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TIC

TANTALUM-NIOBIUM INTERNATIONAL STUDY CENTER

PRESIDENT'S LETTER

As the third quarter of this difficult year 2001 draws to a close, we all anxiously await the market recovery. There appear to be some small signs that the electronics market is reaching its low point in this recession, and I look forward to a return to growth by next March.

I am also looking forward to seeing all of our delegates in Rio de Janeiro at the upcoming Forty-second General Assembly in October. We will have not only an excellent technical program, but also, with CBMM as our host, an exciting tour of the CBMM mine and processing installations at Araxá.

Much of the discussion at the meeting will focus on niobium and the development of new, niobium-based capacitor materials. We are all very excited about the possibilities for these new products.

I have been asked if these niobium developments could result in major change for our industry. Change, and all of the associated challenges, is inevitable. But I believe that there are ample market opportunities for both tantalum and niobium.

The press sometimes refers to the opportunity for niobium as a substitution for "hard-to-find" tantalum. The tantalum tightness late last year was due to limitations of the supply chain, not the shortage of basic raw materials. In fact, the supply of tantalum is more than adequate to meet future demands. The real, long term success of niobium in new applications will be based on delivering value to the customers.

It would not be proper to write my last note to the membership without a special thank you to Judy Wickens for another year of outstanding service to the TIC. Judy has been inundated with requests from the media relative to the United Nations inquiry into Africa and the "Col-tan" issues. Judy has represented all of us well and has been a source of truth in the media which is becoming quite rare in today's world. I want to thank Judy for all the hard work and countless additional hours placed into this effort in 2001. I also want to recognize Ed Mosheim who has been relentless in promoting tantalum and niobium as the Technical spokesperson for the T.I.C. Ed is a high energy player with a great deal of experience and technical integrity and I thank Ed for the hard work he has delivered month in and month out for 2001.

I am confident that the membership of the T.I.C. will continue to face the challenges of meeting customer needs with the reliable supply of high value tantalum and niobium products.

www.tanb.org
e-mail to info@tanb.org

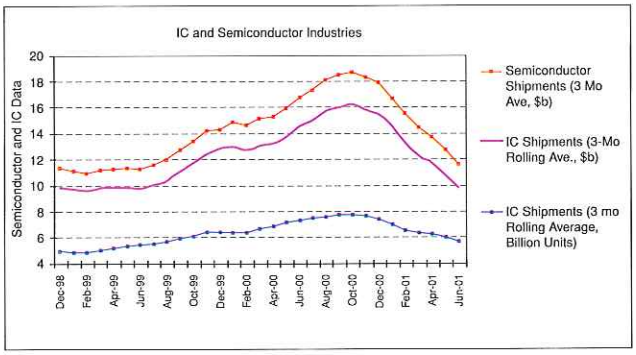
SUMMARY

The electronics industry is beginning to show limited signs of stabilizing, although at sales levels roughly equal to those of two years ago. The general consensus is that although we may be near the bottom of the recession, business will remain sluggish for at least three more quarters.

Integrated Circuits, Semiconductors and Electronics Generally

Electronic OEMs, component suppliers, contract service providers and distributors ended the second quarter with double-digit sales declines, losses and layoffs. The third quarter is not expected to improve significantly over last quarter, although it now looks like it won't get much worse.

Worldwide sales of semiconductor and integrated circuits (IC) sales through June 2001 are reported in the figure below. IC units, with which tantalum powder sales are historically well-correlated, dropped another 6% in June.



So, although the outlook today is poor at best, I see a different view over the next 12 months and look for great things between 2002 and 2005 for the entire industry. Thanks to all members of the T.I.C., in their increasing numbers, for keeping the focus through this down turn and I look forward to seeing you in October.

Tom Odle
President

CONTENTS

GENERAL ASSEMBLY OCTOBER 2001

The Forty-second General Assembly of the Tantalum-Niobium International Study Center is due to be held in Rio de Janeiro, at Hotel Le Meridien, Copacabana.

Participants are expected to gather over the weekend, and on Sunday October 7th the registration desk will be open. In the evening a welcome reception will be sponsored by Companhia Brasileira de Mineração e Metalurgia (CBMM).

