TNT MINES LIMITED

ABN 67 107 244 039

RL10/1988

MOINA

ANNUAL REPORT TO 21 OCTOBER 2015

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ABSTRACT

Equipped with the (pre JORC 2012) resource estimation for Moina, and the generally positive results of the TNT Mines metallurgical testwork (both previously reported to MRT), most of the year under review was spent trying to secure funding or an appropriate partner to advance the project,.

In the light of adverse equity and metals markets conditions during the year, coupled with the apparent complexity of a treatment circuit for this skarn rock, and possibly less than optimal product quality, this aim was not able to be achieved despite strenuous efforts. Although TNT Mines had originally intended to produce a new resource estimate compliant with JORC 2012, it was decided that that would not materially advance the project and that efforts were better directed elsewhere.

Emphasis then switched to seeking a potential offtake partner which would be willing and financially and technically capable of carrying out feasibility, funding construction if feasibility proved positive, and then taking the product on a life of mine basis.

Towards year's end, this has been achieved, with initial involvement of the European Union through its FAME project. Renewed metallurgical testwork aimed at optimisation of a processing circuit should be initiated before the end of calendar 2015 using material to be dispatched shortly to the UK.

However, at tenement year end, TNT Mines has advised the tenement holder, Geotech International, that it will be withdrawing from the option agreement. The project has reverted wholly to Geotech.

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1.0 INTRODUCTION

1.1 Location and tenure

The Moina tenement is located approximately 40km south-west of Devonport, in north-west Tasmania (Figure 1). The 2 km^2 tenement is centred approximately 2 km south-west of the small town of Moina. The tenement area can be found on the Forth (1:100,000) LTIS map sheets.

Topographically the area is of variable relief with patches of rainforest, plantation and farmland. Vehicular access is good with Moina Road running through the tenement and numerous rough tracks giving 4WD access to most of the tenement. The land tenure is a mixture of State Forest and private freehold.

The owner of the tenement is Geotech International Pty Ltd ("Geotech"). That company has entered into an option agreement with TNT Mines (Moina) Pty Ltd, a wholly owned subsidiary of TNT Mines Limited (formerly part of the Minemakers Australia group). In turn, the major shareholder of TNT Mines is ASX-listed Niuminco Group Ltd, and Niuminco has been funding the project via a loan arrangement to TNT Mines. On the 19 October 2015, TNT Mines has advised Geotech that it does not intend renewing the option agreement. Tenement ownership and responsibility will revert to Geotech.

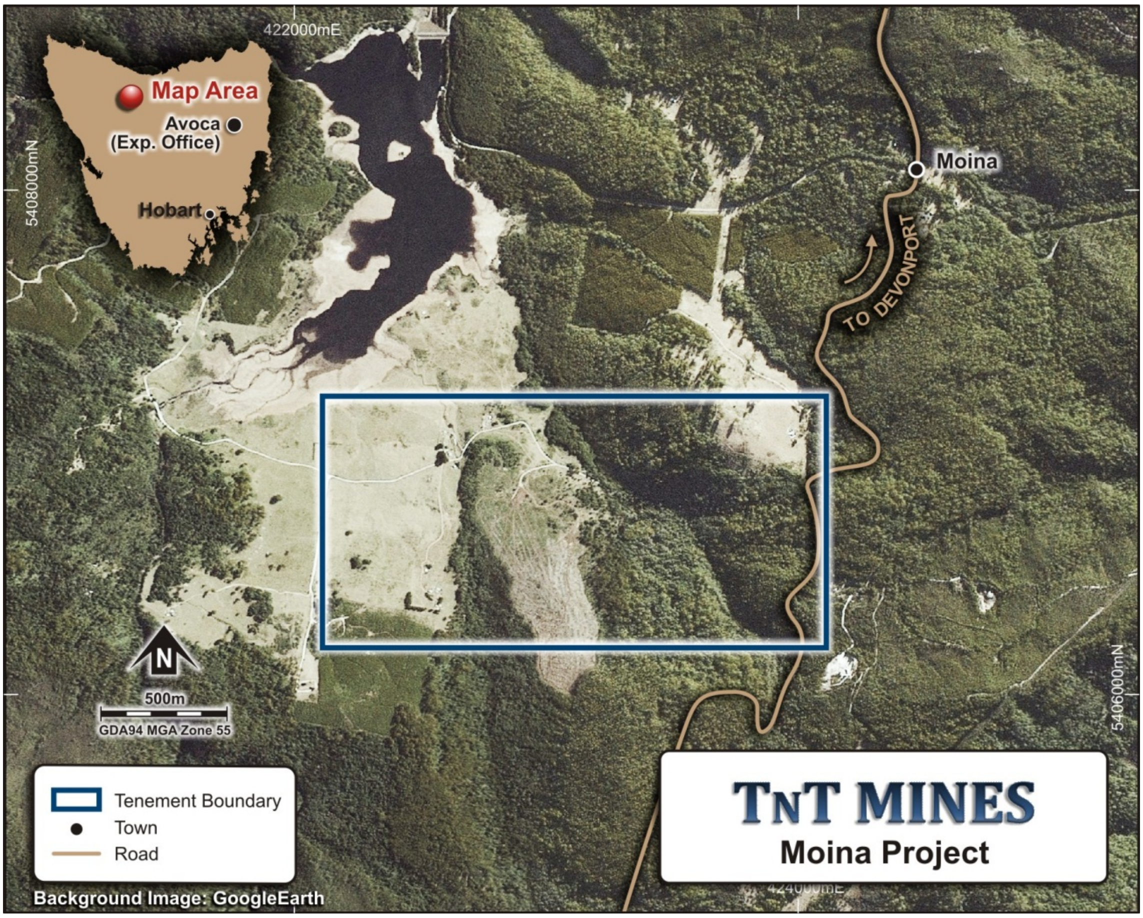

Figure 1: Tenement location plan

1.2 Geology

Tenement geology is shown below in Figure 2 and is taken from Map 9 (1:25,000) Geology of the Winterbrook – Moina Area, of the Geological Survey of Tasmania's Mt Read Volcanics Project 1989.

