MILLENNIUM
MINERALS LIMITED
ASX Code:MOY

Corporate Details

Ordinary Shares:
795,237,123

Market Capitalisation:
~$180 million

Cash, bullion and available financing facilities at 31 December 2018:
$18.2 million

Debt at 31 December 2018:
$5 million

ASX Code: MOY

Board of Directors

Greg Bittar
Non-Executive Chairman

Tim Kennedy
Non-Executive Director

Peter Lester
Non-Executive Director

Bruno Lorenzon
Non-Executive Director

Management

Peter Cash
Chief Executive Officer

Ray Parry
Chief Financial Officer and Company Secretary

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7 February 2019

Latest sulphide metallurgical results confirm potential to grow production, cash flow and mine life

Millennium on track to unlock value of extensive sulphide mineralisation at Nullagine – paving the way for increases in Ore Reserves

- **Latest metallurgical test work results confirm outstanding gold recoveries from sulphide ore:**
  - ***+80% from pyrite-dominant ore***
  - ***~70% from arsenopyrite-dominant ore***
- **Exceptional recoveries on arsenopyrite-dominant ore achieved using pressurised in-mill oxidation process. As a result, Millennium is now planning to undertake a two-stage expansion of the Nullagine processing plant, comprising:**
  - ***Stage 1: In-mill oxidation to facilitate processing of pyrite/arsenopyrite-dominant ore. Capital cost of $15M, commissioning April 2019.***
  - ***Stage 2: Pressurised in-mill oxidation to facilitate processing of arsenopyrite-dominant ore. Capital cost of $5M, commissioning early 2020.***
- **Total capital investment for two-stage sulphide plant expansion of just $20M, with metallurgical results indicating potential for strong Return on Investment.**
- **Plant upgrade to provide processing optionality, enabling Millennium to apply a combination of fine grinding, in-mill oxidation and pressurised in-mill oxidation to optimise recoveries and cash flow from different ore types.**
- **Metallurgical results to underpin completion of maiden Ore Reserve estimate for Golden Gate Underground. Results will be included in the global Resource & Reserve update for the Nullagine Project as at 31 December 2018, which is on-track for delivery in early February.**
- **Sulphide Expansion Project, which is currently under construction and on track for commissioning in Q2 2019, will see a large number of new ore sources come on stream over the next 12 months.**

Millennium Minerals (ASX: MOY) is pleased to announce outstanding metallurgical test results which provide more strong evidence that its sulphide expansion strategy at the 100%-owned Nullagine Gold Project in WA's Pilbara will be a technical and economic success.

The latest tests were conducted on a range of pyrite and arsenopyrite ore samples with varying degrees of refractory behaviour from the Golden Eagle deposit, the largest deposit defined to date at Nullagine.

The test work was undertaken using two innovative processing techniques – in-mill oxidation (INOX) and pressurised in-mill oxidation (PINOX) – both of which have been patented by Millennium.

Millennium has previously announced that tests conducted on samples of mildly refractory pyrite-dominant ore and moderately refractory pyrite/arsenopyrite samples from Golden Eagle generated recoveries of over 80 per cent using its in-mill oxidation (INOX) process (see ASX Announcement 14 January 2019).

The latest results now confirm that gold recoveries of ~70 per cent can be generated from highly refractory arsenopyrite-dominant ore from Golden Eagle using the pressure oxidation (PINOX) process. Previous cyanidation test work on this highly refractory ore delivered gold recoveries averaging less than 30%, meaning this mineralisation has never previously been considered economic.

An overview of the INOX test work results across the various ore types is provided in Table 1 with composite detail given in Table 2. The PQ3 hole locations shown in Figure 3 and hole details given in Table 3.

Millennium Chief Executive Peter Cash said the latest metallurgical results confirm that the Company's sulphide expansion strategy has the potential to increase production, operating margins and mine life at Nullagine by opening up an extensive inventory of sulphide mineralisation across the project to economic exploitation.

"These are hugely exciting results that indicate we can deliver highly-profitable additional ounces at Nullagine by processing sulphide ore," he said.

"The expanded plant configuration will enable Millennium the processing flexibility to apply the required methods to optimise the plant performance for each ore type. Within the single circuit, we will have the ability to process oxide ore with no additional treatment, or choose to apply a combination of fine grinding, INOX or PINOX to optimise recoveries from all ore types."

"This set-up will provide the Company with an exceptional level of control and optionality to ensure we can deliver strong operating margins from each ore type, with a priority focus on maximising cash flow across our operations.

"Importantly, the plant expansion is being completed at very low capital cost. Phase one, which will see us processing pyrite-dominant ore from Golden Eagle by April, will cost around $15 million. And phase two, which will enable us to process arsenopyrite-dominant ores by early next year, is expected to cost an additional $5 million.