On Monday October 8th the member company delegates will meet for their General Assembly, to carry out the business and administration of the association, also to admit and welcome new applicants. The rest of the day will be devoted to presentations of technical papers, ending with a panel discussion, with a break for lunch in one of the hotel's fine salons overlooking Copacabana beach. In the evening all delegates and guests and those accompanying them are invited by CBMM to a gala dinner.

A field trip to Araxá, with a return flight, is planned for Tuesday October 9th, to visit the world's largest niobium mine and tour the processing installations of CBMM. The reserves in the mine are sufficient for the entire world's forecast demand for niobium for 500 years! A description will be found in this issue of the Bulletin.

There will be sightseeing tours in and around Rio de Janeiro on Monday and Tuesday for those accompanying the delegates.

TECHNICAL PROGRAMME

Two more papers have been added to the technical programme announced in June, those by Mr Peter Kählert and Mr Alan Crawley, they should be particularly topical.

CBMM – The most comprehensive and fully integrated manufacturer of niobium products
by Mr Clovis Antonio de Faria Sousa and Mr Antonio Telhado Pereira, CBMM

Niobium and tantalum: a year in review
by Mr Edward Mosheim, Technical Promotions Officer of the T.I.C.

A processor's view of the current state of the tantalum industry
by Mr Peter Kählert, Chairman of H.C. Starck GmbH

The year 2000: a trader's perspective
by Mr Alan Crawley, Pacific Ores Metals and Chemicals

Overview of Metallurg's tantalum and niobium activities in Brazil
by Mr Itamar Resende, Metallurg

Mamoré's position in the tantalum and niobium markets
by Mr Ricardo Dequech and Mr Jorge José Correia Salles, Tin, Tantalum and Niobium Division of the Paranapanema Group, parent of Mamoré Mineração e Metalurgia

Alternative materials for electrolytic capacitors
by Dr Karlheinz Reichert, H.C. Starck & Co GmbH KG

The technical session will close with a **panel discussion:**

Panel discussion: The development of niobium capacitors
The panel will be chaired by Mr John Linden, and the panel members will be

AVX Ltd	Mr William Millman
Cabot Performance Materials	Mr Randall Redd
Epcos	Dr Josef Gerblinger
Kemet	Dr Daniel Persico
NEC	Mr Katsuhiro Yoshida
Reference Metals/CBMM	Mr Solon Tagusagawa
H.C. Starck GmbH	Dr Karlheinz Reichert
Vishay Sprague	Mr Peter Maden

PROCEEDINGS

The book of the Proceedings of Symposium 2000 is about to appear. Delegates registered for the Symposium will each be sent a copy of the book.

Others who would like copies should order them from the T.I.C. at 40 rue Washington, 1050 Brussels, Belgium. The cost will be US$200 per copy, including postage and packing.

CBMM

CBMM – THE MOST COMPREHENSIVE AND FULLY INTEGRATED MANUFACTURER OF NIOBIUM PRODUCTS

by Mr Clóvis Antonio de Faria Sousa and Mr António Telhado Pereira, CBMM - Companhia Brasileira de Metalurgia e Mineração, Araxá, Minas Gerais, Brazil

1. Introduction

In the mid 1950's, a huge niobium deposit was discovered in Araxá, Brazil. In 1961 CBMM began its industrial operation, exploiting this deposit. Since then the history of niobium has changed dramatically. The metal became readily available, with an excess of supply at stable prices.

Since the beginning of its industrial operations, CBMM has been dedicated to maintaining a stable scenario on the niobium market. Process development, technological modernization and expansion of capacity, along with investments in the development of new niobium applications, have been constant and continuous efforts of CBMM.

This paper describes the present technology and capacity of CBMM's product manufacturing. It also comments on planning for the future.

2. Mining operation

A computerized mining plan was introduced in June 2000. The block model was developed, based on historical data acquired during geological surveys performed in the past and also based on the historical database generated during the operation in the last 40 years of operation.

This plan allows CBMM to improve its mining operation based on a correlation between the quality of the ore and its behavior and performance in the concentration process.

