MONTEZUMA
MINING COMPANY LTD

31 JULY 2017

TEST WORK ON HYDROMETALLURGICAL PROCESSING OF BUTCHERBIRD ORE EXCEEDS EXPECTATIONS

- CSIRO has completed Stage I (leach optimisation stage) of hydrometallurgical processing studies to produce high value battery materials from the Butcherbird Manganese Deposit (100% MZM).
- Final leaching results produce a Pregnant Leach Solution ("PLS") with **>91% purity** and **>95% Mn extraction** in a rapid single stage leach under benign conditions;
  - atmospheric pressure and ambient temperature.
  - leaching rates unaffected by grind size up to 1mm. Coarser particle size tests pending.
  - leach kinetics are very rapid with optimal residence times between thirty and sixty minutes.
  - reaction is exothermic, producing heat energy for use in purification processing stage - no additional energy required.
- Discussions in progress to define scope of work for Stage II studies on PLS purification and production of a final value added product.
- Market research has identified a number of potential product streams which should add significant value to the Butcherbird ore including:
  - Electrolytic Manganese Dioxide ("EMD").
  - Chemical Manganese Dioxide ("CMM").
  - Electrolytic Manganese Metal ("EMM")
  - Manganese Sulphate as a fertilizer and feed additive.
- Butcherbird is Australia's largest onshore manganese resource at >170 million tonnes of manganiferous ore[4].
- Lithium-Ion battery[1] cathodes contain up to 60% manganese, which is ~5 times the contained value and ~15 times the amount of lithium[2,3].

Montezuma Mining Company Ltd ("Montezuma" or "Company") is pleased to announce that the Commonwealth Scientific and Industrial Research Organisation ("CSIRO") Process Science and Technology Group has successfully completed Stage I of the research and development studies into the production of high purity manganese products from ores sourced from the Company's 100% owned, infrastructure endowed Butcherbird Project in Western Australia. Results exceeded expectations.

[1] http://www.visualcapitalist.com/manganese-powering-the-next-generation-of-lithium-ion-batteries/
[2] http://batteryuniversity.com/learn/article/types_of_lithium_ion
[3] https://www.metalary.com/lithium-price/

ABOUT MONTEZUMA MINING

Listed in 2006, Montezuma Mining Company Ltd (ASX: MZM) is a diversified explorer primarily focused on gold and manganese. The Company's primary objective is to achieve returns for shareholders through selected strategic acquisitions and targeted exploration.

Montezuma has 100% interests in the Yamarna Gold Project in the Yamarna Greenstone Belt, the Holleton Gold Project in the Wheat Belt region and the Butcherbird Manganese/Copper Project in the Murchison region, all located in Western Australia.

MARKET DATA

ASX code:	MZM
Share price:	$0.135
Shares on issue:	83.5M
Market capitalisation:	$11.3M
Cash (at 30 June):	~$4.2M
Listed Investments:	~$6.4M

BOARD AND MANAGEMENT

Chairman	Seamus Cornelius
Executive Director	Justin Brown
Non-Executive Director	John Ribbons
Exploration Manager	Dave O'Neill

Company information, ASX announcements, investor presentations, corporate videos and other investor material on the Company's projects can be viewed at www.montezuma.com.au

ABOUT THE BUTCHERBIRD PROJECT

The Butcherbird Manganese Deposit is Australia's **largest onshore manganese resource**[4] comprising large tonnages of near surface manganese oxide ore in seven deposits.

The Project also has some **excellent infrastructure advantages** with a gas pipeline and main bitumen highway passing directly adjacent to and through the mineralised envelope.

The mineralisation occurs as supergene enrichment of a regional scale basal manganese shale which underlies much of the Project area. The shale beds are gently folded and where the folds approach the surface topography, supergene processes have significantly upgraded the manganese content to form a potential feedstock for further upstream processing.

Classification	Inferred Resource	
Cut-off	10% Mn	
Deposit	Tonnes (Mt)	Mn (%)
Bindi Bindi Hill	8.75	11.09
Budgie Hills	1.03	10.82
Cadgies Flats	0.25	11.08
Coodamudgi	12.9	11.48
Illgararie Ridge	17.0	10.71
Mundawindi	14.2	12.23
Richies Find	16.1	11.56
SUBTOTAL	70.2	11.4
Yanneri Ridge	48.8	11.8
GLOBAL TOTAL	119.0	11.6

Table 1. Inferred Mineral Resource Estimates at the Butcherbird Manganese Project are reported at a 10% Mn cut.

