets based on recent metallurgical testwork has allowed initial scoping level financial modelling that indicates a conceptual project that is operating cash flow positive under a range of scenarios:
  - Capex Range US\$63 million (125k tpa uranium plant only) to US\$105 million (250k tpa plant, uranium, molybdenum, germanium)
  - Results for a high-grade case\* 250k tpa throughput, recovering uranium only providing net revenue of US\$117/tonne, equal to US\$30 million per annum free cash, cash cost of \$24/lb U<sub>3</sub>O<sub>8</sub> or ~ 3.5 years payback on capital.

(\*assumptions page 6).

## INTRODUCTION

The Directors of PacMag Metals Limited ("PacMag") are pleased to report an initial resource estimate for the Church uranium, germanium, molybdenum deposit in North Dakota, USA. The Church Deposit is the first area drill tested within the Sentinel Project, and represents only a small portion of the total prospective project area. The Church area was the first of the leases acquired by PacMag in the district and has become a test area to assess the continuity, grade and metallurgical characteristics of the uranium, molybdenum, germanium mineralisation hosted within regionally continuous lignite seams.

Mining in the late 1960's from a small open pit (now rehabilitated) that occurs within the Church lease is reported as producing approximately 40,000 tons of ore grading 0.175%  $U_3O_8$  from near surface. This open pit and others within the district are all near surface, rarely exceeding a depth of 15 metres. Furthermore, a 40 ton bulk sample taken approximately 1km north-west of the open pit located on PacMag's tenure, returned an average grade of 0.13%  $U_3O_8$ . Mining in the district ceased in the late 1960's when  $U_3O_8$  was at \$7 per pound. The recovery of molybdenum and germanium was not reported.

The resource drilling has shown that the mineralisation in the district is continuous over mineable widths and lengths. Metallurgical testwork has successfully demonstrated that the dried and calcined mineralisation is amenable to acid and alkaline leaching, with high metal recoveries (97%  $U_3O_8$ , 70%  $MoO_3$ , 66% Ge). The drying and calcining process beneficiates (upgrades) the mineralisation by an average of 76%, reducing the tonnes of ore to be leached to 1/5 from that mined. Furthermore, initial scoping level financial modelling indicates a conceptual project that is operating cash flow positive under a range of development scenarios.

Future activities will now focus on the Company's surrounding land holdings, where numerous high-grade surface samples have indicated strong potential for additional resources to be defined in the district. The Company has ascribed an Exploration Target for its regional landholdings of between 3 to 6 million dry tonnes at grades of 0.05% to 0.1%  $U_3O_8$  and 0.05% to 0.1%  $MoO_3$  (5 – 10 million pounds  $U_3O_8$ ), with 6 – 18 million tonnes of germanium rich lignite at grades of 65 to 100 g/t  $GeO_2$  (450 – 1350 tonnes  $GeO_2$ ).

