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TANTALUM-NIOBIUM INTERNATIONAL STUDY CENTER

PRESIDENT'S LETTER

We are coming up to our Fiftieth General Assembly, which will take place in Tallinn, Estonia on Monday October 19th. As previously mentioned, the T.I.C. meeting and programme will extend from Sunday October 18th to Wednesday October 21st 2009.

This past April, the T.I.C. Executive Committee met in Brussels to discuss, among other subjects, the plans for the event. These plans are well underway and it promises to be a very informative meeting. Therefore, I would like to encourage all of you to take the opportunity of coming to Tallinn in October. If you need any information on how to proceed with your bookings do not hesitate to contact our Secretary General Emma Wickens. Invitations will be sent to all members by mid-July.

We wish to thank Silmet for its valuable help and support with the organization of our forthcoming Fiftieth General Assembly in Estonia.

At this time, I would like to mention that the Working Group addressing the tantalum and niobium mining aspects is making good progress and more details of its work shall soon be available to our members.

We know that our business continues to be dramatically impacted by the economic crisis. Maybe this is the right time to find new ideas and solutions for the future - talking to our partners and business contacts alike may bring those. Thus, I look forward to seeing you all in Tallinn in October.

José Isildo de Vargas
President

CONTENTS

FIFTIETH GENERAL ASSEMBLY AND TECHNICAL MEETING

(c) Kevin Bongart@flickr/CC

Tallinn Town Hall

The Fiftieth General Assembly meeting of the Tantalum-Niobium International Study Center will be held in Tallinn, Estonia, from October 18th to 21st 2009. The technical sessions and social events will take place at the Swissôtel, where a block booking of bedrooms is being held to accommodate the participants.

On Sunday October 18th, the registration desk will be open from 10a.m. to 1p.m. and 2p.m. to 5p.m. All participants are invited to a Welcome Reception from 6p.m. to 8p.m.

The formal General Assembly of the association will be held on Monday October 19th and will be followed by technical presentations for the rest of the morning, then lunch.

Companies wishing to apply for membership at this General Assembly are reminded that their completed application forms should be returned to the T.I.C. by August 19th 2009. For any further information on becoming a member, please contact the Secretary General on info@tanb.org.

On Monday evening, all participants are invited to a Gala Dinner, to be held at the hotel.

A second technical session will be held on the morning of Tuesday October 20th, followed by lunch.

On Wednesday October 21st, there will be a plant tour to the facility of AS Silmet in Sillamäe. After the plant tour, delegates will be the honored guests of Silmet to a medieval lunch in Rakvere castle.

Sightseeing tours for those accompanying the delegates are also being arranged. On Monday, participants will discover Toompea, the upper part of Tallinn's Old Town, then the outskirts of the city, including the splendid Kadriorg Palace and Park. Tuesday, they will explore a different part of the medieval Old Town, be able to practice their skills at making chocolate truffles, visit a handicraft market and then take lunch in a traditional Estonian restaurant. On Wednesday, the participants will be shown the beautiful countryside of Lahemaa, the oldest and largest national park in Estonia. They will visit the Sagadi manor which houses the forestry museum. The bus will then drive them to Rakvere castle, to join the delegates who took the plant tour for a medieval lunch.

An invitation will be sent to the nominated delegate of each member company around mid-July. Others who would like to attend should contact the T.I.C. as soon as possible.

Technical programme
The following papers are expected (not in running order):

Tantalum – a rare metal in abundance?
by Richard Burt, GraviTa Inc.

Flux pulling method of growing stoichiometric $LiTaO_3$ crystals
by Li Bin and Zhang Xuefeng, Ningxia Orient Tantalum Industry Co., Ltd.

Accelerating science - the Large Hadron Collider at CERN
by James Gillies, CERN

Ultra76 - a new tantalum alloy for the chemical process industry
by Paul Aimone, HCST Inc.

Statistics and transport
by Ulric Schwela, T.I.C.