BENEFICIATION POTENTIAL

The Company discovered the Butcherbird deposits during 2010-2011, and has subsequently undertaken several rounds of metallurgical test work which have shown that a **high silica concentrate with approximately 33% contained manganese and low deleterious elements** can be reliably produced through relatively simple processing methods[5]. This medium grade concentrate is suitable for use in the production of silico manganese alloys, a major manganese feedstock for use in steel making.

Building on further mineralogical characterisation work at CSIRO, a range of selected samples and beneficiation strategies were tested during the recent studies. Despite a range of processing streams, similar results were achieved to the historical work, and reconfirms the limited potential to further upgrade the ore. However, this concentrate has been used as the initial feed for the EMD production process test work, with highly encouraging results.

Classification	Inferred Resource	
Cut-off	8-10% Mn	
Deposit	Tonnes (Mt)	Mn (%)
Bindi Bindi Hill	5.7	9.2
Budgie Hills	3.5	8.9
Cadgies Flats	0.2	9.1
Coodamudgi	3.6	9.5
Illgararie Ridge	18.5	9.2
Mundawindi	2.1	9.4
Richies Find	6.6	9.4
SUBTOTAL	40.1	9.3
Yanneri Ridge	15.8	9.4
GLOBAL TOTAL	55.9	9.3

Table 2. Inferred Mineral Resource Estimates at the Butcherbird Manganese Project are reported at 8-10% Mn.

EMD TEST WORK SUCCESS

Early test work involving a range of hydrometallurgical options, including impurity leaching to generate a concentrate, and direct leaching of manganese, showed very encouraging results. In particular, the first tests using selected reductive leaching, designed by CSIRO scientists, yielded excellent manganese leaching results, rapid leach kinetics **(>95% Mn extraction in 30 minutes**), and impressive selectivity over key impurities[6]. Subsequent work focussed on optimising the leach protocols and the confirmed that it is possible to achieve these results at atmospheric pressure and ambient temperature at coarse grind sizes without the need to add sulphuric acid for pH control.

[4] Montezuma Mining Company Ltd ASX release dated 7 December 2012
[5] Montezuma Mining Company Ltd ASX release dated 27 December 2014
[6] Montezuma Mining Company Ltd ASX release dated 6 June 2017

ABOUT BATTERY GRADE MANGANESE

Industry observers expect the global electrolytic manganese dioxide market to reach USD 635.7 million by 2022 with a **projected compound annual growth rate of 4.9%** from 2015 to 2022.[7]

Growth in demand from the battery manufacturing industry is expected to drive projected demand curves as technological advancements in **wind and solar power generation** and the need for associated grid electrical storage systems expands.

Battery production is the leading EMD consumer with market share estimated to exceed 90% of global consumption. This demand is expected to continue to grow due to the current and expected future growth in the global electric vehicle industry, which in turn has a strong impact on battery demand. Manganese in the form of **EMD is a key ingredient in several types of widely used battery technologies including Li-ion**, alkaline and zinc-carbon**, and the next generation lithiated manganese dioxide batteries, with cathodes comprising over 60% Mn compared to approximately 4% lithium**.

In addition to the potential production of EMD, concurrent market research has also identified a range of other products with high value in use which may be considered for the processing of Butcherbird ores. These include:

- Electrolytic Manganese Dioxide ("EMD").
- Chemical Manganese Dioxide ("CMM").
- Electrolytic Manganese Metal ("EMM")
- Manganese Sulphate as a fertilizer and feed additive.

On a theoretical chemistry basis, all of these end products should be able to be produced from the PLS that resulted from the Stage I test work.

The test results have exceeded expectations and the Company has initiated discussions with CSIRO to commence Stage II investigations focussed on potential purification options for the PLS and subsequent production of end products for marketing and commercial studies.

Table 3: Assay of typical PLS sample (500 µm, 40% pulp density, controlled pH ~1.2).

Time	Concentration (mg/L)									
(min)	Mn	Fe	K	Al	Ni	Co	Cu	Zn	Cd	Cr
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	74646	1560	3517	1629	33	58	27	45	<0.2	8
15	117866	2455	5103	2431	60	90	41	65	<0.2	11
30	136891	2898	5911	2732	86	101	41	82	<0.4	12

Time	Concentration (mg/L)								
(min)	Na	Mg	Li	Pb	As	Ba	Mo	Se	Ca
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	664	286	6	7	5	1	<0.2	17	673
15	964	379	13	10	5	<0.2	<0.2	22	458
30	1099	394	18	10	7	<0.2	<0.4	27	949

[7] http://www.grandviewresearch.com/press-release/global-electrolytic-manganese-dioxide-market

Table 4: Assay of typical PLS sample (500 µm, 40% pulp density, no pH control).