RL10/1988 is underlain by a thin sequence of Ordovician sediments. The Ordovician sedimentary package is a graded sequence of shallow water marine sediments with Roland Conglomerate at the base, overlain by medium to coarse grained Moina Sandstone, which in turn is overlain by Gordon Limestone. These three formations are conformable, gradational, and relatively thin, typically being in the range 50m to 150m thick. The sedimentary package dips gently north and has been lightly folded with fold axes trending NW sub parallel to the Bismuth Creek Fault. The sediments have been disrupted by a number of NW trending normal faults, principal of which is the Bismuth Creek Fault.

The Ordovician sediments are underlain in part by Cambrian volcanics and were intruded in Upper Devonian times by the Dolcoath Granite. A 2km wide stock of this leucogranite outcrops 3km to the east of Moina with an average composition of 40% orthoclase, 35% quartz, 20% plagioclase and 5% biotite. Gravity data indicates a west trending spine of this granite underlies RL10/1988 at depths of less than 1km. Drilling has revealed that beneath Moina the granite has been metasomatically altered to greisen. A Tertiary erosion surface, characterised by cemented gravels (graybilly) is patchily developed on the Ordovician sediments. Tertiary basalts, which are variably magnetic, cover substantial sections of the tenement area.

A large zone of hydrothermal alteration was associated with this granite spine. It caused dominantly iron and fluorine metasomatism of the Gordon Limestone and of calcareous beds in the Moina Sandstone and resulted in the formation of the Moina Skarn. These fluids were accompanied by variable amounts of tin, tungsten, bismuth, and molybdenum, which were fractionated from the granite; and by some precious metals and base metals either from the granite or leached from the Cambrian volcanics that lie between the sediments and the granite. This metasomatism resulted in a pocket of higher grade metamorphism turning the limestone to marble, the sandstone to quartzite, and indurating the conglomerate.

The Moina Skarn, with its associated tin-tungsten-fluorine veins and greisen, has been deposited in the roof above the Dolcoath Granite where it replaced Ordovician sediments. The skarn occurs as a thick horizontal plate roughly 1km in its longest dimension and up to 100m thick. It is separated from the granite's upper near horizontal contact by about 200m of the Moina Sandstone and replaces parts of the Gordon Limestone. The plumbing system for the mineralizing fluids was probably a series of east-west trending tension fractures, now tin-tungsten-quartz veins, associated with the major NW trending Bismuth Creek Fault and named the Shepherd and Murphy Vein Swarm. Emplacement of the granite was at shallow depths, probably less than 3km.

The main body of skarn is zoned and consists of:

- A top zone of a granular garnet-pyroxene-vesuvianite-fluorite skarn overlying the other units. This unit is relatively enriched in boron;
- The main skarn ("wrigglite") of fluorite-magnetite-vesuvianite (cassiterite-scheelite- adularia) and having a characteristic, fine grained (less than 0.2mm), rhythmic, finely layered, contorted structure;
- Within and near the base of the main skarn a granular, pale green pyroxene skarn occurs as thin units (less than 5cm) consisting of diopside-hedenbergite with very minor amounts of fluorite and garnet;
- A wollastonite-rich skarn may be present in places and can be a useful marker. It is probably derived from a silty/sandy facies of the limestone

and consists of over 80% by volume of wollastonite with small amounts of garnet, pyroxene, vesuvianite and fluorite;

- A basal zone of granular garnet-pyroxene-vesuvianite-fluorite skarn;

However, the skarn is essentially variable depending on local factors that controlled the metasomatism. A number of distinctly different skarn types are found in limited quantities in other areas where metasomatic conditions varied. The two most notable are the pyrrhotite skarn and the sphalerite skarn. The former consists of medium to fine grained pyrrhotite, magnetite, fine grained actinolite/chlorite, and minor fluorite; the latter of granular to massive andradite garnet with minor diopside containing conspicuous bands of closely spaced lenses of sphalerite with quartz.

The various skarn units can carry up to 25% (by weight) fluorite; 0.6% tin, 0.5% tungsten, 0.2% beryllium, 27.5% zinc, and 4.5 g/t gold. Tin, beryllium, and iron values increase toward the upper part of the skarn sequence but zinc, copper, and molybdenum values are erratic. Secondary zinc-copper-indium-cadmium-gold-sulphide-amphibole alteration of the primary fluorine-tin-beryllium oxide skarn is related to the Bismuth Creek Fault. When the primary wrigglite skarn is altered, tin is largely lost from that part of the skarn.

The hydrothermal fluids that extensively skarned the Gordon Limestone resulted in the formation of a number of known significant mineral deposits, including:

- The Shepherd & Murphy vein swarm, consisting of a set of east-west near vertical veins containing tin-tungsten-bismuth-molybdenum mineralisation.
- The fluorite-magnetite “wrigglite deposit” in the basal section of the Gordon Limestone west of the Bismuth Creek Fault.
- The zinc-bismuth-gold mineralisation in the Hugo Skarn east of the Bismuth Creek Fault where the Hugo Thrust, which strikes E-W and dips north at 30°, has removed the top of the skarn and thrust older sediments over the top of the skarn.
- The auriferous pyrrhotite skarn west of the Shepherd & Murphy Mine.

