Plymouth minerals limited

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ASX via Electronic Lodgement

Process Metallurgy confirmation for San Jose Lithium-Tin Project: On track and continues to deliver

Highlights

- **San Jose has undergone extensive historical metallurgical test work which Plymouth acquired all data for in February 2017**
- **Process flow sheet to treat lithium mica and produce lithium carbonate using industry standard processing basis of historical feasibility study**
- **All further metallurgical work undertaken by Plymouth to date has either enhanced or confirmed the historical work completed (97% lithium recovery achieved)**
- **San Jose poised to satisfy burgeoning European lithium demand**
- **Completion of Process flow sheet work estimated end Q2, 2017**
- **Commencing Off take discussions**
- **Lithium requirements (battery plants) increasing in Europe**

Plymouth Minerals Limited (ASX: PLH) (Plymouth or the Company) is pleased to provide an update on the rapid advancement of metallurgy programmes being conducted for the San Jose lithium-tin project in Spain (San Jose).

San Jose has undergone extensive historical exploration and metallurgical test work in the late 1980s and early 1990s which culminated in a positive feasibility study being completed in 1991. The basis of the study was open pit mining and proven process technology to produce lithium carbonate on site. In February 2017, Plymouth purchased this detailed and process specific historic drilling, mining and processing data, allowing Plymouth to fast-track the delivery of a JORC 2012 resource (ASX 25th May 2017) with minimal confirmation drilling required. Plymouth is using this data to focus the remaining process verification work required to confirm the simple process flow sheet previously defined which utilises acid leach to produce high-quality lithium carbonate on site at San Jose.

Positive results have been obtained to date (ASX 6th April 2017) and continue to be received confirming or enhancing results delivered from historical positive feasibility study (Figure 1). A detailed process flow sheet update is expected to be published in several weeks. This will allow the production of a JORC Scoping Study for San Jose to produce lithium carbonate and tin on site and to be released in Q3 2017.

Plymouth's testing so far has confirmed the previous study's sulphuric acid leach process result and achieved 97% lithium recovery. Utilising a sulphuric acid flowsheet was considered the preferred method due to readily available sulphuric acid in Western Spain and given access to a nationwide reticulated gas pipeline network, which passes within 1km of the proposed San Jose processing plant (providing access to cheap energy).

Executive Chairman Adrian Byass said, "*Plymouth purchased the historical data in February allowing the Company to deliver a JORC resource shortly afterwards. The historical data will assist us to confirm and develop an updated process flowsheet based on updating the previous work with new confirmation testwork. This will allow Plymouth to fast-track metallurgy programmes, saving considerable time and costs and deliver updated economics for the high value San Jose Lithium Project*."

FIGURE 1: TESTWORK UNDERWAY IN SPAIN FOR SAN JOSE LITHIUM SAMPLES

For further background and test work specific information please read the following sections and detailed information contained below;

DETAILED INFORMATION

LITHIUM IN MICA MINERALS

Lithium (Li) at San Jose is hosted in mica minerals with tin (Sn) hosted in associated quartz. Lithium-bearing micas are an established source of lithium which is able to be directly converted to lithium carbonate on site, bypassing the requirement to trade in concentrate with off-site convertors in China.

Lithium carbonate in industrial quantities was first produced from lithium micas (zinnwaldite) in the late 1920s by Metallgesellschaft AG in Germany (R.J. Bauer Lithium in Europe 1978). San Jose, as well as European Lithium's (ASX.EMH) Cinnovec project in the Czech Republic (market capitalisation ~A$130 million) are lithium-tin deposits in which the lithium is hosted by zinnwaldite micas.

Lithium at San Jose is hosted in a massive replacement style deposit, with cross-cutting tin-bearing quartz veins. This is a common lithium deposit style as seen in several other large lithium-tin deposits in Europe which are historic lithium producers. The San Jose outcrops at surface providing the opportunity to develop it via a low cost low strip ration open pit mine.

Plymouth and its Spanish Joint Venture partner, Valoriza Mineria (VM), intend to produce lithium carbonate (LCE) on site. VM is a subsidiary of +A$ billion market capitalisation, construction and engineering company Sacyr S.A. Europe's only commercial lithium production is currently sourced from Spain and Portugal.

METALLURGICAL PROGRAMME

Between 1988 and 1991 a substantial amount of metallurgical work was completed at the San Jose project that culminated in a feasibility study that outlined a project that produced lithium carbonate. Utilising a sulphuric acid flowsheet or a Sulphate calcine pathway providing high recoveries of lithium to lithium carbonate. The sulphuric acid flowsheet was the preferred method due to readily available sulphuric acid in Western Spain.

