



ASX/Media Announcement

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PILBARA COMPLETES KEY METALLURGICAL TESTWORK PROGRAM AHEAD OF PILGANGOORA DEFINITIVE FEASIBILITY STUDY

Phase 2 metallurgical testwork and process design completed – DFS to be released this month

Key Points:

- **Comprehensive Phase 2 metallurgical testwork program now completed, allowing the process flowsheet to be finalised for inclusion in the Definitive Feasibility Study (DFS).**
- **Overall recoveries range between 76% to 78.1% Li₂O and significant Ta₂O₅ recovery improvements in the range of 51% to 59.3%.**
- **The proposed three stages of Heavy Media Separation (HMS) outlined in the March PFS has now been reduced to just two stages as a result of the Phase 2 Heavy Liquid Separation (HLS) testwork, which will simplify operability.**
- **Comprehensive spodumene flotation testwork has been completed with further optimisation work underway.**
- **A Pilot Plant testwork program has commenced on the HMS phase – flotation program to follow.**
- **A 4Mtpa Primary Crusher will be installed upfront to facilitate early expansion capability of the project.**
- **The DFS encompassing a 2Mtpa base case development of the Pilgangoora Project, together with a PFS on a 4Mtpa expansion in Year 3, is now in its final stages and will be announced to the market towards the end of September following review by the Pilbara Minerals Board.**

Australian lithium developer Pilbara Minerals Limited (ASX: PLS) is pleased to advise that it has completed the Phase 2 metallurgical testwork program, representing one of the final work streams for the Definitive Feasibility Study (DFS) on its flagship 100%-owned **Pilgangoora Lithium-Tantalum Project** in WA. With the completion of this key metallurgical testwork program, the DFS has now entered into its final review and compilation stage, and is expected to be announced to the market towards the end of this month following review by the Pilbara Minerals Board.

Whilst the substantial growth in the Pilgangoora Resource and Reserve during the year has necessitated additional site design works to complete the DFS, it has also facilitated an assessment of the expansion opportunities at the Pilgangoora Project.

This, combined with additional engineering completed during the DFS, means that the Company has been able to progress a Prefeasibility level of assessment for the 4Mtpa production case. These results will be published at the same time as the release of the DFS outlining the 2Mtpa base case.

“The scale of the Pilgangoora Resource and Reserve, combined with its distinct location and grade advantages, will underpin a low-cost operation which should be the ‘go-to’ hard-rock lithium project for expanded raw material supply. We look forward to demonstrating its potential,” said Pilbara’s Managing Director and CEO, Ken Brinsden.

Pilbara Minerals Limited



Phase 2 Metallurgical Testwork Program

For the Phase 2 program, an additional 740 metres of PQ diamond drilling was completed during the March 2016 quarter to generate sufficient samples (~3 tonnes) from the three ore domains to undertake variability testing representing the first five to seven years of mine life.

In addition to Phase 2, a Pilot Plant Program was instigated to validate the flowsheet during the detailed engineering design phase (post-DFS) and to generate spodumene concentrate samples for further marketing purposes.

As a result of the completion of the Heavy Liquid Separation (HLS) variability testwork during Phase 2, the program demonstrated that the three stages of HMS proposed in the original flowsheet (as outlined in the March PFS) can now be reduced to two stages, eliminating the coarse rejects, improving plant operability and ultimately with the expectation of further improving mineral recovery of both Lithia and Tantalite during the post DFS plant optimisation (and in particular float recovery) process.

The following testwork programs were completed on ore from the three Domains representing the first five years of mine life, namely the Eastern, Western and Central Domains:

- Comminution data, and optimisation of crushing and grind size;
- High Pressure Grinding Rolls (HPGR) variability testwork;
- Heavy Liquid Separation (HLS) optimising density operating parameters producing coarse spodumene and tantalite concentrates;
- Flotation operating parameters;
- Tantalite gravity testwork;
- Physical testing, settling and filtration; and
- Comprehensive mineralogical examination.