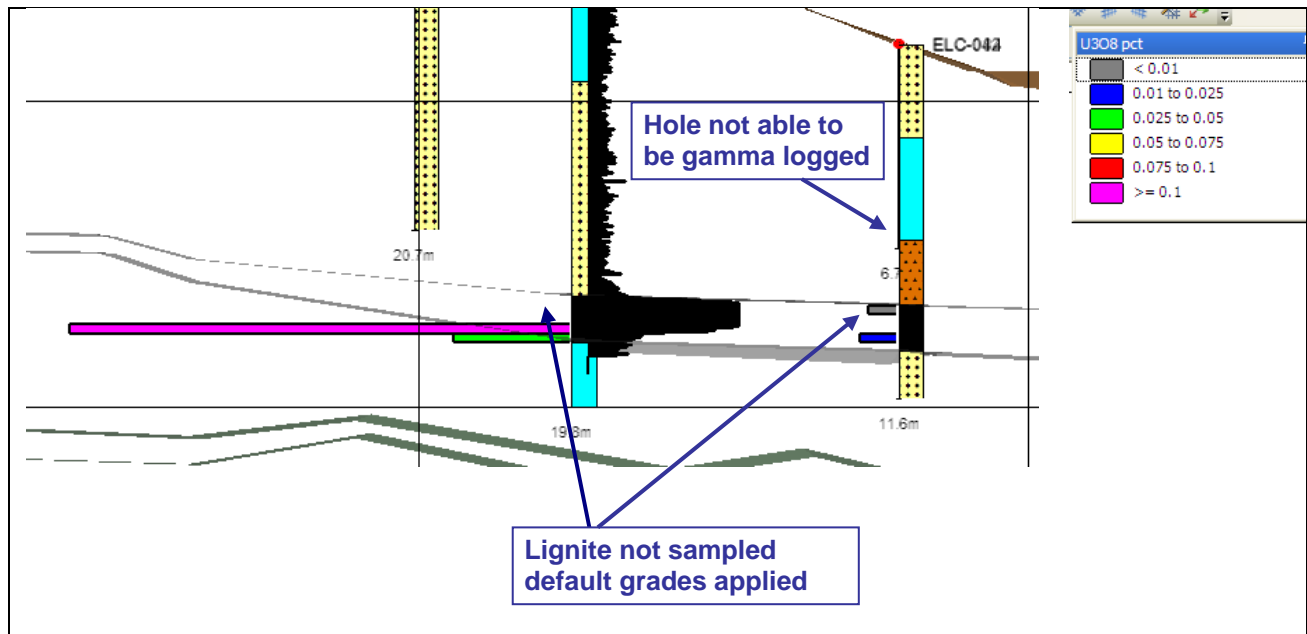
The Company is looking to secure a development partner by the end of the year to accelerate the assessment of the Sentinel project.

## RESOURCE ESTIMATE

PacMag engaged Golder Associates Pty Ltd (Golder) to carry out resource estimation for the Church deposit, with a view to deriving a Mineral Resource estimate in accordance with JORC/NI-43-101 guidelines.

Drilling at the Church deposit has been completed, using clusters of drill holes with nominal 100m x 100m spacing. Locally close spaced drilling has been completed with a nominal 30m x 10m pattern.

The Company believes that the resource drilling has to date inadequately sampled the full extent of the lignite seams, leading to a potential under call of tonnes and grade within the stated resource. Early phase drill sampling focused on only the upper and lower portions of the lignite seams (Figure 1) and did not adequately sample the core zones of the lignites, in a belief that the mineralisation was concentrated at the lignite margins, based on literature reviews of similar deposits in Russia and China. Drill holes in the final phase of the drilling program showed that the core of the lignites was just as likely to contain mineralisation as the outer zones.



**Figure 1: Church Deposit – Example of Lignite Under Sampling of Lignite intervals in holes ELC-178 and adjoining hole ELC-084.**

Downhole gamma logging (black histogram right) versus chemical assays of uranium (coloured histogram left in percent) (yellow dashed = sand, blue = bentonite, black = lignite)  
NB 10x vertical exaggeration.

For this resource estimate a conservative approach was taken, whereby all un-sampled intervals were allocated half below detection limit (default) metal grades in the resource modelling. For the main upper mineralised lignite bed, the assignment of default values (0.0005%  $U_3O_8$ , 0.00025%  $MoO_3$  and 7.2g/t  $GeO_2$ ) approximately doubled the number of composites available for estimation but correspondingly reduced the mean values for  $U_3O_8$  and  $MoO_3$  by 46% and  $GeO_2$  by 43%. The statistics for the composites for the main mineralised lignite zone before and after, including the default grades, are shown in Table 1. Future infill drilling will ensure the full lignite zone is sampled in all cases.