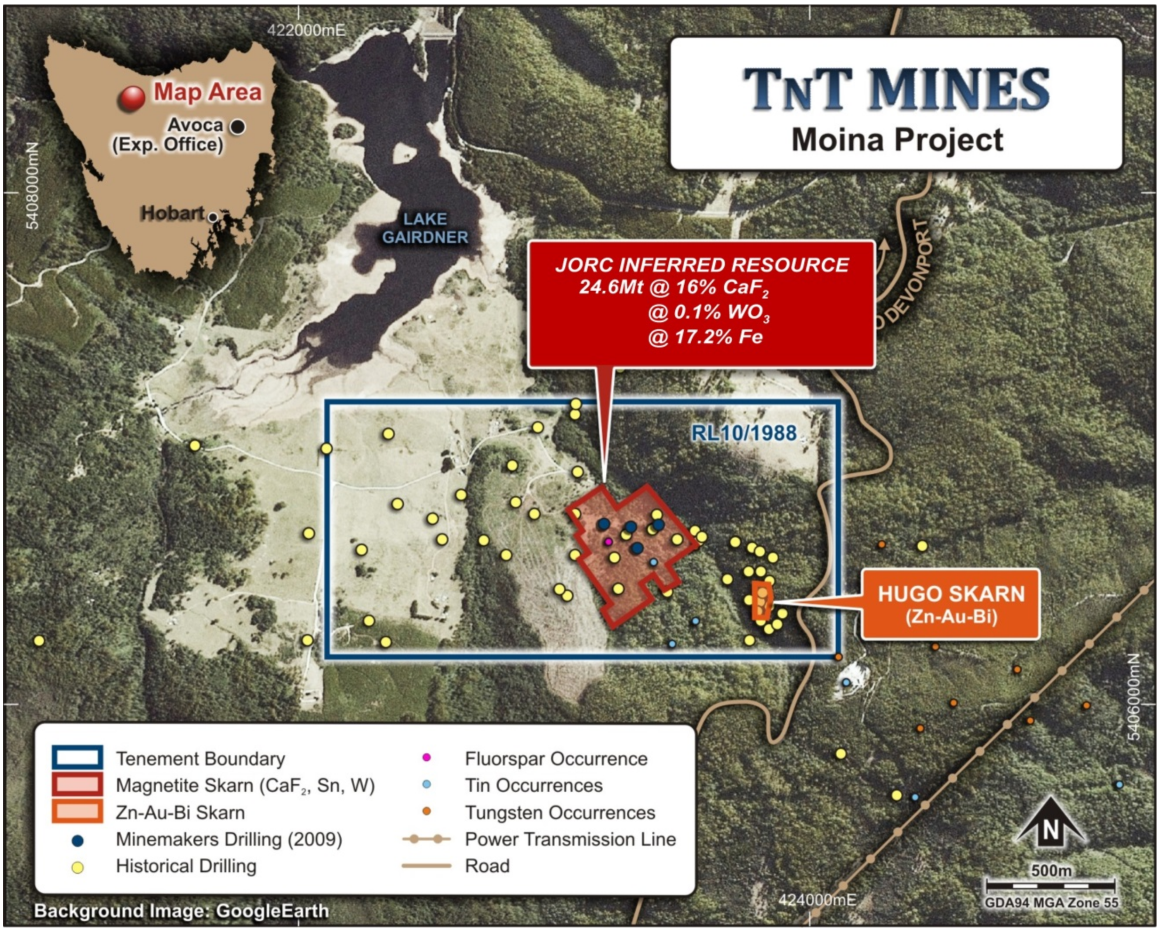

Figure 2: Tenement geology

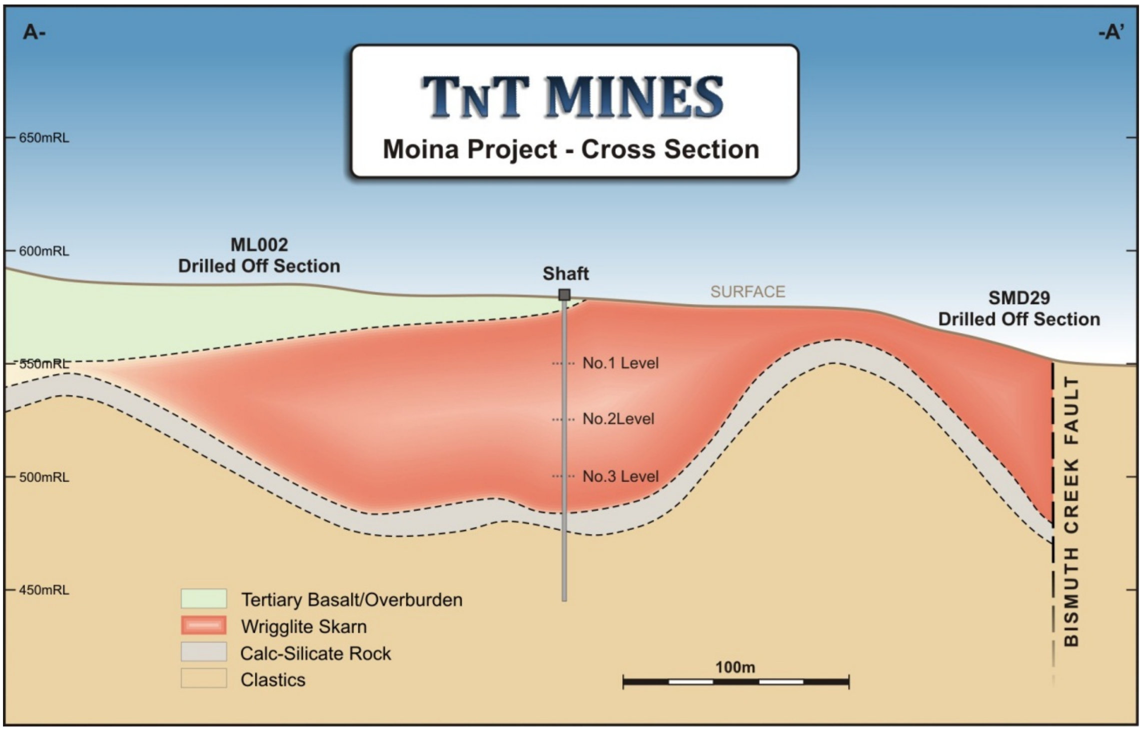

Figure 3: Section through Moina deposit

1.3 Exploration and Development Rationale

The Moina fluorspar deposit has been known about for a long time but has remained undeveloped due to the ready availability of cheap, high quality fluorspar. This situation has changed over the past five years or so and the supply of high quality fluorspar has decreased and the price risen significantly.

The Moina fluorspar deposit had a pre-JORC resource estimate of 26.5Mt @ 18% fluorspar, 0.1% tungsten and 0.1% tin, which has been updated to JORC 2004 standard by TNT Mines. The deposit also contains significant magnetite. Metallurgical test work carried out in the 1970s and 1980s was unable to define a clear pathway to generate a saleable product, although this predominantly concentrated upon fluorspar recovery only. TNT Mines believes that advances in processing technologies since then combined with dwindling fluorspar supply and consequent higher prices mean that the potential to develop an economically viable operation at the Moina deposit is now as high as it has ever been. TNT Mines recognises that, irrespective of future fluorspar price, the most likely development route will be via significant co-product recovery, particularly tungsten, bismuth and magnetite.

TNT Mines had determined that, in the currently economically challenging investment environment, and in the light of all results to hand, it should seek involvement of a partner which not only had the technical and financial capacity to take the project into production, but which will also decide to take all or most of them cover products. As described in section XXX, this appears to have been achieved, with the involvement of the European Union. However, advancement of this initiative will now be in the hands of Geotech, and it is expected that they will provide a planned and staged evaluation programme.

2.0 REVIEW OF PREVIOUS WORK

2.1 Previous exploration prior to TNT Mines Limited (formerly Minemakers TTT Pty Ltd)

Historical exploration before TNT Mines is well summarized in the 2011 annual report.

2.2 Exploration by TNT Mines Limited

TNT Mines has completed the following work:

<u>2006-2011</u>

- Review of literature
- Fatal flaw review to determine potential project viability
- Metallurgical test work carried out in Austria by tungsten producer Wolfram Bergbau Material was collected on-site (tailings dump) or from diamond drill core held at the MRT core store in Mornington
- Infill assaying using diamond drill core obtained from the MRT core store
- Davis Tube Recovery work on selected intervals of wrigglite from diamond drill core held at the MRT core store in Mornington
- Drilling of four PQ/HQ-sized cored holes in 2009 to recover mineralisation for further metallurgy
- Analysis of 274 half PQ-sized core samples from 2009 drilling for F, Al, Bi, Ca, Cd, Cu, Fe, Mg, Mo, Pb, S, Sb, Si, Sn, W and Zn.