"These metallurgical results show the potential to generate outstanding returns on that investment. The current sulphide expansion project timeline will see us bring a large number of new ore sources on-stream over the next 12 months, potentially supporting an increase in our production profile beyond 100kozpa with a focus on strengthening operating margins and cash flow while at the same time increasing mine life. It will be a huge winner for Millennium on so many levels," he continued.

Construction of the expanded plant is underway, with the gravity concentration spirals on site and the mills expected to arrive in March.

Stockpiling of sulphide concentrates will start later this quarter with plant commissioning scheduled for early April.

The Golden Eagle deposit is expected to provide baseload feed at Nullagine for the next two years.

In light of these strong metallurgical results, test work has been initiated on samples from the Golden Gate deposit. This will enable Millennium to complete a maiden underground Reserve and Resource estimate for Golden Gate.

This estimate will form part of the Company's annual Reserve and Resource statement, which is expected to be released in early February, along with its production and cost guidance for the year to December 31, 2019.

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Table 1: Metallurgical results based on ore type – leach versus INOX

Sample Classification	Average leach recovery	Average INOX recovery
Highly refractory	34.8%	70.6%
Moderately refractory	63.8%	82.8%
Mildly refractory	86.2%	92.1%

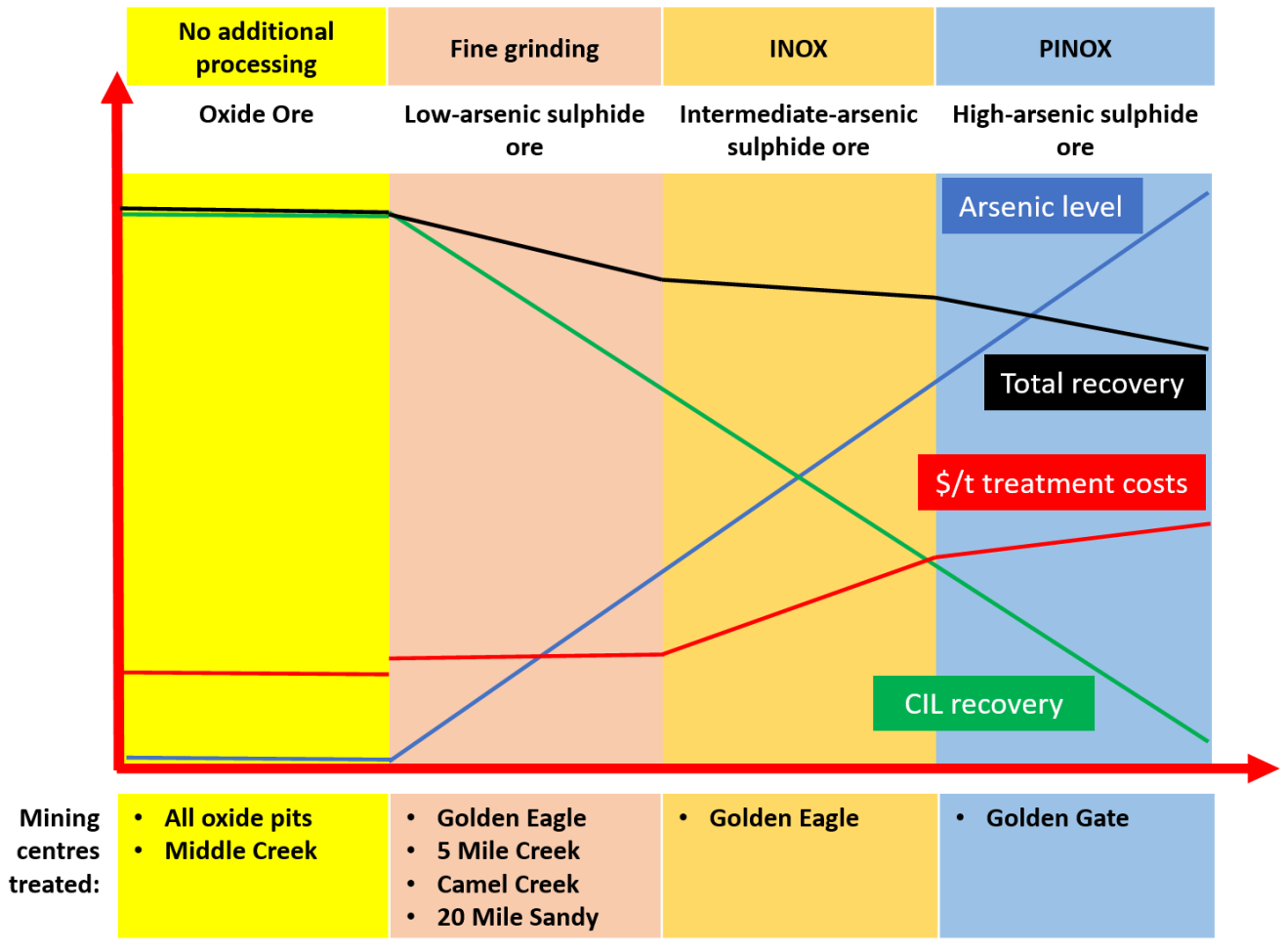

Figure 1: *Comparison of processing options and outcomes*

Figure 1 is provided as a graphical representation of the potential application of the developed processes to the various ore sources identified for the Nullagine Gold Operations. Due to the range of refractory nature of the various ore sources, to optimise cost and recoveries, the process has been designed such that various operational conditions can be changed to allow the most cost effective processing route to be "switched on" for each ore type. It has been shown in the test work conducted by Millennium that the leach recoveries for the various ore types can vary from the mid 90%'s for the free milling or oxide ores down to the 10-20% range for the highly refractory, high Arsenopyrite ores in the sulphide rich material. The "CIL Recovery" line is a representation of this characteristic variation. It has been found that there is a coarse correlation between arsenic levels in the ores and the CIL recovery. Although not perfectly linear, the line drawn in this graphic is there as an indication only that as the arsenic level increases (Note: – there is very low levels of arsenic in the oxide material), so the leach recovery decreases.

The total recovery line represents an estimation of what may be achieved on the range of ores with correct application of the fine grind / InOx / PInOx processes. The line is an indication of the targeted recoveries based on a halving of the tails grade. This outcome has been achieved in the majority of the samples in the test program with the use of one of the identified processes.

The processing costs estimates are based on application of first principles for wear, reagent, labour and power consumption for the operation of the various plant components / processes. The graphical representation is made to show a step change from the CIL operation with the implementation of the various processes and it is expected that the processing cost per tonne of mill feed will increase as the refractory nature of the ore increases due to additional costs associated with higher concentrate mass, higher reagent costs and increases in equipment wear.

The selection of the appropriate process for the treatment of any ore type will be based on the combination of operational cost, ore head grade and overall gold recovery.