A blending pile is being considered as a future improvement. Simulations are showing good results in the plant operation.

3. Concentration process

In January 2000, CBMM started up the operation of the second grinding line, which allowed the plant capacity to increase to 84,000 tons per year of floated concentrate.

New reactants are constantly being tested.

The column flotation process for pyrochlore was developed. A pilot column was installed and the results obtained supplied the basic parameters for the design of the industrial plant. Basic engineering is under development.

4. Pyrometallurgical refining of concentrate

In 1996, CBMM decided to develop a new process for pyrochlore concentrate refining. The leaching process, which has been used since 1976 for the purification of the concentrate, is based on the removal of Pb as a $PbCl_2$, S as $BaSO_4$, and P as $CaHPO_4$ in a wet chemical process.

The new process removes the P, Pb, and S in two sequential steps: sintering and smelting in an Electric Arc Furnace.

4.1. Sintering

Before sinterization, the floated concentrate is pelletized with petroleum coke and bentonite. The green pellets are fed into the steel belt-sintering furnace, designed by Outokumpu Oy, where H_2O and sulfur are removed. The gases are washed in two stages of wet scrubbers, which remove the sulfur and particulate. The water is treated and recirculated in the system.

After this, the sinter produced is crushed and classified. Part of it returns to the sinter belt as a bedding protection and the balance goes to the feedstock pile for the Electric Arc Furnace Smelting.

4.2. Electric arc furnace smelting

The pyrochlore sinter, mixed with petroleum coke or charcoal, and steel scraps are fed into the 10.5 MVA Electric Arc Furnace, designed by SMS Demag, where the concentrate is refined with respect to phosphorus and lead.

The carbon from the coke or charcoal reduces phosphorus and lead oxides. The lead is fumed off, it reoxidises and is collected in the bag-house as lead oxide. The iron from the scrap collects the phosphorus, forming a ferro-phosphorous alloy (about 11 % P), which goes to the bottom of the furnace.

The process is carried out in a molten phase at 1450-1500°C. The refined concentrate is tapped from the furnace and granulated by water. Following this, the refined concentrate is filtered, dried, packaged and transferred to the metallurgical plant for ferro-niobium production.

The ferro-phosphorus alloy is tapped periodically and, so far at least, it is disposed of as waste material.

5. Ferro-niobium production

Since 1994 CBMM has been producing ferro-niobium in an Electric Arc Furnace. The furnace, initially designed to produce 15,000 tpy reached the capacity of 30,000 tpy in 1998. The present capacity of the Electric Arc Furnace is 39,000 tpy.

Aiming to guarantee an excess of production compared to world demand, CBMM decided to build an aluminothermic shop to increase the capacity of production incorporating an extra 6,000 tpy, to bring the total to 45,000 tpy. This production began in October 2000.

The next step of development is the reduction of the liquid refined concentrate, tapped from the Electric Arc Furnace smelting. Pilot tests showed very promising results. Full scale tests are being considered for the end of 2001.

6. Crushing and packaging

The new crushing and packaging plant, which has been operating since June 1999, incorporates the most recent technology available. The plant is fully automated. The crushing is completely dust and noise proof. Supervision is carried out by cameras, which allows the operators to monitor the process without being exposed to the noisy environment. All the points where dust is generated are provided with devices to collect the dust and carry it to a bag house. The lots are automatically sampled.

After crushing and sampling, the lots of ferro-niobium are stored in individual silos to await quality approval.

The packaging is done in specific stations for big-bags, drums or boxes. Palletising is also automated and carried out by a robot designed by Asea Brown Boveri.

The plant has the capacity to crush and pack 50,000 tpy.

7. High purity niobium oxide plant

The first CBMM high purity niobium oxide plant started in 1980 with an installed capacity of 1,800 tpy. This plant made high purity niobium oxide easily available and independent from tantalum production. Following the same business principles already applied in the ferro-niobium market, CBMM has stabilised the oxide price. In 1979, before the CBMM oxide plant start-up, the high purity niobium oxide price rose to more than US$35.00/kg Nb_2O_5. After CBMM entered the market, the price was reduced to half this level, and has been kept constant.