- QEMSCAN work. A compositing of selected core samples from the 2009 drilling was sent to SGS Lakefield in Ontario, Canada for QEMSCAM analysis. The purpose of this work was to investigate the mineral distributions, deportment of F and Sn, locking/association and grain size characteristics of the fluorspar, cassiterite, Bi-minerals, scheelite, sulphides and Fe-O oxides, and determine mineralogical parameters such as mineral release and grade recovery. The work has demonstrated that to obtain reasonable recoveries the ore would need to be ground to -20 µ. At this size, fluorspar would need to be agglomerated to produce a saleable product. The analytical work has also demonstrated that only 48% of the tin is present in cassiterite, the remainder contained in garnet or Sn-Fe oxides. Although the modelling suggested that recoveries, other than tin, would be relatively high at a fine grind it should be recognized that the QEMSCAN system is a 2-D modelling approach and with such fine-grained mineralisation the results should not be seen as conclusive. The modelled maximum recoveries achievable at a 20µ regrind are F – 76.4%, WO3 – 92%, Sn – 36% and Bi – 90%.
- A mining heritage survey was conducted over the area, at the request of MRT, by Gary Vines from Biosis Research. The conclusions drawn from the survey was that the site had significance at state level as an example of a distinctive and rare mining site reflecting a range of mineral extraction and processing technologies. In particular it represents an early example of tungsten production. Although the site is significant the report indicated that there was no impediment to further exploration drilling including track clearing and site preparation provided recommended precautions were observed.

2012

- 2008 DAVIS TUBE RECOVERY WORK REVIEW: A review of Davis Tube Recovery work undertaken in 2008 was carried out by Geos Mining. The review indicated that the DTR work had been carried out under sub-optimal test conditions and only a single stage grind had been used. There was no record of the parameters set for the DTR testing and no analysis of composite head grade. Recoveries of 25% magnetite with grades ranging from an acceptable 62% in the minus 20 micron fraction to 50% in the 20-53 micron fraction were achieved. Geos Mining used the QEMSCAN modelling to show that, in theory, a much better recovery and grade would be achieved from fine grinding with recoveries of up to 55-65% at acceptable Fe grades. They recommended another round of DRT testing under stringently controlled test conditions using the 2009 core.

- NEW METALLURGICAL TEST WORK: A new metallurgical test work program was commissioned in May. This study was carried out at ALS-Ammtec Burnie, and ALS-Ammtec Perth under the management of John Glen. Metallurgical advice and interpretation came from Brian Povey of Mintrex and Ron Goodman. This is the first integrated study to look at producing magnetite, fluorspar, and scheelite concentrates.