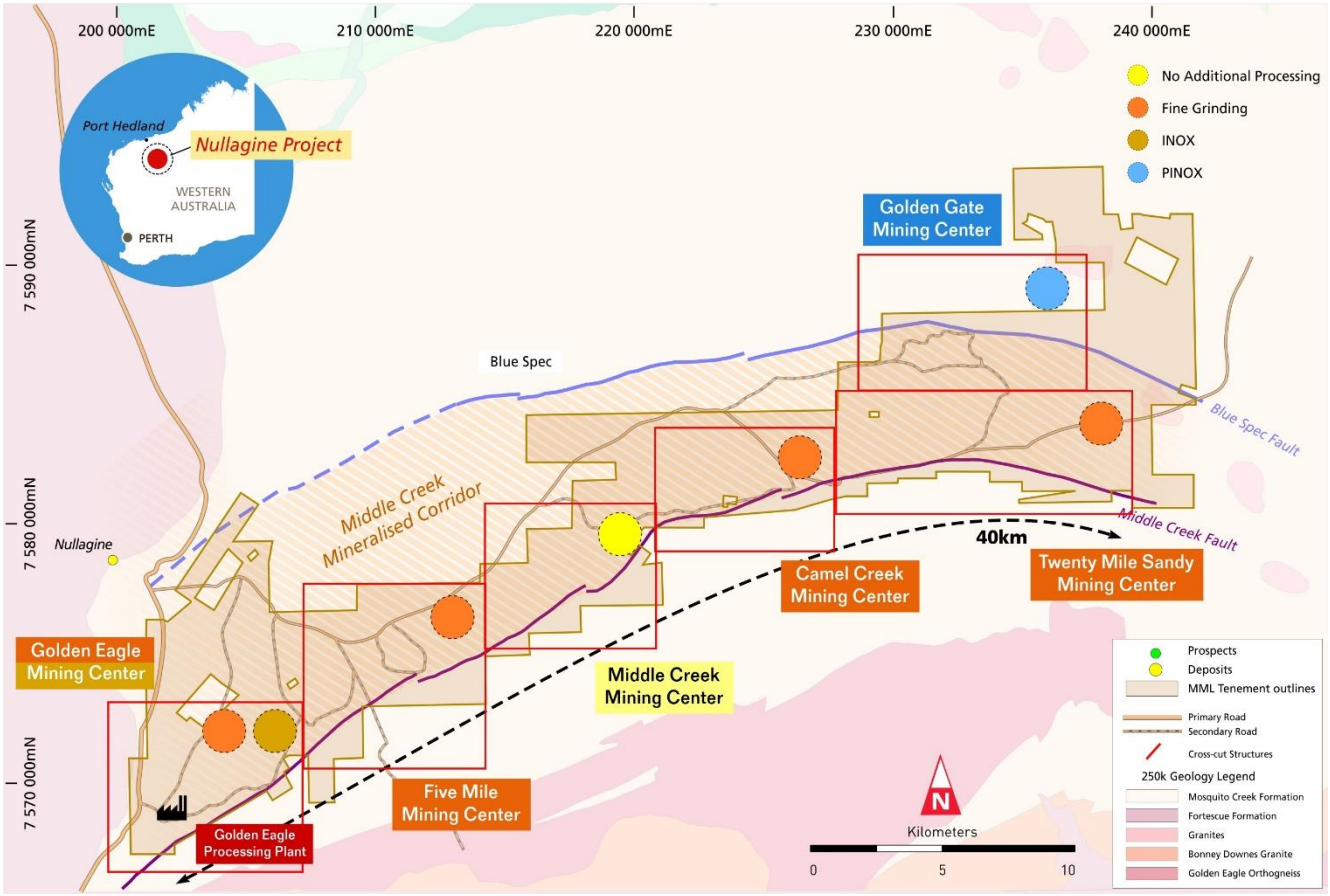

Figure 2: *Plan view of Nullagine Gold Project showing mining centres and processing options*

Pilot-scale PINOX equipment at ALS Laboratories

Spirals in transport frames on site

Spiral steel work pre-assembly

Mill urethane wear parts

Mill shell and base ceramic lined

Competent persons statement

The scientific and technical information in this report that relates to process metallurgy is based on information developed and reviewed by Mr Dale Harrison MAusIMM, who is a metallurgist and employee of Millennium Minerals Pty Ltd. Mr Harrison has sufficient experience that is relevant to the processes being undertaken for the treatment of the ore and to the testwork activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012.

Metallurgical test work – Explanatory Statement

Metallurgical factors and assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*	• *The Nullagine processing plant is currently in operation and has been since 2012. It is an industry standard 1.5 Mt pa primary crusher, SAG mill, gravity circuit and carbon-in-leach tankage facility.* • *This is conventional, well-tested technology, and is appropriate for oxide and free milling lode style of mineralisation in all the Project deposits, as demonstrated by successful plant operation since commercial production was declared in February 2013.* • *Recovery factors of 70% to 95% (varies between deposits) have been assumed in the estimation of the Ore Reserves. The recovery factors are based on comprehensive test work on metallurgical core holes, mini BLEG and Leachwell analyses on RC and Diamond Core samples.*

	• *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• *The Ore Reserves are quoted 'delivered to mill' basis; this excludes metallurgical recovery factors.* • *Pyrite and arsenic as arsenopyrite are present in the ore and are known to interfere with the metallurgical performance of the ore. The treatment of these minerals is seen as key to providing the enhancement or recovery in the treatment process.