Environmental compliance and waste minimization in tantalum scrap metal recycling
by Craig Hafner, Hi-Temp Speciality Metals

Further development of the high temperature processing concept for niobium-microalloyed API pipe grades
by Volker Flaxa, Salzgitter Mannesmann Forschung GmbH

Mibra mine: a long-term reliable source of tantalum from Brazil
by Ivan Alves, Cia. Industrial Fluminense

Cambridge FFC process, environmental, commercial and scale-up considerations
by Ian Margerison, Ian Mellor and Lee Shaw, Metalysis

The tantalum supply chain – discovery and exploration to production and how to maintain security of supply
by David Hodge, Commerce Resources Corp.

Application of niobium based superconductors in Magnetic Resonance Imaging systems
by Jonathon Noys and Adrian Thomas, Siemens Magnet Technology

Two further papers are expected – details are being finalised.

NIOBIUM – THE CAPACITY EXPANSION PROJECT AT CBMM

This article was prepared from the paper by Clóvis Antonio de Faria Sousa of CBMM, presented at the meeting of the T.I.C. held in Shanghai, China, in October 2008.

HISTORY

The element niobium was discovered in 1801. From that time to the beginning of the 1960s the element remained more a scientific curiosity than a suitable solution for the market.

At the end of the 1950s the Araxá pyrochlore mine was discovered and in the beginning of the 1960s the method for processing the mineral was established.

After the material became available, a long-term program to develop applications for the new and promising element was started. The main objective of this program was to promote the use of niobium, working together with technical institutions and final users, developing and disseminating the benefits of its uses.

Niobium availability and the development of its applications are strongly related to CBMM's history. At the time the applications became reality CBMM´s production capacity was adjusted to the demand.

CBMM is highly committed to guaranteeing niobium availability with a high quality standard.

Over the last 40 years, the processes for niobium manufacturing have been updated many times. Investments in capacity increase were carried out when called for by market demand.

In the last five years niobium consumption has increased as a consequence of demand for steels with higher strength and higher toughness. Niobium is a unique technological solution for leaner and lighter structures, pipes and automotive bodies and parts.

The reasons for this conclusion are discussed in this paper.

FERRO-NIOBIUM MARKET GROWTH

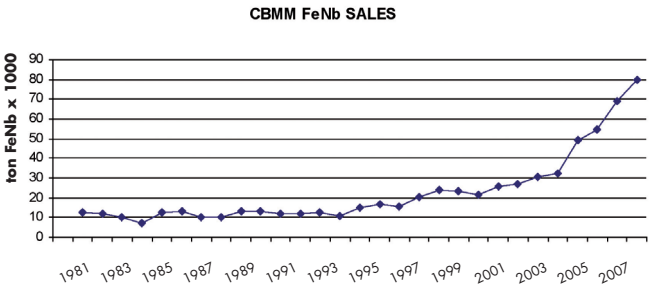
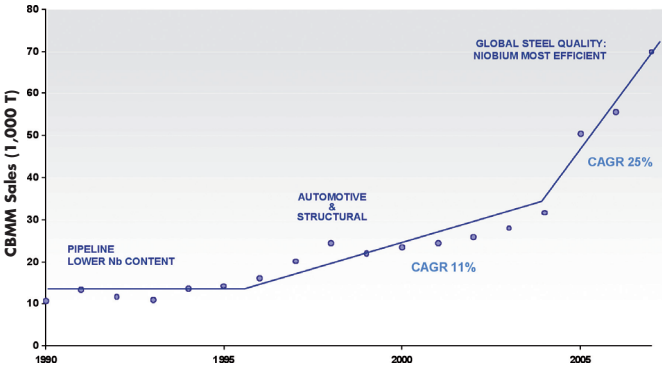


Figure 1 shows CBMM´s ferro-niobium sales since the 1980s.