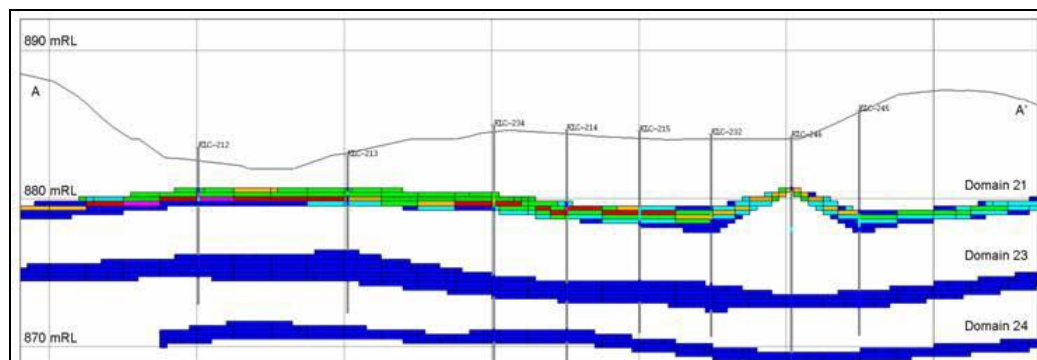
Metal	Number of initial composites	Mean grade of initial composites	Number of Composites after inclusion of default values	Mean grade after inclusion of default values; (value used in resource estimation)	% Difference
$U_3O_8$	677	0.028%	1279	0.015%	46
$MoO_3$	677	0.036%	1279	0.019%	46
$GeO_2$	678	67 g/t	1279	38 g/t	43

**Table 1: Univariate Statistics of Lignite 21 – Main mineralised lignite zone**

Furthermore, the drill sampling for chemical analysis was guided by downhole gamma probe logging with high gamma counts assumed to correlate with highly mineralised intervals. For the most part, high gamma count zones have returned high chemical uranium assays, however, there are numerous zones of low gamma counts that have also returned strong chemical assays, indicating variable disequilibrium within the deposit.

The geological interpretation completed by PacMag consists of eight lignite seams which host mineralisation, the upper two containing uranium, germanium and molybdenum mineralisation whilst lower seams also contain germanium locally.

A block model was created using a nominal block size of 25m (east) by 25m (north) by 0.3m (Z) for all mineralised lignites (Figure 2). Grade estimation of  $U_3O_8$ ,  $MoO_3$  and  $GeO_2$  was carried out using the geostatistical method of Ordinary Kriging (OK), with high-grade restraining of very high grades.



Block grades ( $U_3O_8$  ppm) dark blue 0 – 50, light blue 50 – 100, green 100 -200, orange 200-300, red 300 – 500, purple >500

Drill Collar Plan and Cross Section Location

**Figure 2: Church Deposit – Resource Block Model (Cross Section A-A' 600m in length)**

Golder geologists classified the Church deposit Mineral Resource estimate in accordance with the Australasian Code of the Reporting of Identified Mineral Resources and Ore Reserves (JORC Code, 2004). The classification of Inferred Resources was based on drill hole spacing, sample interval, geological interpretation and representativeness of all available assay and bulk density data. Mineral Resources are shown in Table 2:

Cut off Grade	Wet Tonnes	Dry Tonnes	$U_3O_8$ (%)	$MoO_3$ (%)	$U_3O_8$ (millions lbs)	$MoO_3$ (millions lbs)
50 ppm $U_3O_8$	3,439,000	2,353,000	0.0165	0.0221	0.86	1.14
100ppm $U_3O_8$	2,065,000	1,413,000	0.0227	0.0282	0.71	0.88
200ppm $U_3O_8$	841,000	580,000	0.035	0.039	0.45	0.5

**Table 2: Church Deposit - Insitu Inferred Mineral Resource**

The  $GeO_2$  estimate was not classified as a Mineral Resource, due to ongoing verification of germanium analytical results, and as such is classified as an Exploration Target\* (Table 3).