* *Metallurgical test work completed in 2017 (Process Plants International report – PPI-003-PR-RWEP-02_Nullagine testwork) has indicated that with appropriate processing routes, CIL gold recoveries of between 63% and 80% on the Golden Eagle ore can be achieved. These figures were based on grinding the whole ore sample to the target size followed by a conventional laboratory cyanide leach.* *The samples tested in this program were from Stages 1 & 2 of the Golden Eagle ore body and were made up of RC and blast hole samples.* *With the overall potential leach recovery identified in this work, an option was assessed for a potential process route that could deliver the desired recoveries without the need to grind the entire ore to the target, fine grind size.* *Research into existing processing routes in the Western Australian Goldfields region provided evidence of processing options that could be used (New Celebration Gold Mine[1] and Granny Smith Gold Mine[2] tailings retreatment circuits). This process option was based on:* ○ *Processing the whole ore through the existing CIP circuit at the current process conditions* ○ *treating the tailings stream (gravity circuit) to recover a concentrate containing the un-leached sulphide materials* ○ *fine grinding of this concentrate to the desired liberation size (20 micron or less)* ○ *intense cyanidation of the ground concentrate for final Au recovery* *Preliminary test work was conducted on a single diamond core sample from Golden Eagle South. The core was crushed and blended to produce a whole of ore zone sample with subsamples being split for various test work. The test program followed is as per ALS laboratory flow sheet "Flow Sheet - Millennium - Golden Eagle Study - Scouting Sample - Rev 1"* • *The test on a 1 kg sub sample indicated that:* ○ *CIL leaching produced a 52.6% Au recovery* ○ *Gravity concentration of the leach tail produced a concentrate with 73.4% of the gold from the tailings in 6.8% of the tailings mass* ○ *CIL leaching of the concentrate following grinding to a p80 of 10 um provided a 27.9% leach recovery*

- *The leaching of the concentrate was carried out at cyanide levels higher than the standard laboratory CIL (0.2% vs 0.1%) but below the levels expected for intense cyanidation treatment (5%+)*