In 1988, CBMM installed a new oxide plant with the same capacity but with several process developments that have improved the oxide quality.

In 1998, the oxide plant capacity was expanded to 2,400 tpy.

Recently, in July 2001, the production capacity was increased to 3,000 tpy.

The pyrochlore mine

Part of the installations

Conveyor belt – 3.2km long

Electron beam furnace

Control room

The mine site – with cattle grazing, and a view of some of the thousands of trees which have been planted

Anteater in the environment centre, she was recovering from a road accident

8. Special purity niobium oxide plant

The special purity niobium oxide plant was inaugurated in 1998, having a capacity of 150 tpy for the production of optical grade niobium oxide.

Again following the same business principles, CBMM has offered the market a high purity optical grade oxide with a low and stable price. This is already being reflected in a continuous increase in the market share.

An expansion plan is being studied.

In this plant, Niobia HY-340 is also produced, a niobium acid catalyst.

9. Niobium metal

The niobium metal refining plant (electron beam) was inaugurated in 1989 having a capacity of 40 tpy for third melt niobium metal. In 1996, the capacity was increased to 60 tpy, and at the beginning of 2001 a complete retrofit of the electronic was implemented.

Last August, the acquisition of the second electron beam furnace was decided upon. The capacity will be increased to 210 tpy of third melt pure niobium metal.

10. CBMM production capacity

Table I summarises the current products, their typical niobium content and production capacity.

Table I – CBMM products and production capacity

Products	Content %	Capacity tpy
Ferro-Niobium Std	65-67 Nb	45,000
Niobium Oxide High Purity	99 Nb_2O_5	3,000
Ferro-Niobium VG and Nickel-Niobium	65 Nb	1,500
Niobium Oxide Optical Grade	99.9 NbO_2O_5	150
Niobium Metal	99.9 Nb	60

11. Process development – new products

At the beginning of the year 2000, CBMM inaugurated the new Research Center in Araxá. In this new facility, CBMM has united the central analytical laboratory and the process development laboratory. The aim is to promote closer contact between those labs that will improve CBMM's product development capabilities.

11.1. Ceramic grade niobium oxide

Since 1998, when the optical grade niobium oxide plant was implemented, CBMM has focused on the development of ceramic grade niobium oxide. The final project is being studied.

11.2. Niobium metal powder

At the beginning of 2000, a special task force was designated to study the best approach for CBMM to enter this promising market. CBMM has decided to implement a parallel development strategy involving several specialists and research centers with the aim of obtaining the product, as soon as possible.

CBMM is giving priority to the niobium metal powder program. This material has been targeted due to the promising potential for its use as an electrolytic capacitor material.

11.3. Niobium products for catalysis

This is a very active field for new niobium applications.

In 1986, CBMM introduced to the market Niobia HY-340, an acid catalyst. Since then, CBMM has developed other products like niobium ammonium complex for catalysis applications.

12. Quality, environment and safety

In the constant process of modernizing its production facilities, CBMM has focused on three major points: product quality improvement, protection of the environment, and safety and occupational protection.

To achieve the quality target, since May 1994 CBMM has operated a quality management system according to the ISO 9002 standard, certified by ABS QE, American Bureau of Shipping – Quality Evaluations Inc.

Production of niobium products at CBMM's facilities has always complied with Brazilian environmental regulations. In August 1997, CBMM was the first mining and metallurgy company in the world to be granted the ISO 14001 Certificate of Compliance. This achievement demonstrates CBMM's commitment to continual improvement in technology, processing and environmental performance. The Environmental Management System, certified by ABS QE, applies to the entire production process from mining to final products.

Safety and occupational conditions are constantly being improved in CBMM facilities. A formal management system is in use to guarantee that the best and most up-to-date technology and equipment are available to the workers. Written procedures and training are provided to all.

13. Supply

It has been, and will continue to be, the characteristic and strong policy of niobium producers to maintain the market oversupplied, keeping stable both the supply and market price of niobium. Niobium is not marketed as a commodity, and the sales channels are well-established enterprises all over the world.