As CBMM is the major supplier, the trend of the total niobium market is the same as CBMM´s sales in the considered period. It is possible to conclude from this picture that the market was very stable during the 1980s. It started to increase very slowly in the middle 1990s until the middle of this decade, experimenting a very strong increase after 2005.

Figure 2 shows market growth and main reasons for this growth, indicating the compound average growth rate (CAGR) since 1990.

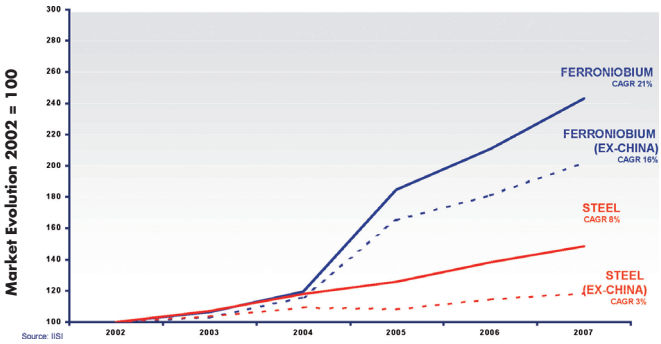
CBMM's FeNb Sales Compound Average Growth Rate



Analyzing figures 1 and 2 it is possible to conclude that the market experimented a very stable period from the beginning of the 1980s until the middle of the 1990s when niobium was used mainly in pipelines containing low amounts of niobium. During the next decade (1995 to 2005), excellent results when using niobium in automotive and structural steels proved the efficiency of niobium in these fields. It is important to note that the CAGR in this period is higher than the growth rate of steel production.

The interpretation for the next period (2005 until today), when the growth is even more significant (25%), is that niobium has been recognized as a very efficient technological solution and, with the product being available plentifully, the market has turned towards niobium-containing applications.

Figure 3 shows the behaviors of the ferro-niobium market and the steel market in two scenarios. One scenario includes China and the other does not. In this graph, we have considered the market in 2002 as 100 for both ferro-niobium and steel.



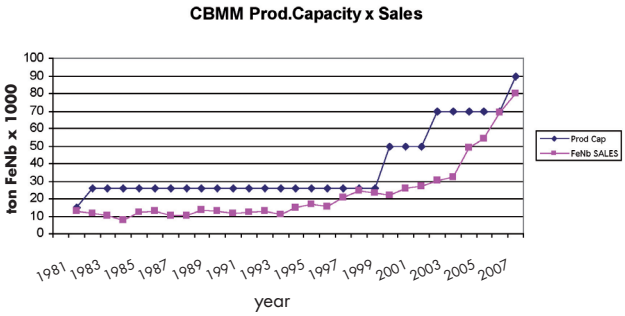
From the picture, it is possible to conclude that, despite the growth of China´s steel production and its strong demand for metallic commodities, the growth of demand for niobium is still higher than that of steel production.

The consumption of ferro-niobium per ton of crude steel produced is increasing considerably.

The market recognizes that niobium is an efficient technological solution for the steel industry.
This is a consequence of decades of promotional efforts to develop applications for niobium in areas where reliable, energy saving, environmentally friendly and resistant materials are a concern. Niobium is cost effective in all applications, giving high added-value to the final products.

EVOLUTION OF CBMM'S FERRO-NIOBIUM PRODUCTION CAPACITY

Figure 4 illustrates the ferro-niobium market and CBMM's production capacity.



From 1965 until 2005, CBMM's strategy was to have a production capacity higher than the world demand in order to guarantee the stability of the niobium market.

From 2005 to 2007, production capacity increase was based on productivity and debottlenecking.

In 2006, CBMM decided to plan the expansion of its capacity in two phases. The first one would achieve 90000 ton/year of ferro-niobium equivalent capacity by the end of 2008 and the second would reach 150000 ton/year of ferro-niobium by

Please note our new office address:
Tantalum-Niobium International Study Center,
Chaussée de Louvain 490,
1380 Lasne,
Belgium.