  The purpose of this first phase work is to determine the recoverability of fluorspar, magnetite and scheelite. Although QEMSCAN work indicated that very good recoveries could be achieved it is generally accepted that QEMSCAN modelling overestimates the likely actual recoveries of mineral constituents by up to 20%. Oxide flotation and gravity work was carried out at Burnie and detailed DTR work was carried out in Perth. Some magnetite separation work has also been carried out at Burnie.

  A main composite was made up from core retained from the 2009 drill program and stored in Launceston. Table 1 shows the intervals selected for the composite. Analyses of the metre intervals from which the composites were selected are presented in Appendix 2. This composite was used for fluorspar, scheelite, and magnetite work at both Burnie and Perth laboratories. A second batch of six samples was sent to Ammtec in Perth for variability analysis but unfortunately the samples were composited and run as a single DTR test rather than as six individual tests.

Hole_ID	From	To		Hole_ID	From	To
MODD003	33.20	33.60		MODD001	66.50	66.75
MODD003	36.15	36.45		MODD001	65.85	66.15
MODD003	38.40	38.70		MODD001	62.85	63.10
MODD003	40.50	40.70		MODD001	48.05	48.25
MODD003	42.80	43.00		MODD001	46.20	46.50
MODD003	45.05	45.4		MODD001	41.95	42.25
MODD003	47.40	47.65		MODD001	40.50	40.80
MODD003	49.15	49.50		MODD001	37.15	37.45
MODD003	51.80	52.10		MODD001	34.40	34.75
MODD003	54.45	54.80		MODD001	31.25	31.50
MODD003	55.40	55.75		MODD001	29.70	29.95
MODD003	56.60	56.80		MODD001	27.55	27.80
MODD003	59.30	59.70		MODD001	25.80	26.20
MODD003	46.00	46.40		MODD004	71.60	71.90
MODD003	60.70	61.00		MODD004	69.30	69.55
MODD003	62.60	63.00		MODD004	67.55	67.75
MODD003	64.40	64.70		MODD004	65.60	65.90
MODD003	66.20	66.65		MODD004	64.10	64.40
MODD003	67.65	67.90		MODD004	62.40	62.70
MODD003	69.35	69.80		MODD004	60.50	60.70
MODD003	71.70	72.00		MODD004	59.35	59.65
MODD003	73.80	74.10		MODD004	56.15	56.40
MODD003	76.25	76.45		MODD004	54.60	54.90
MODD001	69.30	69.70		MODD004	53.20	53.40

Table 1: Main composite core intervals

Hole_ID	From	To
MODD001	30.50	30.75
MODD001	47.40	47.80
MODD003	32.60	32.80
MODD003	33.00	33.25
MODD003	49.60	49.85
MODD003	75.10	75.40
MODD004	64.70	65.00

Table 2: Second composite core intervals (DTR only)

A summary of the results obtained in the 2012 year are outline below:

Scheelite

A significant amount of scheelite is present in veins and gravity separation of the coarser vein scheelite (and vein fluorite) looks good. The finer groundmass scheelite is likely to end up in the fluorspar concentrate. It is likely that a saleable grade of 60-65% WO_3 suitable as APT feedstock will be achieved with an overall recovery of about 45%.

Magnetite
Basically, the main composite produced results that were not particularly encouraging. Six individual samples that were intended to be processed separately to get a feel for variability were composited, unfortunately, because of a lack of communication between Povey and the Ammtec Perth. This composite produced more encouraging results but probably because it has a higher grade to begin with. The main composite gave a 25% yield to a grade of 58% Fe and the smaller composite gave a 31% yield to a grade of 63% Fe.

John Glen believes that it may be possible to upgrade the magnetite concentrate by floating off some of the silicates that are reporting to the magnetite concentrate (because they contain fine inclusions of magnetite). This work would be carried out in the next phase of met work.

Fluorspar
Fluorspar flotation has been carried out on the non-magnetics stream and the Burnie lab has achieved a 95% CaF_2 concentrate with 80% recovery in a six cycle float. They are confident that this recovery will push up towards 90%. However, striking the balance between fluorine reporting to the mags and fluorine reporting to the non-mags is a critical factor in overall CaF_2 recovery and this will not be resolved with the current phase of test work. Floating silicates off form the mag concentrate, as discussed above, may significantly increase the overall CaF_2 recovery.

Cassiterite
It does not look like a saleable tin concentrate will be produced. There is no coarse vein tin and about half of the tin is locked up in garnet (and some in stokesite). Garnet contains up to 1% tin. Whether a garnet concentrate can be separated or not has not been addressed in the current work.

Bismuthinite
No work has been done on the recovery of the small amount of sulphide present.

- JACOBS SCOPING STUDY: Jacobs, a large international engineering company, were engaged to carry out a desktop scoping study on a mining operation at Moina. The study generate CAPEX and OPEX on an 800,000 tonnes per annum open pit mining operation producing magnetite, fluorspar and scheelite concentrates. The Jacobs study assumed a mining rate of 800,000 tonnes per annum with ore production based on the parameters outlined in Table 3.

Mineral	% in feed	Concentrate Grade	Recovery (%)	Dry tonnes per annum
CaF_2	18.2	94% CaF_2	68	86,369
Fe_3O_4	21.9	67% Fe	70	150,100
WO_3	0.12	65% WO_3	58	703

Table 3: Ore Production Targets

Jacobs took input from Shaw Contacting, Mining One and Mancala Pty Ltd. for mining studies and used their own expertise for process plant estimation.

They considered three scenarios: Owner Mined and Concentrated, Contract Mining, and Dry Lease of Mining Equipment. The first scenario was the most expensive and the latter two were similar.