In addition to inventories equivalent to 3-4 months of operation in the plant, the CBMM marketing system also includes sizeable inventories strategically located in the major markets in different parts of the world. These enable customers to have just in time delivery and also guarantee supply despite events which are not controlled by the industry.

INFORMATIVE INTERNET WEB SITES – NIOBIUM AND TANTALUM

Numerous requests have been received by your organization for information related specifically to the properties of niobium and tantalum metal, their chemicals, their minerals, and equipment for mining the predominant minerals of these two elements in small placer and alluvial deposits. In most cases, these deposits are located in remote areas, sometimes without access to water or power. The primary interest is to produce a niobium-tantalum concentrate that can be economically transported to a point of collection/shipment.

Analysis of niobium and tantalum concentrates in the field has also been a significant topic of inquiries.

Properties of Niobium and Tantalum

One of the best web sites for information on the properties of niobium and tantalum is 'Web Elements' at http://www.webelements.com. This award-winning site was developed by Mark Winter at the University of Sheffield in England. There are two editions, namely, 'Scholar' and 'Professional', with the Scholar Edition being developed for students at the high school and university level.

The site opens to the Periodic Table of Elements. Clicking on the element Ta in Group V takes you directly to the information for tantalum. Down the left side of the screen is a listing of various categories of information for the element. They are as follows:

Index
Background, including history
Uses
Geology
Biology
Tantalum Compounds
Electronic Properties
Physical Properties
Crystallography
Nuclear Properties

If you click on "Index", you find a listing of 79 different properties for tantalum. Clicking on each will produce details of the information listed. For many of the listings, reference citations are listed at the bottom of the page. A listing of various compounds of tantalum will be found along the right side of the screen. Clicking on any specific compound will produce the characteristics associated with that chemical.

An equivalent listing of information is on this web site for niobium, as well as all of the other elements known to exist.

Minerals of the Elements Niobium and Tantalum

For those who are interested in the actual minerals in which tantalum and niobium are found, there are two web sites of interest. They are as follows:

http://www.webmineral.com/chem/Chem-Nb.shtml
http://www.webmineral.com/chem/Chem-Ta.shtml

The first contains a listing of all the known minerals containing niobium and the second lists the tantalum minerals. Some minerals contain both niobium and tantalum, with one of these elements being at a predominant level in comparison to the other.

One feature is that the percentage of niobium is listed for the niobium minerals and percentage of tantalum is listed for the tantalum minerals, based on theoretical calculations. You have the option of looking at the list of minerals based on % Nb in the composition or rearranging the listing so that the minerals are shown in alphabetical order.

The top of each page provides some basic information about the element, followed by a listing of the minerals for that element. If you click on the mineral "pyrochlore", you will be looking at a listing of the chemical analysis, showing the %Nb to be 52.51% (equates to 75% Nb_2O_5), the geological environment for pyrochlore, IMA Status, localities, origin of the name, and an image of a mineral specimen. This information is provided for many of the minerals listed.

Each page also has advertisements by mineral dealers, where if you so desire, you can search for and purchase specimens of your favorite niobium and tantalum minerals.

Mineral Processing Equipment

Numerous requests for mineral processing equipment suggestions and vendors were received during the past year from prospectors and from operators of small mines throughout the world. In most cases, these requests were for gravity processing equipment, or in some cases interest indicated magnetic and/or electrostatic separation. Simple process flowsheets could require grinders, screeners, tabling, vibratory, magnetic, and/or electrostatic separation equipment. The listing of web sites generally supplied was as follows:

1. http://www.eriez.com Eriez Magnetics – magnetic and vibratory equipment.
2. http://www.mpimagnet.com/separation.htm Magnetic Products, Inc
3. http://www.aquafinecorp.com Aquafine Corporation
4. http://www.carpco.com Carpco Corporation, Division of Outokumpu Technology Inc. – magnetic separation equipment, hydrocyclones, and Wilfley tables.
5. http://www.concentrators.net/index.html Falcon Concentrators. This company has experience in processing tantalite, according to information on their web site.
6. http://www.orepro.com/sys-tmpl/processing Humphrey Spirals, vibratory feeders, Wilfley tables, screeners
7. http://www.kason.com/Ussite/VS/vs.htm vibratory, centrifugal, and cross-flow screeners

It is generally advisable to process typical "run-of-mine" ore through a trial process flowsheet in order to make a determination that the intended equipment will perform the concentration of the tantalum- or niobium-bearing minerals as desired. The importance of testing representative samples cannot be overemphasized.

