TNG LIMITED

TNG's TIVAN® PROCESS UPGRADED AND DE-RISKED WITH NEW DESIGN

Key outcomes include potential higher recoveries, and expected lower operating and capital costs for Mount Peake Vanadium Project

HIGHLIGHTS

- **A significant change to the front-end of the TIVAN® process, utilising conventional equipment widely used in the resource industry, has been proven to provide higher magnetic concentrate feed grades with consequently lower gangue grades.**
- **The Process update has resulted from extensive optimisation work carried out by METS and CSIRO during 2014.**
- **The modifications to the pre-leaching step of the process are expected to provide enhanced vanadium recoveries at the leach stage of up to 96%, iron recoveries of >85%, and a higher TiO_2 leach residue grade of up to 70% TiO_2.**
- **The downstream requirement for a large acid regenerating section is also reduced as a result of the improvements. Pre-leach and back-end changes are expected to reduce refinery CAPEX for Mount Peake by up to $100M.**
- **Final engineering design drawings incorporating the significant improvements are now being completed at CSIRO with a new Pilot Plant currently under construction.**
- **Pilot plant now expected to run in the last Quarter of 2014 with results in the first Quarter of 2015, paving the way for completion of the Mount Peake Definitive Feasibility Study.**
- **Provisional site locations for the TIVAN® refinery in Malaysia have been received and are under review.**

TNG Limited (ASX: TNG) is pleased to announce that it has achieved a number of important breakthroughs with the ongoing development and commercialisation of the TIVAN® downstream metallurgical process for its flagship **Mount Peake Vanadium-Titanium-Iron Project** in the Northern Territory.

The changes, including an optimised design relating mainly to the front-end of the TIVAN® Process, are expected to deliver substantial enhancements to the Mount Peake Project including higher metal recoveries, lower operating costs and a reduction in capital expenditure of up to $100 million.

ASX ANNOUNCEMENT

24 September 2014

ASX CODE: TNG

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PROJECTS

Mount Peake: Fe-V-Ti
Black Range Iron
Manbarrum: Zn-Pb-Ag
East Rover: Cu-Au
McArthur: Cu-Zn-Pb-Ag
Mount Hardy: Cu-Au-Zn-Pb
Sandover: Cu-Au
Walabanba: Fe-V-Ti-Cu-Au

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Since the last update on the test work program (*see ASX Announcement – 10 February 2014*), a significant amount of detailed optimisation work has been carried out by TNG's team of metallurgical consultants at Perth-based laboratories under the management of METS, with significant input from the CSIRO and a leading European engineering group.

This optimisation work, which has been carried out over the last six months, has resulted in significant changes to the front-end of the TIVAN® process. As a result of these changes, the resultant leach feed material is now of a higher grade with lower gangue material present.

This provides a cleaner feed which has in turn enabled an upgraded design for the main leach operation. Although this has delayed the commencement of the Pilot Plant test work, the new process is expected to have significant advantages by potentially providing a higher recovery and grade for the titanium dioxide product of up to 70% TiO_2, and much higher recoveries of both vanadium and iron – with grades for these products remaining at a high purity of 99.0% V_20_5, and 99.9% for Fe_20_3.

New Magnetic Concentrator

A new rare-earth magnetic separation unit was trialled and successfully incorporated into the initial separation stages to improve the recovery of vanadium and titanium. Fine magnetic separation beneficiation testwork involved optimising the grind size. The magnetic separation stages of the process were also successful in rejecting more gangue from the magnetic concentrate.

The aim was to produce higher vanadium, iron and titanium recoveries in the magnetic product and reduce the silica, aluminium and magnesium gangue material than had previously been achieved at the pre-feasibility stage.

This optimisation process was highly successful with results demonstrating the removal of over 70% of the run-of-mine plant feed mass, thereby removing the majority of the gangue material and reducing the grades of this accordingly while increasing the grades of the high-value products V_2O_5, TiO_2 and Fe. This process produced a magnetic concentrate with a grade as shown in Table 1 below:

Table 1: Average New Magnetic Concentrate Grade, Mount Peake

V_2O_5	Fe	TiO_2	MgO	Al_2O_3	SiO_2	P	CaO
%	%	%	%	%	%	%	%
1.22	54.6	16.8	<1.6	<2.6	<2.9	<0.004	<0.310

New Pre-leach Process Design

As regeneration of large quantities of acid contributes considerably to the overall capital cost of the Mount Peake Project, a new pre-leach step was investigated. This new pre-leach processing step involves a roasting stage and would utilise conventional equipment which is widely used in the resource industry.