2013. For the first phase, the concentration plant was identified as a bottleneck.

First phase:

To make the expansion plan easier to understand it is important to know the integrated CBMM production process. Basically it is a sequence of five steps:

- Mining and ore preparation
- Concentration
- Sintering
- Refining
- Ferro-niobium production

Mining and ore preparation capacity has been much higher than the needs since the beginning of the 1980s. During recent years the mine has been operated only during the day shift. As the mining operation is quite simple due to the weathered characteristics of the ore and the open pit operation, the increase of capacity is a function of the fleet of trucks and equipment investments.

Sintering capacity was increased by improving the productivity of the plant. Present capacity is 100000 ton/year of equivalent ferro-niobium.

Improvements in the refining operation guarantee the needs of refined concentrate up to 110000 ton/year of equivalent ferro-niobium. Improvements are still being implemented in the refining plant.

Aluminothermic reduction (ferro-niobium production) was also increased by mechanical modifications and process improvements in the furnaces, achieving 100000 ton/year of equivalent ferro-niobium.

The concentration plant was the bottleneck at the beginning of 2006. The capacity was around 70000 ton/year of ferro-niobium equivalent.

The concentration plant expansion consisted of the installation of a new grinding line, magnetic separation, desliming and flotation columns. This phase of the expansion was implemented in the existing building.

CBMM started the commissioning of this expansion in mid-2008, reaching the full capacity by September 2008.

Second phase:

In the second phase of expansion, it is necessary to increase the capacity of all steps. The strategy and timetable are described herebelow.

- Mining and ore preparation:

To improve the homogeneity of the ore transferred to the concentration plant, CBMM decided to install a blending patio with a stacker and a reclaimer machine, to guarantee the best performance of the concentration process. The design is on course and start up is expected by the end of 2009. The stacker will have a capacity of 3500 ton/h of ore and the reclaimer 2800 ton/h of ore. Reclaimer capacity is higher than 250000 ton/year of ferro-niobium equivalent.

- Concentration plant:

The project for the new concentration plant started in October 2008. The new project will incorporate the development of flotation columns replacing the conventional cells. A green field plant will be built side-by-side to the present one. The commissioning of the new plant is expected for the first quarter of 2011. Capacity of the new plant will be 100000 ton/year of ferro-niobium equivalent.

- Sintering plant:

The project for a new sintering plant is finalized. The construction of the plant has already started. The capacity of the plant will be 50000 ton/year of ferro-niobium equivalent. The commissioning of the plant is planned for the third quarter of 2009.

- Aluminothermy – ferro-niobium production:

The new plant for ferro-niobium production is in the final stage of construction. A new furnace of 5 MVA and a new system for handling and blending of raw materials are being installed. The start-up of this new facility is planned for November 2009. Capacity will be 60000 ton/year of ferro-niobium.

- Refining:

Improvements are still being implemented to the refining plant. The expectation is to achieve 120000 ton/year of ferro-niobium equivalent. Expansion of this step is planned to be effective by 2013.

- Crushing:

The present capacity of the crushing plant is 110000 ton/year of ferro-niobium. Expansion of capacity is planned for 2011 with the construction of a new plant.

PRODUCTION CAPACITY FOR OTHER NIOBIUM PRODUCTS

CBMM's present production capacity of niobium oxide and derived products such as ferro-niobium high purity, nickel-niobium, optical grade niobium oxide, niobium hydroxide, and pure niobium metal is 5000 ton/year of niobium pentoxide, which is adequate for the market needs at the moment.

Nonetheless, expansion of the niobium oxide plant is being planned, to achieve 10000 ton/year in 2013. A new plant will be constructed. The environmental licenses are already granted.

CONCLUSION

Since the beginning of its operation CBMM´s policy has been to keep the capacity close to the market demand to guarantee the supply of niobium to the market.

During the 1980s, when the market was stable, CBMM kept at least 15% overcapacity.