Time	Concentration (mg/L)									
(min)	Mn	Fe	K	Al	Ni	Co	Cu	Zn	Cd	Cr
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	55039	499	2690	482	21	43	11	33	<0.2	3
15	77064	1077	3859	1107	33	64	22	47	<0.2	4
30	112202	1819	5556	2062	33	55	22	42	<0.2	6
60	139705	2385	5990	2473	61	103	38	81	<0.4	8

Time	Concentration (mg/L)								
(min)	Na	Mg	Li	Pb	As	Ba	Mo	Se	Ca
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	501	228	2	6	2	<0.2	<0.2	13	523
15	711	284	4	7	6	8	<0.2	17	656
30	557	210	8	6	4	<0.2	<0.2	14	552
60	1124	401	17	14	8	2	<0.4	26	890

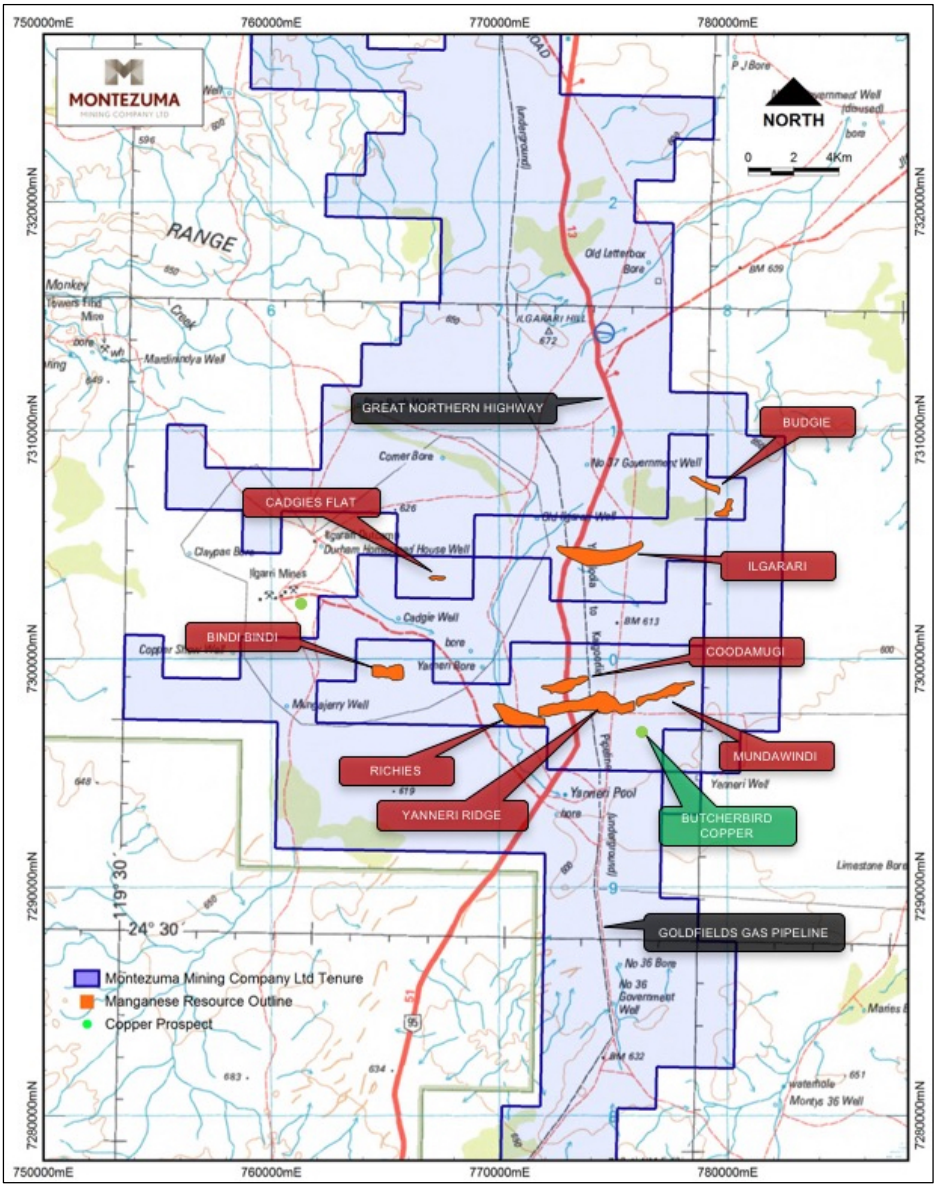

Figure 1: Butcherbird Manganese Project location plan including resource outlines.