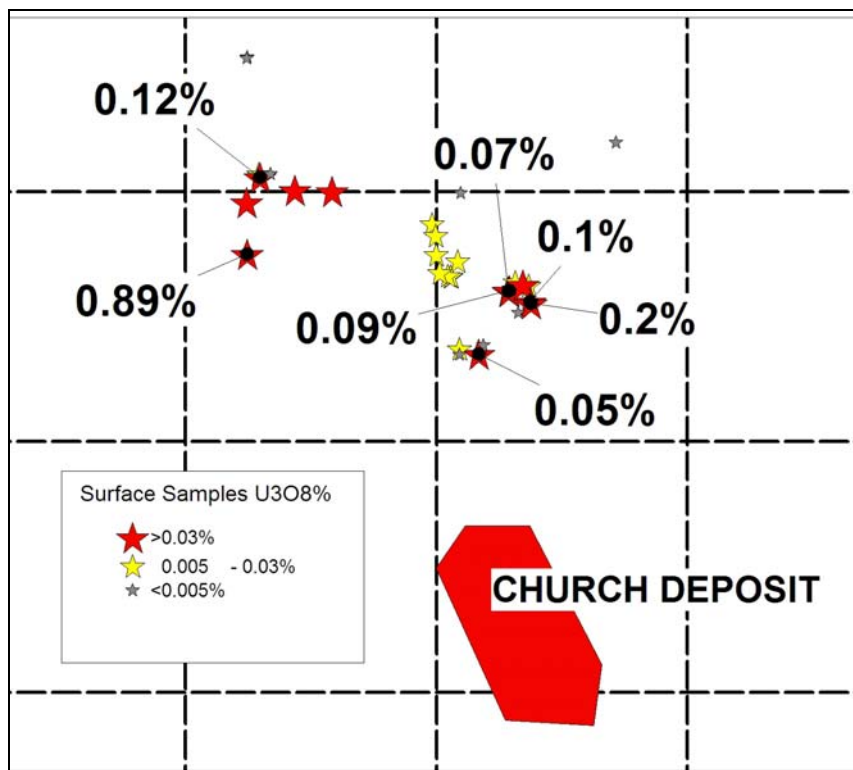
Cut off Grade	Wet Tonnes	Dry Tonnes	$GeO_2$ (g/t)	Tonnes $GeO_2$ (median values)
25ppm $GeO_2$	5.9Mt - 10.9Mt	4.0Mt - 7.5Mt	40 - 70	287
50ppm $GeO_2$	2.4Mt - 4.3Mt	1.6Mt - 3Mt	50 - 100	171
75ppm $GeO_2$	1Mt - 1.8Mt	0.7Mt - 1.2Mt	70 - 120	88

Mt = million tonnes

**Table 3: Church Deposit –  $GeO_2$  Exploration Target\***

\* The term "Exploration Target" should not be misunderstood or misconstrued as an estimate of Mineral Resources and Reserves as defined by the JORC Code (2004), and therefore the terms have not been used in this context. Exploration Targets are conceptual in nature, and it is uncertain if further exploration or feasibility study will result in the determination of a Mineral Resource or Mining Reserve.

Note that the Exploration Target shown in Table 3 above relates specifically to the Church deposit only. The Church deposit, the first zone of mineralisation drill tested within the Sentinel Project, represents only 1/5 of the total prospective project area of the Company's current landholdings (Figure 3).



**Figure 3: Sentinel Project – Exploration Potential (grid is 5000 metres, north up page)**

In addition to the Church deposit, the Company has ascribed an Exploration Target for its regional landholdings of between 3 to 6 million dry tonnes, at grades of 0.05% to 0.1%  $U_3O_8$  and 0.05% to 0.1%  $MoO_3$  (5 – 10 million pounds  $U_3O_8$ ), with 6 – 18 million tonnes of germanium rich lignite at grades of 65 to 100 g/t  $GeO_2$  (450 – 1350 tonnes  $GeO_2$ ), based on geological mapping, regional water bore hole data and surface sampling.

## SCOPING STUDY RESULTS

The resource drilling has shown that the mineralisation in the district is continuous over mineable widths and lengths. Metallurgical testwork has successfully demonstrated that the dried and calcined mineralisation is amenable to acid and alkaline leaching, with high metal recoveries (97%  $U_3O_8$ , 70%  $MoO_3$ , 66% Ge). The drying and calcining process beneficiates (upgrades) the mineralisation by an average of 76%, reducing the tonnes of ore to be leached to 1/5 from that mined (Figure 4). Furthermore, initial scoping level financial modelling indicates a conceptual project that is operating cash flow positive under a range of development scenarios (Table 4).