A nationwide reticulated gas pipeline network was installed in Spain after the historic study was completed. The network passes within 1km of the proposed San Jose processing plant providing access to cheap abundant energy. Plymouth is developing the sulphate calcine pathway in parallel with the sulphuric acid flowsheet as each process has high recoveries but different energy requirements.

Plymouth's Metallurgical work focusses on confirming and updating the previous study. The modern work programmes are being undertaken by AGQ Mining and Bioenergy in Spain, Nagrom in Perth Australia and overseen by Peter Adamini from IMO Project Services based in Perth. Representative material for this testwork was derived from the recent diamond drilling programme completed at San Jose. It is anticipated that scoping study numbers from the metallurgical testwork programme will be available by the beginning of Q3 allowing an updated economic evaluation of the San Jose lithium deposit to be presented.

The Company has access to hundreds of kilos of fresh sample material suitable for process flowsheet testwork this comes from a combination of surface material outcropping at the deposit and material sourced from the recent diamond drilling campaign.

MINERALOGY

The San Jose deposit is hosted in metamorphosed sedimentary rocks which have been intruded by a swarm of quartz pegmatite veins forming a stockwork within the sediments. These veins have mineralised the sediments by introducing large quantities of lithium into the micas.

The Company has employed industry experts to provide reports on the mineralogy of the ore. This work confirmed the findings of the previous study. The mineralisation is hosted in zinnwaldite micas within metamorphosed sediments. The mineralogical work confirmed the grain size of the quartz, tourmaline and mica minerals within the ore, from which liberation and grind sizes have been determined for optimum processing and beneficiation. The lithium bearing rocks at San Jose are made up of quartz, mica and tourmaline. The quartz is characterised by 0.5mm particles surrounded by 0.2mm aggregates of mica minerals with tourmaline. The micas make up between 30 and 50% of the rock mass. The outcomes of this work are in line with the existing studies.

BENEFICIATION

Plymouth intends to beneficiate the ore material prior to any leach process, this will improve the grade to the plant and remove waste reducing costs and improving recovery. Gravimetric testing undertaken during the previous study indicated that the ore could be beneficiated so that 99% of the lithium could be contained in 65% of the mass improving the head grade to the leach circuit by approximately 35%. Plymouth is in the process of testing beneficiation techniques that include dense media separation, magnetic separation and flotation process.

LEACH TESTS

The previous feasibility study conducted extensive testing to produce lithium carbonate including:

- Sulphuric acid leach with or without calcining at atmospheric pressure
- Limestone and gypsum roast
- Potassium sulphate calcine
- Limestone and calcium chloride roast
- and sodium chloride roast.

The two preferred processing paths that evolved from this work were sulphuric acid leaching (96% recovery) and potassium sulphate calcine with water leach (93% recovery). The previous metallurgical testwork is significant and highly advantageous to the commercial value of the project as it allows Plymouth to quickly advance the development of a modern process flowsheet at a reduced cost.

Plymouth's testing so far has confirmed the previous study's acid leach process result and achieved 97% lithium recovery into the leach liquor using sulphuric acid at 100 degrees centigrade at a 30% solid ratio with a grind size of 200µm.

The leach testwork program continues to test the sulphuric acid pathway as well as testing in parallel sulphate calcine with water leach at the AGQ laboratory in Spain.

LITHIUM CARBONATE

A saleable grade of lithium carbonate was produced by the previous feasibility study by precipitation and purification process common in the industry today. Plymouth has programme of testwork to confirm the parameters required for the precipitation and purification of lithium carbonate suitable for the new European battery market. The process required to produce lithium carbonate from the leach liquor are well established and similar to the production of lithium carbonate form other sources such as spodumene or brines.

OFFTAKE DISCUSSIONS

Plymouth is engaging with customers based in Europe, current and planned regarding lithium carbonate offtake. The Company is focussing on the natural demand in Europe. Large groups including Tesla, Daimler, Northvolt, LG Chem, Samsung SDI, BMZ, Nissan, TerraE, all have stated plans to build large dedicated EV and ESS battery manufacturing facilities in Europe, with Daimler, LG Chem, Samsung SDI, BMZ and Nissan's projects already underway today (Figure 2). In addition, Johnson Matthey, AccuPower, Kreisel Electric and A123 are all existing large scale manufacturers of Li Batteries in Europe.

The battery factories with a combined proposed output of 100GWhpa would consume up to 50,000t LCE pa. The San Jose Project would supply one third of Europe's planned near term requirements per year. Plymouth is well placed to service this burgeoning demand.