Equally important is having a feedstock where the tantalum and/or niobium-containing minerals are 'liberated' from the other mineral constituents. Mixed-mineral particles are not amenable to a clean separation of say tantalite from gangue minerals. Fine particles, defined as –40 microns can also be troublesome in terms of the efficiency of recovery.

Analytical Equipment – Analysis for Tantalum in Minerals

Numerous requests for analytical equipment that would be useful for determination of tantalum in the field were received during the last year. The primary reference sent in response to that question from prospectors was that X-Ray Fluorescence Analyzers were commonly used and a favorite seemed to be a unit produced by Spectro/Asoma. Different models are available depending on individual interests. They are sold by Scientific & Medical Products Ltd. and their product line and contact information can be found at http://www.scimed.co.uk. If an X-Ray Fluorescence Analyzer is used, the purchaser should be knowledgeable in the procedure for analysis of the tantalum-bearing mineral concentrate utilizing this system.

The above named companies and their products are not being endorsed or recommended for any specific application in the general field of niobium and tantalum mineral processing. The information is provided as a guide. There are literally hundreds of companies and products that will exhibit similar performance to those noted in this article.

C. Edward Mosheim
Technical Promotion Officer
Tantalum-Niobium International Study Center

September 11th

The Tantalum-Niobium International Study Center extends its sympathy to all family and colleagues of innocent victims of the appalling attacks carried out on September 11th.

DLA

The following article has been provided by the DLA, especially for the T.I.C. Bulletin. We are most grateful to the DLA for this contribution.

The Defense Logistics Agency (DLA) has completed its fiscal-year sales for most of its columbium and tantalum products. Buyers can still make offers for columbium carbide powder, but sales for the other products will not resume until Fiscal Year 2002 (FY02), beginning October 1st 2001.

The U.S. Congress approves the Annual Materials Plan (AMP) that controls the quantity of each material that the DLA can sell annually. Each AMP expires on September 30th at the conclusion of its fiscal year.

DLA encourages anyone who wants to participate in the FY01 or FY02 sales to contact the Directorate of Contract Sales, Defense National Stockpile Center, 8725 John J. Kingman Road, Fort Belvoir, VA 22060-6223. Telephone +1 703 767 6500. Web site https://www.dnsc.dla.mil/.

In the data below, the DLA's inventory is current as of July 31st 2001.

Columbium materials:

Columbium carbide powder: Inventory is 21,372 lbs. AMP is 21,500 lbs, meaning that all the material is authorized for sale. Sales are held the first Tuesday of each month.

Columbium concentrates: This material is commingled with tantalum concentrates. DLA sells the combined concentrates as 'Tantalum/Columbium Concentrates'.

Ferro-columbium: Inventory is 0 lbs. AMP was 150,000 lbs. In April 2001, ABS Alloys and Metals (Mexborough, England) purchased the last 100,000 lbs for $1.3 million.

Columbium metal ingots: Inventory is 100,659 lbs. AMP is 20,000 lbs. Sales are held the second Friday of each evenly numbered month. In December 2000, ABS Alloys and Metals purchased 20,000 lbs for $0.3 million.

Tantalum materials:

Tantalum carbide powder: Inventory is 12,156 lbs. AMP is 4,000 lbs. In November 2000, Sandvik AB (Sandviken, Sweden) and ELG Metals (Greenville, PA) purchased 4,000 lbs for $1.3 million.

Tantalum metal ingots: Inventory is 140,649 lbs. Congress has not yet authorized for sale 120,228 lbs. AMP is 40,000 lbs, meaning that all but the not-yet-authorized material can be sold in FY02. In November 2000, Cabot (Boyertown, PA), Claris Partners (New York, NY), and H.C. Starck (Newton, MA) purchased 32,000 lbs for $15.2 million. In February 2001, Cabot purchased 7,000 lbs for $2.7 million.