Following the outcome of this program, a larger (100Kg) sub-sample (ALS *Flow Sheet-Millennium-Golden Eagle- Scouting Sample-BULK LEACH-Jan 2018) of the whole of hole composite was generated for leach, gravity concentration and concentrate leach optimisation work. The test work on this lead to the development of the InOx (IN mill oxidation) process and establishment of the base line test procedure for the more refractory samples.*

Metallurgical drill sampling has been undertaken on the Golden Eagle ore source incorporating stages 1,2 and Golden Eagle South. From this material, metallurgical domains were identified based on Au, As, Fe grades and bottle roll leach recoveries of the individual core sample intervals and variability samples were generated for testing on the process established on the GEDDMET009 sample.

The drill core material from this program (GEDDMET 010-022 inclusive) was prepared at ALS laboratories buy crushing each individual interval to 6mm and then riffle split to provide the half of interval sample for processing. Each interval was subsampled for head assay multi element analysis.

From the analysis results, intervals were selected to generate composite samples for further test work. These composites were based on the Au, As, Fe and S grades from each interval to provide variability in levels of each element. Material from each interval was riffle split out of the main sample to provide the required mass for the composite. The composite samples were selected to be representative of a metallurgical domain rather than specific areas of the orebody and samples were selected to ensure that sufficient composite mass was generated to avoid mixing of materials from different drill holes into the one composite.

Classification of the composite samples into the highly/moderately/mildly refractory categories came after the initial cyanide leach tests on the composite samples was completed. This classification was based on a "rule of thumb" classification of refractory gold behaviours as provided in "Classification of Refractory Gold Ores Based of Degree of Refractoriness". Modified after Amankwah et al. (2013) and summarised in the table below extracted from this reference.

Classification	Gold recovery
Free milling	More than 95%
Mildly refractory	80 - 95%
Moderately refractory	50 - 80%
Highly refractory	Less than 50%

		A summary of the individual composite test program results is provided in table 2. The table provides the following information: 1. Head assay of the composite 2. Cyanidation leach recovery 3. Recovery of gold to concentrate 4. InOx leach recovery of gold from concentrate 5. Enhanced InOx leach recovery of gold from concentrate (where applied) 6. Overall gold recovery for sample (combined cyanidation and InOx recovery) 7. Overall gold recovery for samples where enhanced InOx teste were completed. Ausenco Engineering were engaged to as SMP contractor to progress the process through to construction and commissioning based on the finalised designed flow sheet incorporating spiral concentrators, fine grinding mills, reagent supply and addition and waste water treatment facilities. The direct capital cost estimation for the plant expansion is circa $16M. Operational costs were updated from the original trade off study figures and developed from the final design criteria parameters as well as inputs from the existing Nullagine Gold Operations processing cost base, including consumables, maintenance and overhead costs. The final Operating cost estimation for the plant expansion is estimated to be circa $5/tonne in addition to the existing processing costs. [1] Martins, V.,R. Dunne and G. Delahey, "New Celebrations Tailings Treatment Plant – 18 Months Later", *in XVIII International Mineral Processing Congress, Sydney, May 1993. 1215-1222.* [2] Recovery Of Gold Carriers at the Granny Smith Mine Using Kelsey Jigs J1800 *G.Butcher and A.R. Laplante*

Table 2: Metallurgical test work composite test summary

Composite ID	Head grade	CIL rec %	InOx Total rec %	Enhanced InOx rec %	target rec	CIL average rec %	InOx Average rec %
GEDDMET20	3.34	26.97	40.70	73.40	63.49	34.83	67.80
GEDDMET12-2	6.55	30.41	44.00	59.20	65.21		
GEDDMET19	2.25	31.95	62.40		65.98		
GEDDMET10-1	2.46	39.32	63.40	70.60	69.66		
GEDDMET10-2	1.78	45.48	68.00		72.74		
GEDDMET12-1	3.84	51.59	77.10		75.80	63.79	86.70
GEDDMET20	1.21	52.59	65.80		76.30		
GEDDMET11-1	1.05	56.17	70.00		78.09		
GEDDMET13-1	3.67	60.81	79.10		80.41		
GEDDMET20	1.66	60.83	75.20		80.42		
GEDDMET14-1	3.35	63.56	75.50		81.78		
GEDDMET22	1.4	69.86	87.00		84.93		
GEDDMET12-3	1.73	72.56	81.10	86.70	86.28		
GEDDMET21	1.02	73.37	88.20		86.69		
GEDDMET15-1	1.05	76.51	87.10		88.26		
GEDDMET16-3	1.39	82.86	91.20		91.43	86.21	92.10
GEDDMET15-2	1.05	84.04	91.50		92.02		
GEDDMET19	0.98	84.82	90.90		92.41		
GEDDMET17	1.13	85.51	92.80		92.76		
GEDDMET16-2	2.51	87.04	92.10		93.52		
GEDDMET16-1	1.7	92.99	94.10		96.50		