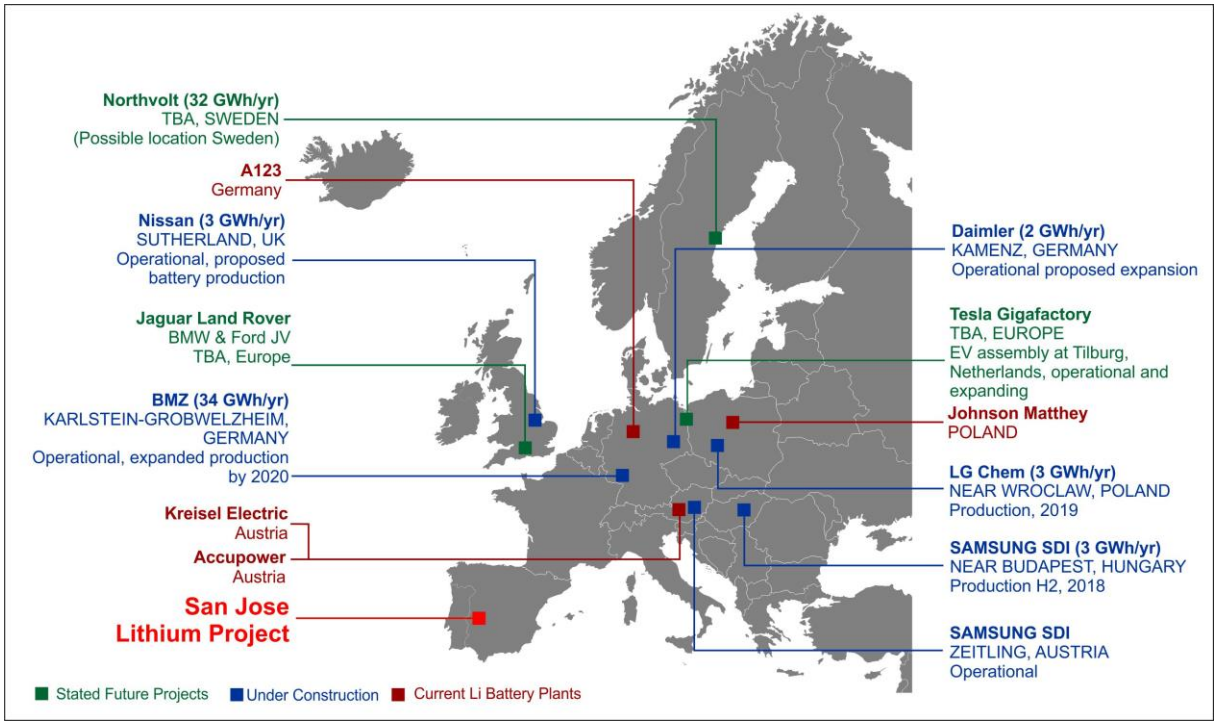

FIGURE 2: LOCATION OF PROPOSED GIGAFACTORIES IN EUROPE

MINERAL RESOURCE (Refer ASX release 25th May 2017)

Plymouth has completed a drilling program that has confirmed and updated the validity of the previous drilling, bulk density and assaying, which culminated in the release of a substantial JORC resource that contained 11% more tonnes than the historic estimate.

The combined Indicated and Inferred Mineral Resource at a 0.10% Li cut-off is reported as;

92.3Mt @ 0.60% Li_2O (lithium oxide) and 0.02% Sn (tin)

The combined Indicated and Inferred Mineral Resource at a 0.35% Li cut-off is reported as;

16.5Mt @ 0.9% Li_2O (lithium oxide) and 0.04% Sn (tin)

The resource estimate for San Jose is shown below in Table 1;

TABLE 1 SAN JOSE MINERAL RESOURCE, REPORTED ABOVE 0.1% LI CUT-OFF

Classification	Tonnes (Mt)	Li (%)	Li_2O (%)	Sn (%)
Indicated	23.9	0.31	0.67	0.02
Inferred	68.3	0.26	0.56	0.02
TOTAL	**92.3**	**0.27**	**0.60**	**0.02**

Estimated using Ordinary Kriging methodology. Note: Small discrepancies may occur due to rounding

Snowden Mining estimated the total Mineral Resource for the San Jose lithium deposit using Ordinary Kriging interpolation methods and reported above a 0.1% Li cut-off grade. Full details of block modelling and estimation are contained in the ASX announcement dated 25 May 2017.

EXPLORATION TARGET (Refer ASX release 25th May 2017)

Snowden has conjecturally derived an Exploration Target for San Jose, based on the observed geology to the southern side of the syncline that hosts the Mineral Resource Estimate (Table 2) and shown in Figure 1B. Snowden observes that identical lithology and alteration exists on the southern flank of the syncline and that tin mineralisation has been historically exploited in the same manner as it has on the northern side of the syncline. Snowden infers that the only geological reason for lithium mineralisation not being identified in this area is that it has not been drilled in recent years.