In the 1990s, demand increased and new investments were made to bring the capacity back above the demand.

Considering the present growth rate of the niobium market that is mainly due to infrastructure needs across the world, environmental awareness and energy savings CBMM decided to implement investments in capacity expansion, as described, to guarantee plentiful availability of niobium to the market in the future.

General view of CBMM plant in Araxá

REACH – WHAT'S NEXT?

by Ulric Schwela, Technical Promotion Officer, T.I.C.

As everybody must know by now, REACH stands for Registration, Evaluation and Authorisation of CHemicals. The terms 'chemicals' and 'substances' include metals, metal compounds and alloys. This is a European Union (EU) regulation which entered into force on June 1st 2007 to streamline and partly replace the existing regulatory framework for chemicals in the EU. REACH is managed by the European CHemicals Agency (ECHA) and enforced by the Competent Authority in each Member State.

Pre-Registration
On December 1st 2008 the deadline passed for the pre-registration obligation for chemicals currently on the EU market. Companies that did not meet this deadline can not continue producing or importing the substances until they have submitted a full registration dossier. The purpose of the pre-registration was to extend the full registration deadlines, which depend on the tonnage band and hazardous properties of the substance. If a company starts manufacturing or importing a substance after December 1st 2008 it may still benefit from late pre-registration. Late pre-registration may also be possible if a new 'Only Representative' has been appointed since the deadline (an 'Only Representative' is an EU-based entity that carries out registration for a non-EU supplier).

Of relevance to the tantalum and niobium industry, there is an exemption for minerals, ores and ore concentrates, provided they have not been chemically modified. **Synthetic minerals are not covered by this exemption.**

Substance Information Exchange Forum (SIEF)
One intent of pre-registration is to gather those companies which use the same substance in order that they may exchange product information for the purpose of full registration. To achieve this, the companies should first of all agree whether the substances they use are indeed the same and, if so, set up a SIEF for each substance. A Lead Registrant should then be appointed, which provides a joint submission for that substance to the ECHA. The ECHA will not accept multiple registrations for the same substance.

All registrants are therefore now legally obliged to join SIEFs for the substances of interest to them. The SIEFs are established to facilitate the sharing of information, avoid duplication of new studies and agree on classification and labelling as necessary.

Registrants should become active by communicating with other SIEF members, keeping a record of all SIEF activities from the beginning so that this activity can be demonstrated if necessary.

The substances which have been pre-registered can be consulted on the ECHA website at:
http://apps.echa.europa.eu/preregistered/pre-registered-sub.aspx

Alternatively the full list can be downloaded in its entirety or in four smaller files (recommended):
http://apps.echa.europa.eu/preregistered/prsDownload.aspx

The Lead Registrant nominated by the SIEF members should submit the joint registration, containing the main part of the technical dossier including the classification and labelling of the substance, study summaries and any proposals for further testing.

The Lead Registrant acts as a contact point for the registrants of other substances who want to 'read across' to the substance data for their own substance. The Lead Registrants should inform ECHA of their nomination as soon as possible in order to benefit from Lead Registrant support.

One issue that will need to be resolved is the right of SIEF members to obtain product data necessary to comply with the registration, subject to a fee payable to those SIEF members contributing the product data.

NIOBIUM JEWELLERY AT MJSA EXPO 2009

by Ulric Schwela, Technical Promotion Officer, T.I.C.

Over the three days from March 8th to 10th this year the Manufacturing Jewelers & Suppliers of America (MJSA) held its annual Expo in New York. Included among the numerous types of jewellery was the category known as Reactive Metals Challenge, in which no less than three niobium metal entries were provided by the designer Joan Dulla.

All three entries exploit the property of niobium where the surface colour can be controlled by the process of anodising. While the niobium metal is immersed in a hot phosphoric acid bath, when a current is applied the colour of the surface oxide layer changes to a hue specific to the voltage of that current, thus enabling a whole rainbow of colours to be created for a single metal. Tantalum also exhibits very similar properties to these and its use in jewellery remains an unexploited opportunity.