For contract mining the estimated cost were:

CAPEX	**$96.7M**
Mining OPEX	**$12.34/t**
Process plant OPEX	**$16.56/t**
General and Administration	**$6.00/t**

The Jacobs study was the first step in the proposed development of a mine at Moina. The assumptions made, particularly in relation to feed grade and recovery will be modified by the metallurgical test work being carried out at present and this will likely have some effect on the capital cost of plant construction. The mining costs will not be significantly affected by changes in these assumptions as long as the mining rate is unchanged.

2013

MINERAL RESOURCE ESTIMATE: A maiden JORC Inferred Resource estimate was made by Mick McKeown of Mining One. Historical drill data, including Minemakers 2009 diamond drilling, was used for the estimate. The resource is 24.6 Mt at 16%CaF2, 0.1%WO3, 0,1%Sn and 17%Fe.

METALLURGICAL TEST WORK: A metallurgical test work report was produced by ALS Ammtec summarising the magnetic separation, gravity and flotation work carried out at the Burnie laboratory, a report on the magnetite separation work carried out at ALS Ammtec Perth, and a report summarising the combined test work.

2014

Site Inspections
Site inspections were undertaken with consulting geologists Russell Fulton and John Nethery.

Review of Data
Consulting geologists Mr Russell Fulton, Mr John Nethery and Mr Vincent Algar undertook preliminary reviews of historical data, metallurgical reports, scoping study report and the conceptual report.

Market research
Further preliminary market research was undertaken by Mr Andrew Drummond on behalf of TNT.

3.0 WORK COMPLETED DURING THE REPORTING PERIOD

As TNT Mines and/or Niuminco required funding to advance Moina**,** TNT Mines director, Andrew Drummond directed a prolonged effort to secure that funding or a technically and commercially appropriate new partner for the project.

It proved difficult to do so against a background of low investor enthusiasm for mineral explorers in general, and for the principal commodities of fluorspar and tungsten contained in Moina in particular. This can be exemplified by efforts during July and August 2015 to attract North American private equity funds through Resource Capital Funds ("RCF"). After a lengthy technical review, particularly by its metallurgical staff, RCF declined to participate in the project advising as follows:

"As promised, albeit delayed, here are the high level reasons for which we are unable to proceed with a detailed due diligence process. As we viewed metallurgy as a prime risk area we focused our analysis on testwork completed to date, and found the following two points to be red flags to an RCF investment.

- Still not proven that a marketable magnetite concentrate can be produced. Contamination in magnetite also needs to be addressed. Grind size required for the magnetite may be less than 20 µ in order to achieve marketable grade.
- Separation of the tungstate and fluorspar from the magnetite is difficult and requires fine grind to achieve good separation. Fine grinding for magnetite recovery however is detrimental to the recovery of tungstate and fluorspar due to increased slimes losses. A complex stage to flow sheet will be required. Recovery of tungstate and fluorspar is possible but overall recoveries are likely to be low. Tin is very fine and does not seem to be recoverable.

As discussed, we are happy to review any updated testwork to see if there is a basis for further detailed review."

However, TNT is pleased to report that engagement with the European Union from August 2015 has met with some recent success, and metallurgical testwork is about to be resumed.

In 2010 the EU European Commission Enterprise and Industry released a report entitled "Critical Raw Materials for the EU", and which can be downloaded from the Web. This report identified some 41 critical minerals with both tungsten and fluorspar being highly rated because of a combination of their economic importance and also elevated supply at risk.

A subsequent development has been the setting up of the Flexible and Mobile Economic Processing Technologies Project, or FAME. Its aim is neatly exemplified by its first newsletter, which is included with this Annual Report in the Appendix. TNT Mines made contact with the project coordinator of FAME at Wardell Armstrong International in the UK in order to determine whether FAME investment would be possible beyond the boundaries of the EU countries themselves, with the overall aims of seeking EU involvement in potential development of Moina and in providing a market for the output.

Upon receiving news that EU involvement in Tasmania for the right commodities and right size project could be envisaged under FAME, or technical data was provided to that coordinator and it was studied during August and September 2015. After a positive review of that data, a four-month research project has been proposed which will be funded by FAME. It will be carried out at the laboratories of Wardell Armstrong by a post-doctoral research fellow from the University of Lorraine. The aim will be to build upon the most recent TNT Mines metallurgical testwork in order to determine a metallurgical flow sheet for the full assessment of Moina, in particular with respect to flotation recovery of fluorspar, tungsten and sulphides, especially that of bismuth. Test material will be dispatched to the UK in the next few weeks and TNT Mines has been advised that testwork will begin before the end of this calendar year. The material has been stored in Tasmania since TNT Mines' large diameter drilling program was undertaken in about 2010 to provide appropriate amounts of material for a range of future tests. Yet to be confirmed by F AME, but understood to be likely, is involvement of a previous senior executive of U.K.'s only fluorspar producer, Glebe Mines, and who is now an industrial advisory panel member of FAME: this is aimed to lead to significant clout for the fluorspar aspect in the investment making process.

Should this next round of research proves successful, the implicit understanding is that the owners of Moina and FAME will enter into some sort of appropriate commercial arrangement to cover feasibility and, if warranted, development of Moina, and life of mine offtake of products. Until that deal has been settled, the involvement of FAME at Moina will remain confidential.

TNT Mines is highly encouraged by this recent corporate advance which has the potential to lead to the eventual development of Moina and has recommended to Geotech that it proceed with this initiative.

4.0 CONCLUSIONS AND FUTURE WORK

- Despite its keenness for the project, and being able to secure initial entry of the European Union, into the next stage of its assessment, TNT mines decided to withdraw from its option agreement with Geotech.
- TNT Mines will make available to Geotech all pertinent material, including the dril core stored in Tasmania.