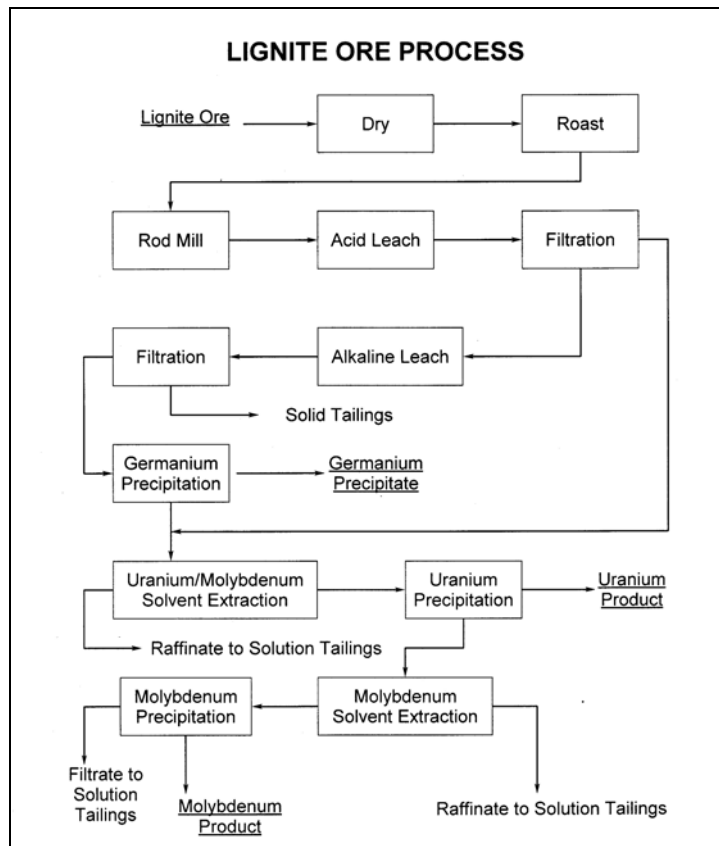


Figure 4: Church Deposit Conceptual Processing Flow-sheet

Scenario	Metals recovered	Head grade of feed to mill	Dry tonnes per annum processed	Net revenue per dry tonne after processing *
Case 1a	U	0.05%	250,000	\$ 32.00
Case 1b	U	0.10%	250,000	\$ 117.00
Case 1c	U, Ge, Mo	0.05%, 80g/t, 0.05%	250,000	\$ 9.00
Case 1d	U, Ge, Mo	0.1%, 120g/t, 0.1%	250,000	\$ 116.00
Case 1e^	U, Ge, Mo	0.196%, 230g/t, 0.16%	250,000	\$ 384.00
Case 2a	U	0.05%	125,000	\$ (23.00)
Case 2b	U	0.10%	125,000	\$ 64.00
Case 2c	U, Ge, Mo	0.05%, 80g/t, 0.05%	125,000	\$ (30.00)
Case 2d	U, Ge, Mo	0.1%, 120g/t, 0.1%	125,000	\$ 79.00
Case 2e^	U, Ge, Mo	0.196%, 230g/t, 0.16%	125,000	\$ 355.00

Assumptions: Metal prices: \$75/lb uranium (U<sub>3</sub>O<sub>8</sub>), \$1000/kg germanium (Ge), \$8/lb molybdenum (Mo)  
Recoveries from testwork 97% U<sub>3</sub>O<sub>8</sub>, 70% MoO<sub>3</sub>, 66% Ge

\* Before amortisation of capital and excluding mining cost of \$1.17/bcm wet ore  
Moisture content of wet ore 32%, Loss on ignition (LOI) of dried ore 64%

^ Metallurgical sample grades

Capex for 125k t pa plant U \$63 million or U, Ge, Mo \$75 million (including 20% contingency)

Capex for 250k t pa plant U \$91 million or U, Ge, Mo \$105 million (including 20% contingency)

Table 4: Church Deposit Conceptual Project Scoping Study Results

Note that the alkaline leach reagent costs comprise >50% of the total processing operating costs in the germanium extraction cases listed above. Further studies on alternate flowsheets and reagents are continuing to determine if lower cost reagents can be used for germanium recovery.