Both niobium and tantalum metals are suited in the role of jewellery thanks to their hypoallergenic nature; in fact they are even used in medical body implants.

The first Reactive Metals Challenge entry was titled 'Jester Necklace', a hand crocheted niobium wire design with

3 mm Swarovski crystals, for a material value of US$600.

The second entry was 'Niobium Flower Collar', also hand crocheted niobium wire with both 3 mm and 8 mm Swarovski crystals, here the bill of materials value was US$350.

Finally the third entry was solely from niobium wire and the material value was US$300.

The niobium used is 99.98% pure and was supplied by Reactive Metals in Arizona, which also sponsored the Reactive Metals Challenge category.

Previous MJSA Expos have also contained entries for jewellery made from niobium and in 2005 Joan Dulla's 'Double Rainbow' entry won the category. The next Expo is scheduled to take place in New York from March 14th to 16th 2010.

ROSKILL: ' THE ECONOMICS OF NIOBIUM '

Roskill Information Services has released in February 2009 an update of its publication 'The Economics of Niobium' (11th edition). More information on the contents can be viewed on http://www.roskill.com/reports/niobium. The document can be purchased from Roskill in hard copy. It can also be downloaded, in its entirety or chapter by chapter.

PAUMANOK: 'CAPACITORS: WORLD MARKET OUTLOOK: 2009-2014'

Paumanok Publications, Inc. has released this month a study entitled 'Capacitors: World Market Outlook: 2009-2014'. More information can be found at the following address: http://www.paumanokgroup.com/market_reports/ppf/c/1/reports.asp.
The document is available in hard copy or electronic format.

WORKING GROUP ON TANTALUM AND NIOBIUM MINING

As already mentioned in Bulletin 137, the T.I.C. has established a Working Group on Tantalum and Niobium Mining. The Group has held several meetings via teleconference and a face-to-face meeting in Brussels on April 27th. On this occasion, we were pleased to welcome Ms Nimmo from ITRI. As the mining of cassiterite presents some similar challenges to the mining of tantalum and niobium bearing minerals, it was most interesting to exchange views with Ms Nimmo.

The Group is developing a policy of due diligence in the form of transparency and traceability of raw materials along the supply chain. An outline proposal was submitted to the Executive Committee during its meeting on April 28th.

The Group is now finalising the policy, based on the comments received. The final document will be circulated to all member companies in advance of the Fiftieth General Assembly.

MEMBER COMPANY NEWS

Joseph C. Abeles

The Tantalum-Niobium International Study Center has recently heard with great sadness of the passing of Joseph C. Abeles, in November 2008, at the age of 93. The T.I.C. expresses its sympathy to his family and friends.

Joseph Abeles was one of the founders of Kawecki Chemical Company, which became Kawecki Berylco Industries (KBI) and later a division of Cabot Corporation. KBI was one of the first processing companies to join the association when membership was broadened from raw material producers in 1976.

He was elected as fifth President of the T.I.C. by the tenth General Assembly, for the term 1978-1979.

Joe and his late wife Sophia were firm supporters of the T.I.C. and of T.I.C. meetings, rarely, if ever, missing an event.

Gippsland Limited

The following article is an extract of the 'Tantalum Project and Corporate Update' published by Gippsland on June 5th 2009, highlighting the technical updates related to the Abu Dabbab project.