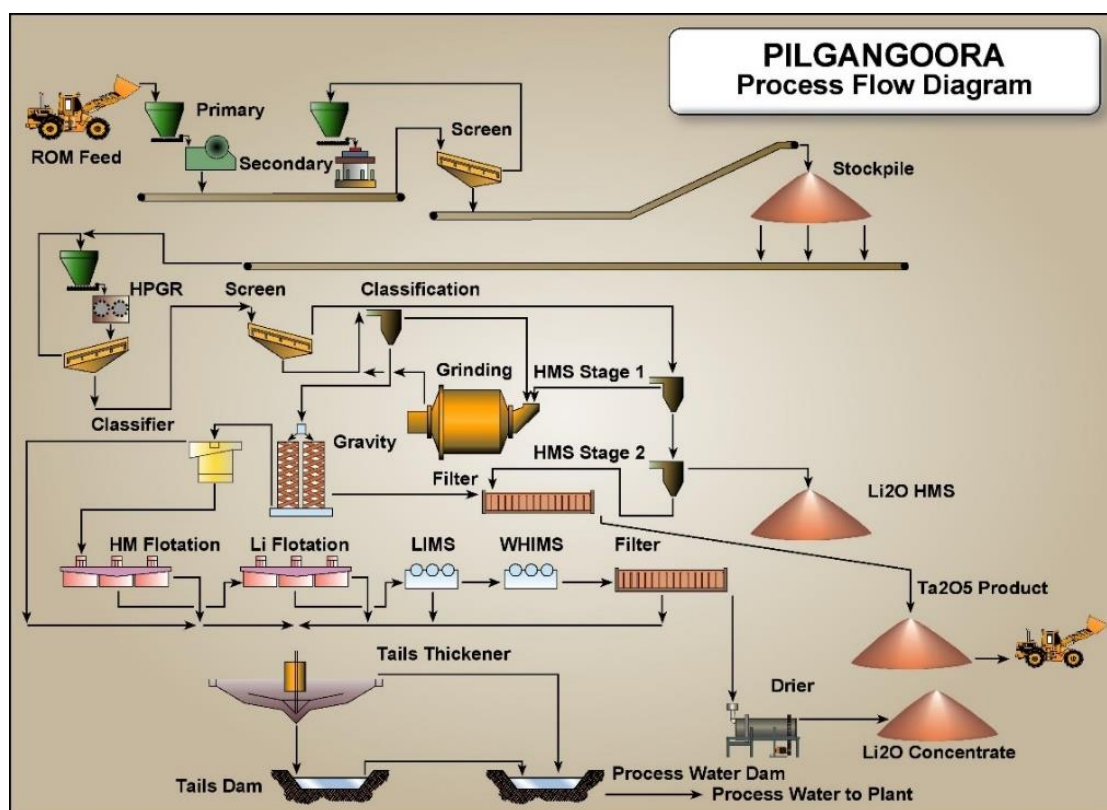


Figure 1: Process Flow Diagram



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As noted above, a key outcome from the HLS testwork has been that the Heavy Media Separation (HMS) stages in the process plant have now been reduced from three to two stages. This eliminates the coarse rejects being generated, representing approximately 20% of the feed, and results in additional material being presented to the gravity and flotation circuits. This will simplify the operability of the HMS circuit shown in Figure 1.

Although not a requirement for the DFS, last month Pilbara commenced HMS Pilot Plant work at Diamond Recovery Services. The Company supplied additional equipment and modified the HMS circuit in order to validate the Heavy Liquid Separation (HLS) bench-scale testwork to produce the coarse fraction spodumene concentrates.

The bulk samples for processing represent each ore Domain; Bulk Eastern Surface ore, Eastern Domain, Western Domain and Central Domain all part of the scheduled first five to seven years of mine life. The bulk samples generated were prepared by the HPGR variability work and then screened to produce (+0.50 – 3.35 mm) HMS feed product, with the (-0.50 mm) material becoming the truncated feed for the gravity and flotation circuits.



Figure 2: HMS Pilot Plant



Figure 3: HMS Spodumene Concentrate (Sinks)



Figure 4: Left – HMS Spodumene-Tantalum Concentrate; Right – HMS Floats

The HMS Pilot Plant commissioning was undertaken on the Eastern bulk sample with the progress results of the program summarised below:

Table 1: HMS Pilot Plant Commissioning – Sighter

Feed		HMS Concentrate, Sinks				HMS Floats
Test	Sample	% Li ₂ O	% Yield	% Li ₂ O	% Recovery	% Li ₂ O
2	Eastern Bulk	1.45	5.2	6.84	23.7	1.20
3	Eastern Bulk	1.40	6.0	6.76	28.9	1.06
4	Eastern Bulk	1.40	12.0	6.45	55.2	0.71
5	Central - Sighter	1.92	23.5	5.57	68.2	0.80

A series of sighter tests are used to determine the density cut point to improve yield and hit a target grade of 6% Li₂O. Commissioning of the pilot plant has been successful as shown by the improvement in Tests 4 and 5 above are showing a positive response to the density cut changes and achieving closer to the optimal grade of 6% lithia as well as optimising yield and recovery.

The Central Domain processing is now complete, with results expected later this week. Processing of the remaining two Domains is underway, with the sinks (HMS concentrate) also being processed through the second stage HMS to recover the coarse tantalite. The HMS Piloting work is expected to be completed by mid-September.

The first stage HMS floats, in conjunction with the truncated feed (-0.50 mm) material, reports to the gravity, milling and flotation circuit for further lithium and tantalum recovery.

The HMS Pilot Plant work is not only being used to validate the bench-scale testwork, but to also provide HMS Concentrate samples that can be used in further marketing Pilgangoora's product streams.