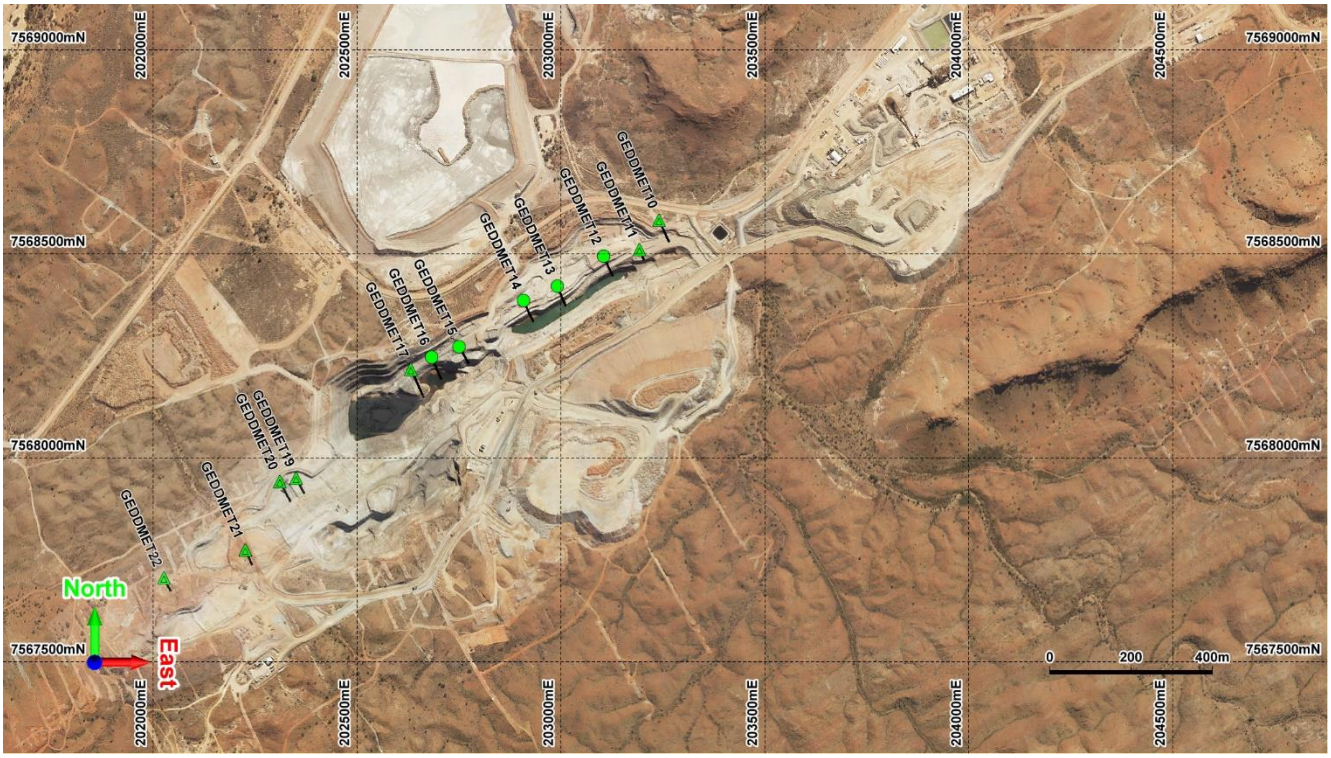

Figure 3: *Plan view of PQ3 diamond holes drilled for sulphide metallurgical program.*

Table 2: Hole details for composites used in the sulphide metallurgical test work programme.