Overview
Through its 50% owned subsidiary Tantalum Egypt JSC, Gippsland Limited owns the 44,5 million tonne Abu Dabbab tantalum-tin-feldspar project in Egypt. Tantalum Egypt also owns the nearby 98 million tonne Nuweibi tantalum deposit.
Gippsland has completed a definitive feasibility study (DFS) for Abu Dabbab based upon a mill feed rate of 2 million tonnes per year producing in excess of 650000 pounds of tantalum pentoxide (Ta_2O_5) which will make it the world's largest tantalum miner. The Abu Dabbab project will also produce approximately 1530 tonnes of tin metal per year.
Within approximately two years of start-up, the project is also scheduled to produce in the order of 1,5 million tonnes per year of ceramic grade feldspar which in turn will result in a tailings stream of less than 0,5 million tonnes per year greatly minimising the environmental impact of the project.
With a resource base in excess of 140 million tonnes, there is a high probability of expanded production.
Tantalum Egypt has executed a 10-year offtake agreement with the German tantalum refiner HC Starck GmbH for the supply of 600000 pounds of tantalum per year in the form of a 20% Ta_2O_5 concentrate. Negotiations are presently in progress to adjust the offtake agreement to reflect the delivery of a high-grade synthetic concentrate (SynCon) having a Ta_2O_5 content of more than 50%.
A detailed Environmental Impact Assessment (EIS) has been completed to World Bank standards and the Company is in project finance negotiation with the German government owned KfW IPEX-Bank GmbH (KfW).

Borefield re-allocation
The Abu Dabbab process plant will consume approximately 6000m^3 of water per day which was to have been sourced from a borefield set back from the Red Sea shoreline by approximately 1km. Recent evaluation of the area proposed cast doubt on this area's ability to produce the required volume of water. The Company is pleased to advise that the Company's joint venture company Tantalum Egypt has now been allocated a prime 8.75ha waterfront property which guarantees access to an unlimited quantity of water. The new borefield, which has a Red Sea waterfrontage of 350m, is ideally suited for the project's desalination plant and long-term seaside accommodation facilities for Tantalum Egypt employees.

Desalination plant – tailings storage facility
It was proposed that the Abu Dabbab project utilise raw seawater for the process plant and a HDPE lined tailings storage facility (TSF) to prevent salt water from entering into the scant Wadi Abu Dabbab underground water system.
Recent re-evaluation of the capital and operational costs for the TSF and the desalination plant determined that it will now be more economic to use desalinated process water and an unlined TSF. The use of desalinated water will also largely eliminate environmental risk of groundwater contamination.
The Company's engineers are presently updating the EIS and the DFS to reflect the relatively minor changes associated with the use of an unlined TSF and desalinated water.

Noventa Limited

Noventa announced in April that it had 'commenced negotiations with all stakeholders with a view to placing the Marropino mine on Care & Maintenance to preserve cash resources. Discussions with potential strategic partners will continue, with a view to production recommencing on the introduction of the necessary funding to allow construction of the hard rock circuit at Marropino.'

Changes in member contact details

GfE-MIR GmbH

Ms Irina Kirschke, the nominated delegate to the T.I.C. for GfE-MIR, has a new e-mail address:
Irina.Kirschke@gfe-duesseldorf.de

NAC Kazatomprom

NAC Kazatomprom has nominated a new delegate to the T.I.C.: Dr Vladimir Shkolnik.

E-mail: shkolnik_v@kazatomprom.kz

Simmonds (Metal Trading) Ltd

The administrative office of Simmonds (Metal Trading) Ltd has recently moved. Here are the new contact details.

Address: 3 Field House Cottages, Brancaster, King's Lynn, Norfolk PE31 8AG, England

Tel.: +44-1485-211-152, Fax: +44-1485-211-164

The e-mail address remains: admin@simmondsmetals.co.uk

Alex Stewart Assayers Ltd

Please note the new contact details for Alex Stewart Assayers Ltd.

Address: Caddick Road, Knowsley Business Park, Prescot, L34 9HP, England

E-mail: david.mcdowell@stewartgroupglobal.com
Website: http://www.stewartgroupglobal.com

Views of Tallinn

From top to bottom : (c) lumierefl, Jeffrey G3, Leo-setä, matildaben@Flickr/CC
Background : (c) Cyberdees@Flickr/CC