Flotation

Flotation testwork has been carried out on all the Eastern, Western and Central Domain master composites, both on whole of ore and the additional truncated feed (-0.50 mm). The flotation testwork has been comprehensive and has involved the following companies:

- KYSKY Adelaide (Kwan Wong);



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- SGS Minerals Perth;
- SGS Lakefield Canada; and
- Nagrom Perth.

Some 150 batch flotation tests have been conducted to date under various conditions including:

- Whole of ore and truncated feed (-0.50 mm);
- Various grind sizes;
- With and without Mica pre-flotation;
- Various de-sliming cut points;
- Various water sources, potable, de-ionised, RO and site water;
- Various collectors and pH modifiers; and
- Various attritioning aids.

The flotation testwork has been extensive with the operating conditions now identified using site water, with each Domain's flotation recovery summarised below:

Table 2: Flotation Recoveries

Domain	% Recovery	% Li ₂ O
Eastern	70.0	6.0
Western	73.3	5.5
Central	71.6	6.0

Flotation testwork is ongoing to further improve recoveries and optimise reagent consumptions, with gains to be made in improving the spodumene flotation which will, in conjunction with the HMS recovery, further improve the overall spodumene recovery.

Once the flotation conditions are optimised, the Pilot Plant flotation program will commence with the bulk (-0.50 mm) material from each of the Domains being combined with the (+0.50 – 3.35 mm) first stage floats generated from the HMS Pilot Plant Program. It is expected that this program will commence in October.

Tantalite Recovery – Gravity Testwork

A bulk, 1-tonne screened sample (-0.5 mm) was sent to Mineral Technologies in Brisbane, Queensland to conduct gravity testwork. The objective was to produce a 5% Ta₂O₅ concentrate, which was then subjected to further dressing to produce a 25% Ta₂O₅ concentrate. At this stage, it is planned to upgrade to this concentrate specification on-site.

The sample was de-slimed at 21 micron, then fed to a bank of primary spirals (MG12), and then tested on a second (cleaner) stage of MG12 spirals. The results were at least equivalent to the rougher stage and showed that a 10% mass yield could achieve a tantalite stage recovery in the order of 95% at a grade of 3% Ta₂O₅.



At a smaller concentrate yield of around 5%, a higher grade concentrate of 5% Ta₂O₅ could be produced for a tantalite stage recovery of 93%.



Figure 5: Cleaner Spiral – Pilgangoora



Figure 6: Cleaner Table – Pilgangoora

The spiral concentrate produced was then subjected to two stages of wet tabling, roughing and cleaning which produced a tantalite recovery of 69%, with the concentrate grading 31% Ta₂O₅ in a mass yield of 0.06% with respect to the feed.

Overall Mineral Recoveries

Overall recoveries determined from the test work program on all the three Domains are summarised in Table 3 below:

Table 3: Domain Total Recoveries

Domain	% Li ₂ O Recovery (HMS & Flotation)	% Ta ₂ O ₅ Recovery
Central	77.7	59.3
Eastern	78.1	57.3
Western	76.0	51.0

Further flotation testwork will be undertaken over the next three months to further improve the recoveries of lithium and optimise the reagent additions. There is still considerable upside from the work completed to date to achieve this.

In addition to releasing the DFS in the coming weeks, the Company is also preparing a Pre-Feasibility Study on a 4Mtpa expansion to come on-line in the beginning of Year 3 (circa 2019). This expansion PFS will be released concurrently with the DFS.

More Information:

ABOUT PILBARA MINERALS

Pilbara Minerals ("Pilbara" – ASX: PLS) is a mining and exploration company listed on the ASX, specialising in the exploration and development of the specialty metals Lithium and Tantalum. Pilbara owns 100% of the world class Pilgangoora Lithium-Tantalum project which is the second largest Spodumene (Lithium Aluminium Silicate) project in the world. Pilgangoora is also one of the largest pegmatite hosted Tantalite resources in the world and Pilbara proposes to produce Tantalite as a by-product of its Spodumene production.



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ABOUT LITHIUM

Lithium is a soft silvery white metal which is highly reactive and does not occur in nature in its elemental form. It has the highest electrochemical potential of all metals, a key property in its role in Lithium-ion batteries. In nature it occurs as compounds within hard rock deposits and salt brines. Lithium and its chemical compounds have a wide range of industrial applications resulting in numerous chemical and technical uses. A key growth area is its use in lithium batteries as a power source for a wide range of applications including consumer electronics, power station-domestic-industrial storage, electric vehicles, power tools and almost every application where electricity is currently supplied by fossil fuels.

ABOUT TANTALUM

The Tantalum market is boutique in size with around 1,300 tonnes required each year. Its primary use is in capacitors for consumer electronics, particularly where long battery life and high performance is required such in electronics, automotive, aerospace, chemical manufacturing and other industries.

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