TABLE 2: SAN JOSE EXPLORATION TARGET

Component	Tonnage (Mt)		Grade ppm Li (Li2O)		**Commodity**
	From	To	From	To	
San Jose	80	120	3,000 (0.65%Li2O)	2,500 (0.54%Li2O)	Li

Disclaimer: The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration completed to date to estimate a Mineral Resource in accordance with the JORC 2012 Edition Guidelines. It is uncertain if further exploration will result in the delineation of a Mineral Resource.

Snowden cautions that this Exploration Target is conjectural and speculative only and serves to indicate the scale of potential mineralisation within the project area, based on current geological understanding. This Exploration Target does not imply economic viability.

Lithium (Li) mineralisation is commonly expressed as either lithium oxide (Li_2O) or lithium carbonate (Li_2CO_3) or Lithium Carbonate Equivalent (LCE)
Lithium Conversion: 1.0% Li = 2.153% Li_2O, 1.0%Li = 5.32% Li_2CO_3

Plymouth is not aware of any new information or data that materially affects the information included in this ASX release, and Plymouth confirms that, to the best of its knowledge, all material assumptions and technical parameters underpinning the resource estimates in this release continue to apply and have not materially changed.

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ENDS

About Plymouth Minerals' Lithium Project

Plymouth has partnered with the large Spanish company Sacyr and its wholly owned subsidiary Valoriza Mineria in an earn-in JV over a large, lithium-tin project (San Jose) in central Spain. Plymouth can earn up to 75% of San Jose by completing a Feasibility Study within 4 years (approximately A$6 million in spend). Plymouth also retains an 80% interest in the Morille tungsten project in Spain which was extensively explored by Plymouth in 2013-2015.

San Jose is an advanced lithium project which is hosted in lithium-mica. A feasibility study completed in 1991 defined an open pit mining operation and a process flow sheet which produced lithium carbonate through acid-leach processing. This historical drilling, mining and processing study work highlights the differences with San Jose and many other hard rock style lithium deposits and highlights the advantages enjoyed by San Jose.

About Plymouth Minerals' Potash Projects

Plymouth owns 100% of the Banio and Mamana Potash Projects, which are drill proven, high-grade, shallow potash deposits that are favourably located on the coast of Gabon and on major transport river ways (barge) with direct access to export ports. Banio has a multi-billion tonne Exploration Target of carnallite and sylvinite based on historical seismic and drilling data.

Competent Persons Statement

The information in this report that relates to Exploration Targets and Mineral Resources is based on the information compiled by Mr Jeremy Peters, FAusIMM CP (Mining, Geology). Mr Peters has sufficient relevant professional experience with open pit and underground mining, exploration and development of mineral deposits similar 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 JORC Code He has visited the project area and observed drilling, logging and sampling techniques used by Plymouth in collection of data used in the preparation of this report. Mr Peters is an employee of Snowden Mining industry Consultants and consents to be named in this release and the report as it is presented.

The information in this report that relates to Exploration Results is based on the information compiled or reviewed by Mr Adrian Byass, B.Sc Hons (Geol), B.Econ, FSEG, MAIG and an employee of Plymouth Minerals Limited. Mr Byass has sufficient experience 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 JORC Code. Mr Byass consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

Disclaimer

Forward-looking statements are statements that are not historical facts. Words such as "expect(s)", "feel(s)", "believe(s)", "will", "may", "anticipate(s)" and similar expressions are intended to identify forward-looking statements. These statements include, but are not limited to statements regarding future production, resources or reserves and exploration results. All of such statements are subject to certain risks and uncertainties, many of which are difficult to predict and generally beyond the control of the Company, that could cause actual results to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements. These risks and uncertainties include, but are not limited to: (i) those relating to the interpretation of drill results, the geology, grade and continuity of mineral deposits and conclusions of economic evaluations, (ii) risks relating to possible variations in reserves, grade, planned mining dilution and ore loss, or recovery rates and changes in project parameters as plans continue to be refined, (iii) the potential for delays in exploration or development activities or the completion of feasibility studies, (iv) risks related to commodity price and foreign exchange rate fluctuations, (v) risks related to failure to obtain adequate financing on a timely basis and on acceptable terms or delays in obtaining governmental approvals or in the completion of development or construction activities, and (vi) other risks and uncertainties related to the Company's prospects, properties and business strategy. Our audience is cautioned not to place undue reliance on these forward-looking statements that speak only as of the date hereof, and we do not undertake any obligation to revise and disseminate forward-looking statements to reflect events or circumstances after the date hereof, or to reflect the occurrence of or non-occurrence of any events.