It is understood that Geotech will proceed with the involvement with the FAME Project, and will shortly be despatching Moina skarn material to the UK for those investigations to begin before the end of calendar 2015.

5.0 ENVIRONMENT

No other ground-disturbing exploration work was carried out at Moina during the reporting period. No rehabilitation of previous disturbance relating to mining or mineral exploration was undertaken.

6.0 REFERENCES

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APPENDIX:- FAME NEWSLETTER

Newsletter

Issue 1/15, 1 July 2015

In this Edition:

Sampling in Portugal * Fact Finding in Finland * Visit to Glebe Mine, UK

Thoughts from the Editors

Dr. M. Martin & Dr. S. Reichel demonstrate a novel bioreactor for biological leaching of ores

Mr. Catalin Perianu (EC, EIP h2020) at the opening event in Meissen

FAME – a challenging, ambitious, multi-partner research and innovation project to unlock EU mineral wealth

Welcome to the very first edition of our FAME newsletter which we shall produce twice yearly throughout the life of the project.

FAME stands for Flexible And Mobile Economic Processing Technologies and is funded by the EU research framework programme HORIZON 2020 which aims to contribute to GDP growth within the EU28 countries.

Today, the EU has become highly dependent on imported raw materials to supply its industrial base. In the past, however, many of these materials were resourced from indigenous supplies - and indeed Europe once led the world in innovative mining and mineral processing technologies. FAME sets out not only to promote the use of European resources and unlock mineral wealth but also to help maintain key processing skills within the EU28 members.

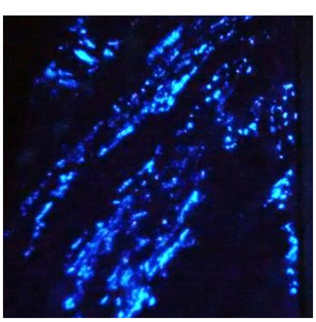
FAME also focuses on environmental and economic challenges – with research into the improved, flexible, and mobile technologies to make mining more environmental friendly but also to help develop the many small-scale or complex ore types that are frequently found in Europe.

FAME specifically addresses the challenges to sustainable processing of three different ore types – skarns, greisens and pegmatites – and will use six reference sites to fully characterise these deposits. We hope that you'll enjoy sharing the results of our project over the coming years. If you have any questions or comments about FAME, please don't hesitate to contact the Wardell Armstrong International Project Coordinator via our website www.fame-project.eu.

Dr. Chris Broadbent
(Wardell Armstrong International)
FAME Project Coordinator

Dr. Wolfgang Reimer,
(GKZ, Freiberg)
FAME Project Manager

FAME website goes live



Embrace the mystical shining blue of fluorescent scheelite. Take a fascinating journey through the realities of processing complex and low grade ores at EU level. Read more about how the expertise and research and development work of seventeen* partners from eight nations will make flexible, mobile processing a reality.

The FAME website introduces the background to our project, reveals more about the core ideas that will benefit the supply of European raw material, and reports on the progress of different projects. The FAME wesbite (www.fame-project.eu) provides background information on FAME, discusses the core ideas and explains how these can contribute to the supply of European raw materials and will report on progress.

*We look forward to AITEMIN Technology Centre being admitted as the seventeenth partner by the EU in the near future.

Image (property of GKZ): flourescent scheelite from Tabuaco Tungsten Deposit, Portugal forms part of the FAME Logo

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 641650.

FAME Kicks off in Meissen

FAME consortium members and guests in front of the historical venue for the kick-off meeting in Meissen, Germany - attended by Catalin Perianu from the European Commission. This was the formal start of the project with the FAME consortium members meeting together for the first time.

The sixteen partners that formed the FAME Consortium at the beginning of the Project:

Events and Publications

FAME at the Dublin Euromines Conference
"Pushing Boundaries Beyond - Circular by 2020?" Held on 9th March 2015 – representing FAME. Attendance of Dr. Chris Broadbent (FAME Project Coordinator) from Wardell Armstrong International, Dr. Wolfgang Reimer (FAME Project Manager) and Maria Nicklas from Geokompetenzzentrum Freiberg e.V who introduced the project to the public for the first time. See more:
http://www.euromines.org/news/newsletters/1-2015/pushing-boundaries-beyond-circular-2020

Applied Mineralogy Group of the Mineralogical Society – Critical Materials Workshop — 17 June 2015
Paper delivered by Dr Robin Armstrong –" FAME: Flexible and Mobile Economic Processing Technologies" see:
http://www.minersoc.org/critical-materials.html for details.

See more: http://www.indmin.com/Article/3432491/FAME-initiative-looks-to-create-European-mining-and-processing-renaissance.html
http://www.mineralandwasteplanning.co.uk/index.cfm?event=page.search&sSearchPhrase=Wardell%20armstrong
http://www.mining-technology.com/features/featuremasterminding-a-mining-revival-can-a-new-eu-initiative-bolster-mining-in-europe-4605499/

FAME Work Package 2 – Mineral Characterisation

Examining Drill Core in the Czech Republic

Obtaining mineralogical samples from Gonçalo, Portugal

Sampling in the German and Czech Erzgebirge

Three of the six reference sites lie within the German and Czech Erzgebirge, an old European mining district that faces a challenging "re-opening" of old mines and exploration of thus far unexploited mineral resources, especially of Critical Raw Materials. Most of these mineral resources are found in skarn and greisen ores with complex mineralogical assemblages. A thorough understanding of the mineralogy of these ores is required to guide new processing approaches so that these deposits can become exploited economically. Consequently, mineralogical samples were obtained from drill cores of the Cinovec greisen Sn-Li deposit in the Czech Republic and further investigations carried out at the Pöhla-Globenstein Sn-W skarn occurrences in the German part of the Erzgebirge. Detailed mineralogical characterisation of these specimens Is currently underway as part of Work Package 2.