The metallurgical testwork and process design work was undertaken by J. E. Litz and Associates of Colorado, Metallurgical and Chemical Processing Consulting Engineers, who have over 50 years experience in mineral, chemical and related industries and have extensive uranium, germanium and molybdenum extraction experience, including from lignites.

## THE WAY FORWARD

Future activities will now focus on the Company's surrounding land holdings, where numerous high-grade surface samples have indicated strong potential for the identification of additional high-grade resources.

The Company has also identified areas outside its current landholdings that it considers prospective and will look to add key additional ground to its portfolio.

Germanium check analysis is ongoing and with an aim of upgrading the germanium Exploration Target to resource status.

The Company is looking to secure a funding partner by the end of the year to accelerate the assessment of the Sentinel project.

## BACKGROUND

The target at Sentinel is multiple, near surface (less than 20 metres depth), stacked, sub-horizontal high-grade uranium–molybdenum-germanium mineralisation zones that occur at the top of low-grade coal (lignite) horizons. The Company is continuing to grow its land position through ongoing negotiations with adjacent mineral property owners.

The Company aims to develop high-grade near surface resources that can be developed by coal-style open pit mining. The lignite seams are flat lying to very gently dipping and are generally 0.5 to 5 metres thick, with the upper 0.3 – 1.7 metre portion generally carrying the highest grades of uranium and molybdenum mineralisation, whilst germanium appears to occur within multiple lignite seams.

Previous mapping and surface sampling by PacMag in the Church Deposit area has identified sub-cropping lignite units over 3.3km of strike. The sampling, guided by surface radiometric anomalies, targeted the upper portion of the lignite beds, returning very strong results with individual rock samples up to 1.50%  $U_3O_8$ , 2.99%  $MoO_3$  and 164 ppm  $GeO_2$ .

PacMag has also previously reported strong reconnaissance surface sample results a further 5km and 10km north of the Church Deposit, with results up to 0.2%  $U_3O_8$  and 0.62%  $MoO_3$ .

The company believes that as the mineralisation occurs from surface and because of the gently dipping strata, the project provides an excellent exploration and development opportunity over large areas.

## GERMANIUM

Germanium dioxide is currently trading at \$1000/kg GeO<sub>2</sub>. Germanium is known as one of the electronic metals, a high-value speciality element used in the manufacture of solar panels, fibre optics, plastics, infrared sensors and high speed electronics. The 2006 world annual production of germanium is estimated by the U.S. Geological Survey (USGS) as 100 metric tonnes, with production primarily from the smelting and refining of zinc ores. As supply tightens and germanium demand continues to surge, there is likely to be a favourable outlook for germanium metal prices.

*The information in this ASX Release that relates to Exploration Results, Minerals Resources or Ore Reserves, as those terms are as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserve", is based on information compiled by Mr Michael Clifford and Mr James Farrell. Mr Clifford is a Member of the Australian Institute of Geoscientists and a full time employee of the Company, whilst Mr James Farrell is a Member of the Australian Institute of Mining and Metallurgy, and a consultant to the Company. Mr Farrell has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserve". Mr Clifford and Mr Farrell consent to the inclusion in this ASX Release of the matters based on their information in the form and context in which it appears.*

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**Michael Clifford**  
**Director**

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### **ABOUT PACMAG (ASX:PMH)**

*PacMag is an Australian-based exploration company focused on its advanced copper-molybdenum-gold assets at Ann Mason in the USA as well as its advanced Sentinel uranium-germanium-molybdenum project located in North Dakota, USA.*

*Ann Mason boasts a mineral resource of 810 million tonnes @ 0.4% copper, 0.004% molybdenum (7.1 billion pounds of contained copper metal). PacMag also holds interests in other less advanced copper projects in Australia.*