Hole ID	GDA East	GDA North	GDA RL	Hole Type	Max Depth	Dip	Azi	Precollar Depth (m)	From (m)	To (m)	Width (m)
GEDDMET10	203241	7568583	394	RCD	114.3	-60	155	29.9	84.00	90.25	6.25
GEDDMET10	203241	7568583	394	RCD	114.3	-60	155	29.9	98.00	101.55	3.55
GEDDMET11	203192	7568510	381	RCD	49.1	-56	155	24.2	34.00	40.00	6.00
GEDDMET12	203105	7568494	380	DD	84.6	-60	155		56.00	66.00	10.00
GEDDMET12	203105	7568494	380	DD	84.6	-60	155		57.90	62.55	4.65
GEDDMET12	203105	7568494	380	DD	84.6	-60	155		68.00	75.35	7.35
GEDDMET13	202991	7568421	376	DD	77.1	-60	155		56.77	60.70	3.93
GEDDMET14	202908	7568385	378	DD	90.9	-50	155		72.00	75.77	3.77
GEDDMET15	202751	7568273	373	DD	110.4	-65	155		66.85	69.02	2.17
GEDDMET15	202751	7568273	373	DD	110.4	-65	155		74.00	76.00	2.00
GEDDMET16	202683	7568247	364	DD	96.3	-51	155		38.00	41.53	3.53
GEDDMET16	202683	7568247	364	DD	96.3	-51	155		68.00	80.54	12.54
GEDDMET16	202683	7568247	364	DD	96.3	-51	155		82.30	87.10	4.80
GEDDMET17	202632	7568217	358	RCD	120.9	-53	155	36.0	54.20	60.10	5.90
GEDDMET19	202352	7567950	401	RCD	78.7	-57	155	36.7	45.60	53.00	7.40
GEDDMET19	202352	7567950	401	RCD	78.7	-57	155	36.7	65.00	70.05	5.05
GEDDMET20	202311	7567942	400	RCD	96.9	-55	155	48.5	53.00	65.00	12.00
GEDDMET20	202311	7567942	400	RCD	96.9	-55	155	48.5	66.00	71.00	5.00
GEDDMET20	202311	7567942	400	RCD	96.9	-55	155	48.5	75.45	78.40	2.95
GEDDMET21	202226	7567775	397	RCD	85.0	-60	155	24.5	40.00	47.00	7.00
GEDDMET22	202027	7567705	402	RCD	73.0	-60	155	42.4	50.00	57.00	7.00

DD = PQ3 sized diamond core drilling. RCD = PQ3 sized diamond core drilling with a RC pre-collar.

JORC 2012 Edition - Table 1

Section 1 Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representatively and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• *No surface samples were used in any estimation of Mineral Resources or Ore Reserves.* • *Metallurgical samples at Golden Eagle were collected by PQ3 diamond core drilling.* • *RC pre-collar drilling was carried out with a 5.5-inch face-sampling bit. Refer to hole details for those holes with RC pre-collars.* • *Diamond core drilling (PQ3 - size) was completed for GEDDMET10 and GEDDMET22. Refer to the table with hole details for those holes with RC pre-collars.*
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• *Reverse circulation (RC) pre-collar drilling was carried out with a 5.5-inch face-sampling bit. None of these samples were used for the metallurgical test work programme.* • *Diamond core holes (PQ3 size) were drilled for metallurgical samples. The core was oriented using a Reflex ACT II orientation tool.*
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• *No RC samples were used for the metallurgical test work programme.* • *ALS records sample weights on receipt of samples. This was used to help track sample recovery.* • *Core recoveries from diamond drilling are generally >98%.* • *There is no correlation between sample recovery and gold grade.*
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• *All of the RC drilling has been captured in chip trays for reference.* • *Geological logging is both qualitative and quantitative in nature. Logging is carried out for lithology, colour, grain size, regolith, alteration, weathering, veining and mineralisation. Sulphide and vein content were logged as a percentage of the interval.* • *In addition to the information collected for the RC drilling, RQD and structural measurements are taken from the diamond core.* • *RC chip trays are retained at site.* • *All of the intersections were logged.* • *All diamond core has been photographed for reference.*

Criteria	JORC Code Explanation	Commentary
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• *No RC samples were used for the metallurgical test work programme.* • *PQ3 size diamond core was sampled to geological boundaries. Full core was submitted to the laboratory for the Au and multielement assaying, as well as metallurgical test work. The sample was crushed (Jaw Crusher - >70% less than 6mm), riffle split to produce a nominal 3 kg sub-sample for to be analysed for Au and multielement content.* • *The sample sizes are industry-standard and considered to be appropriate to correctly represent mineralisation at the deposits based on: the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology and assay ranges for gold.*
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• *No geophysical tools were used to determine any element concentrations used for these results.* • *PQ3 size diamond core was sampled to geological boundaries. Full core was submitted to the laboratory for the Au and multielement assaying, as well as metallurgical test work. The sample was crushed (Jaw Crusher - >70% less than 6mm), riffle split to produce a nominal 3 kg sub-sample for Au and multielement analysis. The remainder of the interval was put aside to create the metallurgical composites. The sub-sample was pulverised (LM5 - >85% less than 75 microns) and subsampled by the scoop method to produce a 50 g charge for fire assay to give a total determination of gold, as per industry standard methods. Multielement (33 elements) was carried out using HF-HNO3-HClO4 acid digestion, HCl leach and ICP-AES finish.* • *Commercially prepared, predominantly matrix-matched low, medium & high value certified reference QAQC standards were analysed.* • *Results highlight that sample assay values are accurate.* • *Sample preparation checks for fineness were carried out by the laboratory as part of their internal procedures to ensure the grind size of 85% passing 75 microns was being attained. Laboratory QAQC involves the use of internal lab standards using certified reference material, blanks, splits and replicates as part of the in-house procedures.* • *The QAQC results from this protocol were considered to be acceptable.*
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• *No exploration results have been reported.* • *The PQ3 diamond core holes twinned holes previous RC holes. The gold intersections from the PQ3 drill programme largely reflected those from the twinned RC holes.* • *Sampling is directly uploaded to the LogChief software and it is synchronised to the database.* • *Assay results were not adjusted.*