Sampling in Portugal

Mining in Portugal dates back to pre-Roman times - and today Portugal is a significant producer of metals including copper. There are many former mines and greenfield sites containing strategic metals such as lithium, tungsten and tin. A number of samples were selected by Fernando Noronha, Machado Leite, Robin Armstrong, Mirko Martin, and Barrie O'Connell for detailed characterisation at the Natural History Museum London and the University of Exeter. The first was a pegmatite deposit in Gonçalo, where lithium is the main metal of economic interest. Two open pits allowed the team to review the mineralisation at depth and take samples. The liberation size of the lithium carrying mica is believed to be some 75 microns - potentially recoverable using process technologies such as froth flotation. The team travelled next to Tabuaço to visit a skarn deposit owned by Colt Resources in the picturesque landscape of the Duoro Portwine yards. The region is noted for tungsten and tin, with artisanal workings in the past. Tungsten in the form of scheelite is the metal of interest - readily identifiable using ultraviolet light. Resource estimates show some 2.7Mt at a grade of approximately 0.57% WO_3. Indeed, fluorescent scheelite forms the basis of the FAME logo!

FAME Visits British Fluorspar Ltd, Derbyshire UK

An example of best practice in a UK National Park environment (Work Package 6 Environmental and Social Impacts)

A group of FAME consortium members visited British Fluorspar Ltd's (BFL) Glebe Mines in Derbyshire, UK on 17 and 18 June. Peter Robinson (FAME Industrial Advisory Board) is Chairman of BFL and he kindly arranged for FAME to view all aspects of BFL's operations, including: Open Pit and Underground workings, Mineral Processing Facilities, Tailings Disposal Areas and Restored Workings.

BFL became owners of Glebe Mines in 2012 and successfully brought the operations back to life. BFL operates in the middle of the Peak District National Park, one of the most visited National Parks in the UK. To do so it has to deploy International Best Practice, both in terms of the mining and processing but also, crucially, in its environmental performance. The environmental management of the site, especially the restoration of former workings, has to be to the highest standards. It is testimony to how good these are that those members of the group staying at the Barrell Inn (the highest Inn in Derbyshire), overlooking Cavendish Mill (Mineral Processing) and Tailings Management Facilities on the opposite side of the valley (see main photo opposite) could barely tell they were there!

Professor Jan Rosenkranz, Work Package 6 Leader (Environmental and Social Impacts of FAME), was particularly enthusiastic about the environmental management and considered BFL as an exemplar of Best Practice that will need to be followed if FAME is to achieve its goal of rejuvinating the European Mining Industry. The visit was invaluable to FAME and especially WP6 for which the consortium expresses thanks to the management and staff of BFL.

The photos show views of the BFL operation in its environmentally challenging setting.

Editorial

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Homepage: www.fame-project.eu
Image Rights: GKZ, WAI
Layout and Setting: GKZ, WAI
Publication date: July 2015

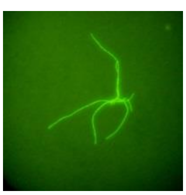
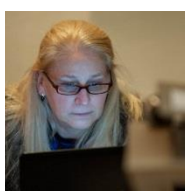
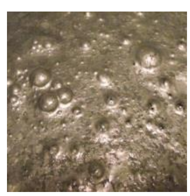
FAME Work Package 7 – Dissemination and Exploitation

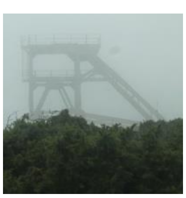
Going north: Fact finding mission in Finland – Preparation for the first FAME Focus Group Meeting

In late May 2015, a group of FAMErs visited the operations of FAME partner Keliber Lithium resources www.keliber.fi in the Kaustinen and Ullaya municipalities of the Ostrobosnia region of Finland. As a late stage exploration company developing a number of lithium pegmatite ore bodies, Keliber is exactly the sort of company the EU believes FAME will be able to help by making mining and processing a commercial reality sooner than would otherwise be possible.

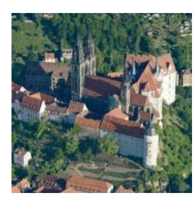
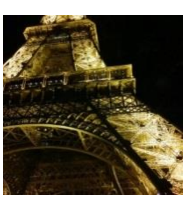
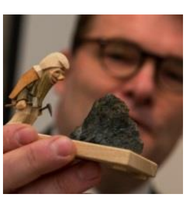
Representatives of GKZ Freiberg, Lulea University and Wardell Armstrong International met with Keliber to review the deposit mineralogy and geology and planned exploitation in terms of best practise of mining a number of remote, separate ore bodies in an ecologically sensitive environment. Keliber has been chosen as the location for FAME´s first Focus Group Meeting to be held later this year. This will form part of the promotion and dissemination activities of Work Package 7 - mining in service of renewable energies. There is more to discover in the region: Cutting-edge research into battery technology is carried out at the nearby University and Freeport Cobalt in Kokkola. Freeport Cobalt offer a comprehensive range of battery products. This cluster, allied to a world class lithium producer (which Keliber would become once their deposits are exploited) makes an exciting grouping and offers an opportunity to interact with the research and innovation projects. More than this, the Focus Group Meeting provides a bridge to the local public introducing the aims and objectives of FAME and the promotion of environmental friendly mining, helping to secure Europe´s raw material supply.

FAME - The first six months in pictures







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