As a result, the incorporation of this processing step is expected to significantly de-risk the overall TIVAN® Process, and will also enable a different acid to be used at the initial leach stage, thereby reducing the size of the downstream acid regeneration plant.

This new acid combination will remain confidential under the current patent pending Intellectual Property of TNG.

This new process addition has a significant positive impact on the process design and capital cost as the previous acid regeneration plant comprised a majority of the plant CAPEX.

New Leaching Process

The new higher grade and cleaner magnetic concentrate was then leached at optimised leaching conditions, which had been determined from the Feasibility Study bench-scale optimization leach test work.

This upgraded test work program has been carried out over the past six months as the feed material changed with the new optimisation of the magnetic concentrate.

The main focus of the investigation was the effect of acid type, acid concentration and temperature on the extraction of vanadium, iron and titanium as well as the gangue minerals magnesium and aluminum.

The results show that over 96% vanadium extraction, as well as an 84.5% iron extraction, can be achieved with respect to the leach feed – a significant improvement over the pre-feasibility results.

New CAPEX Estimate

The current estimated TIVAN® refinery direct capital cost (CAPEX) has been revised to A$422 million. This is at a confidence level of 15% using updated figures. Full details of the CAPEX will be released once the BFS is completed.

The new figure includes a reduction in the Acid Recycling unit from $260 million to $76 million as a result of the change to the front-end feed, however an estimated $84 million of additional front-end equipment will be required, bringing the potential total estimated saving to $100 million.

Table 2: CAPEX Estimate Summary for the TIVAN® Plant

AREA	Refinery
Plant Construction	$ 300,894,329
Acid Regeneration	$ 72,532,100
Infrastructure	$ 46,119,171
Plant Utilities	$ 1,464,670
DIRECT COST SUB TOTAL	**$ 421,010,270**

New OPEX Estimate

The new current estimated operating cost (OPEX) for the TIVAN® refinery is A$83.66 / tonne magnetic concentrate, based on assumed location in Malaysia, at a 15% accuracy. This equates to approximately 8c / kg concentrate.

Operational activity/tonne	
Concentrate production	$25.7
Concentrate processing	$52.16
Totals	$77.86

Final figures for both CAPEX and OPEX remain subject to change and may increase or decrease subject to matters outside of TNG's control.

The company's consultants will continue to work hard to reduce the forecast operating costs in order to achieve TNG's aim to be the world's lowest cost producer of vanadium pentoxide (V_20_5) through the successful development, commercialization and application of the TIVAN® process.

CSIRO Pilot Plant

Updated design drawings have now been completed by CSIRO and METS for the new plant, with test work now underway to optimise the pre-leach process and its integration into the TIVAN® circuit. A modified pilot plant is now under construction to accept this feed material.

It is now expected that the modified pilot plant will be completed and run by the end of 2014 with results fully assessed, and the design of the full commercial TIVAN® plant completed in the first Quarter of 2015. This will enable the Mount Peake Feasibility Study to be completed.

Malaysian Location Update

Following meetings with relevant government agencies in Malaysia, TNG has been provisionally offered two suitable land locations sites for the TIVAN® refinery. Confirmation of these locations is subject to acceptance of terms and completion of permitting and licensing from the Malaysian authorities. This option is still being explored and work is continuing. Further updates will follow when available.

Management Comment

TNG's Managing Director, Mr Paul Burton, said the upgrade to the design of the TIVAN® downstream processing plant represented a very important breakthrough for the Mount Peake Project, allowing it to capture potential significant capital and operating savings that may ultimately substantially enhance returns from the project.

"We have completed a substantial amount of work behind the scenes to reduce both the amount of acid required and the amount of waste produced by the downstream process, while maintaining our targeted product grades," he said.

"I am pleased with the work that has been carried out by METS and CSIRO with very encouraging improvements achieved both to the process and the product recoveries and grades," Mr Burton added.

"Reductions in capital and particularly operating costs and further refinements in the process are extremely important to get right at this stage of development. We have an exceptional team at CSIRO and METS working on this final design who have full confidence in the new de-risked changes to the process," Mr Burton added.

"We look forward to completing the next steps in this process so that the Feasibility Study can be completed, paving the way for financing and construction of the Mount Peake Project to begin."

Paul E Burton
Managing Director

24 September 2014

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Competent Person Statement

The results of the metallurgical test work presented in this report is based on and fairly represent information compiled by Mr Damian Connelly (FAAusIMM, Chartered Processional (MET), tMMICA, MSME, MSAIMM), a full time employee of METS. Mr Connelly has sufficient experience 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 the Exploration Results, Mineral Resources and Ore Reserves. Mr Connelly consents to the inclusion in the report of the matters based on his information in the form and context in which is appears.