FOR MORE INFORMATION…

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The information in this report that relates to Exploration Results, Mineral Resources and Mineral Reserves is based on information compiled by Mr Justin Brown who is a member of the Australasian Institute of Mining and Metallurgy. At the time that the Exploration Results, Mineral Resources and Mineral Reserves were compiled, Mr Brown was an employee of Montezuma Mining Company Ltd. Mr Brown is a geologist and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Brown consents to the inclusion of this information in the form and context in which it appears in this report

Please note with regard to exploration targets, the potential quantity and grade is conceptual in nature, that there has been insufficient exploration to define a Mineral Resource and that it is uncertain if further exploration will result in the determination of a Mineral Resource.

The information in the announcement that relates to Mineral Resources for the Butcherbird Project is extracted from ASX announcement of 7 December 2012. The company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement. This information was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported.

JORC Table 1

JORC Code, 2012 Edition – Table 1 – Butcherbird Project Hydrometallurgical Test Work

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg 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 representivity 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 (eg '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 (eg submarine nodules) may warrant disclosure of detailed information.*	• The samples for metallurgical test work were selected from contiguous lengths of core that were considered to be typical in character to the bulk of the ore zones at Yanneri Ridge. • Whole core was used to maximise the volume of sample. • The drill core was combined into two bulk samples. • The bulk test work samples were then beneficiated using a 950mm rotary drum scrubber.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg 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).*	• A Diamond Drill Rig was used for the metallurgical program with PQ sized core (85mm diameter). • 9 holes were drilled into key areas of the Yanneri Ridge orebody to twin historical RC drill holes.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure*	• Recoveries are noted at the time of drilling and recorded in the MZM database. • Triple tubing was used within the weathered zones to maximise

Criteria	JORC Code explanation	Commentary
	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.*	ore recovery. • Close to 100% of core was recovered.
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 samples have been logged to a level of detail to support the mineral resource estimations. • Qualitative: Lithology, alteration, mineralisation. • Quantitative: Sample assays. • The entire length of the hole is geologically logged. • All drill core is photographed.
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.*	• Sample sizes are considered appropriate for the nature of the test work.
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 (eg standards, blanks, duplicates, external laboratory checks) and whether*	• The metallurgical samples were assayed at the CSIRO laboratory using the ICP-MS technique.

Criteria	JORC Code explanation	Commentary
	acceptable levels of accuracy (ie lack of bias) and precision have been established.	
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.*	• All data has been checked internally for accuracy by senior MZM geological and CSIRO staff. • No adjustments have been made to assay data.
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.*	• All collar coordinates were collected using handheld GPS in MGA 94 – Zone 51.
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.*	• The metallurgical test work drill holes have been selected based on their representivity of the Yanneri Ridge Orebody. • The metallurgical samples have been composited to produce two bulk samples.
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.*	• All drill holes are drilled vertically as the stratigraphy is generally sub-horizontal. • There is no known sample biasing.
Sample security	• *The measures taken to ensure sample security.*	• NA
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• The data and sampling techniques are reviewed internally. • Audits have also been completed by Mineral Processors WA, Snowdens and CSIRO.

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 Butcherbird Project consists of a single granted exploration license – E52/2350. • The tenure is 100% owned by Montezuma Mining Corporation Ltd.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The historical exploration data has been collected by various parties and has been reported to high standards. • The methods of exploration and techniques used are considered appropriate for the deposit types sought (Mn, Cu)
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Butcherbird is a stratiform sedimentary manganese deposit. • The deposits are hosted within the Ilgarari Formation which is generally flat lying with gentle open folding in places. • The manganese mineralisation within the ore zones is divided into three distinctive units – a high grade manganiferous cap, supergene enriched manganiferous laterite and basal shale.

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*
		• See historical ASX releases regarding the Butcherbird Mineral Resources.

Criteria	JORC Code explanation	Commentary
	○ *hole length.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg 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.*	• NA
Relationship between mineralisation widths and intercept lengths	• *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 (eg 'down hole length, true width not known').*	• NA
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.*	• NA
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.*	• NA
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.*	• NA

Criteria	JORC Code explanation	Commentary
urther work	• *The nature and scale of planned further work (eg 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.*	• Phase 2 of the metallurgical test work is planned to commence shortly.