Criteria	JORC Code Explanation	Commentary
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• *Post completion of the drilling the drill collars were surveyed with a Real Time Kinematic (RTK) DGPS device to a ±10mm positional precision. All collars are then validated against planned positions as a cross check. Surveyed collar co-ordinates are uploaded into the Company SQL database.* • *Grid datum is GDA94 51K (East Pilbara).* • *Downhole surveys were completed on all holes at 30m maximum downhole intervals with a preference of an initial survey at ~12m downhole. Initially, surveys were taken using a single shot camera or via electronic multi-shot (EMS) survey tool (Reflex, Camprodual or Camteq), lithologies have negligible magnetic susceptibility (greywacke).* • *Aerial Photogrammetry± LIDAR was produced by Fugro Surveys (±0.2m vertical & ±0.1m horizontal). Survey control points were marked out by licensed surveyor for the Fugro Survey. Collar positions for those holes in or around the pit were compared to the End-Of-Month (EOM) pickups carried out by mine site Surveyors.*
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• *Drilling for this metallurgical test work programme varied from 40m to 200m spacing.* • *The previous drilling has been sufficient to establish geological and grade continuity at Golden Eagle.* • *The individual gold and multielement assays were used to generate composites for metallurgical test work. Any gold or multi-element results were generated using the weighted (by length) average grade method.*
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• *Pit mapping at Golden Eagle confirms the interpreted orientation of mineralisation.* • *No significant orientation bias has been identified in the data at this point.*
Sample security	• *The measures taken to ensure sample security.*	• *Samples were given an ID, cross checked by field personnel that they corresponded to the assigned interval. Samples were collected on completion of each hole and delivered to the onsite assay laboratory for dispatch to Perth. Monitoring of sample dispatch is undertaken for samples sent from site and to confirm that samples have arrived in their entirety and intact at their destination.* • *Sample security is managed with dispatch dates noted for each sample, this is checked and confirmed at the Perth laboratory on receipt of samples and discrepancies are corrected via telephone link up with the on-site and Perth laboratories.*
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data reviews.*	• *Internal lab audits conducted by Millennium have shown no material issues.*

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code Explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• *The Nullagine Gold Project prospects and deposits lie within fully granted Mining Leases within the Pilbara Gold Field (46), as detailed below. All the tenements are in good standing with no known impediments.* • *Golden Eagle^+ - M46/186 & M46/300 (100% MML);* *^ These tenements are located within the Palyku title claim (WC99/16).* *+ A $10/oz royalty payable to Tyson Resources Pty Ltd.*
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• *Exploration by other parties has been reviewed and taken into account when exploring. Millennium has re-drilled in areas that other parties had drilled to gain a greater confidence in those results.*
Geology	• *Deposit type, geological setting and style of mineralisation.*	• *The Nullagine Gold Project deposits are structurally controlled, sediment-hosted, lode gold style deposits. They are all situated in the Mosquito Creek Basin that consists predominantly of Archean aged, turbidite sequences of sandstones, siltstone, shale and conglomerate units.*

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
	  ○ *hole length.*
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*
		• *Information pertinent to the metallurgical results are provided in a table with drill hole information including: hole co-ordinates, RL, dip, azimuth, end of hole depth, downhole length and interception depths.*
		• *Only the details of the holes related to the reported metallurgical results have been included.*

Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• *No exploration results have been reported.* • *Weighted (by length) average grade aggregation method was used to derive any diamond core intersections.* • *No metal equivalents were used.*

Criteria	JORC Code Explanation	Commentary
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• *Most of the drilling is perpendicular to the mineralisation. Quoted widths are down-hole widths. True-widths are likely to be approximately 60-90% of down-hole widths.* • *The drill hole orientations relative to the ore zones have ensured accurate interpretations and 3D modelling.*
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• *No exploration results have been reported.* • *Representative maps have been included in the report to show the holes that were used to create the metallurgical composites.*
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• *No exploration results have been reported.*
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• *The lodes have been mapped in the Golden Eagle pit. Mineralisation is primarily associated with a combination of moderate foliation, strong silica-sericite alteration and strong limonite staining or pyrite-arsenopyrite content. The relevant previous metallurgical test work has been summarised in Metallurgical test work – Explanatory Statement.*
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• *Metallurgical test work is ongoing.*