Tantalum metal powder: Inventory is 40,621 lbs. Congress has not yet authorized for sale 36,020 lbs. AMP is 50,000 lbs, meaning that all but the not-yet-authorized material can be sold in FY02. In January 2001, H.C. Starck purchased 11,000 lbs of Grade 1 for $5.0 million. In April 2001, Recovery Dynamics (Johnson City, TN) purchased 34,000 lbs of Grades 1, 1A, and 5 for $9.6 million.

Tantalum/columbium concentrates: Inventory is 1,909,165 lbs Ta (commingled with 1,309,941 lbs Cb). AMP is 500,000 lbs Ta. In November 2000, Kamco Metals (Hudson, OH) purchased 11,000 lbs Ta. In May 2001, DLA rejected all bids.

Tantalum oxide: Inventory is 61,314 lbs. AMP is 20,000 lbs. In March 2001, ELG Metals purchased 20,000 lbs for $2.6 million.

MEMBERSHIP

Further applications for membership have been received, for consideration by the Forty-second General Assembly:

Angus and Ross
Di Assets
Exotech
Haddington International Resources
Leo Shield Exploration Ghana
MIC Japan
New Millennium Resources
Sanyo Electronic Components
Vectis Tin Mines
Zhuzhou Cemented Carbide Works

MEMBER COMPANY NEWS

AVX

Sales and earnings were in line with forecasts made in April, said Chairman and CEO Mr Dick Rosen on July 12th, and AVX was responding to the 'industry-wide slump' by reducing production as well as manufacturing and administrative costs. Net income for the quarter ended June 30th 2001 was US$29 449, compared to US$120 436 for the same period in 2000. Improved order levels were expected towards the end of September, and improvements in the business climate were expected to follow, Mr Rosen went on.

Cambior

On July 10th, Cambior Inc. reported production of 355 tonnes of niobium as its share of production from the Niobec mine for the second quarter of 2001. This was an increase of 33% over the corresponding quarter in 2000 due to the completion of the mine expansion.

Epcos

Epcos has withdrawn some models of SAW filters, as it has observed a 'substantial decline in demand for SAW filters for receiver decoders' for television sets since the introduction of digital satellite TV broadcasting. The company also announced the relocation of some manufacturing operations for SAW filters from Munich to Singapore and Wuxi, China, to meet demand for a local manufacturing presence in the Asian market.

Epcos has also announced that it is creating production capacity for tantalum chip capacitors with gold-plated terminals, suitable for use at high ambient temperatures. Volume production will begin at Evora, Portugal, in January 2002.

Sons of Gwalia

In July, Sons of Gwalia reported record production and sales of tantalum in the quarter and the full year ended June 30th 2001. Production was 1.6 million pounds Ta_2O_5 contained, an increase of 45% over the previous year.

Kemet

Following 'the most successful year in its history' (see Bulletin 106), Mr David Maguire stated on June 25th 2001 that the tantalum capacitor industry had already entered a correction of unprecedented 'rapidity and depth'. On that date Kemet announced a 'reduction of manufacturing and support personnel' in its U.S. and Mexican facilities, reducing U.S. staff by about 675 employees and personnel in Mexico by approximately 1130, with an additional 80 employees on early retirement.

Mr Maguire said that many electronics companies had issued warnings indicating that they would not meet analysts' estimates for the June quarter and there was a 'growing consensus in the electronics industry that while shipments will ultimately return to long-term sustainable rates, the recovery will take longer than previously estimated'. Kemet expected to maintain its leadership in the tantalum capacitor market as the industry recovered, added Mr Maguire.

NEC

NEC Corporation announced in July 2001 that it had developed the world's first conductive polymer-type solid electrolytic capacitor fabricated using niobium. The first sample shipment was scheduled for August, with mass production planned for early 2002. Features include equivalent quality to existing polymer-type capacitors, shape and structure identical to chip tantalum capacitors and low ESR characteristics.

Reference Metals

Niobium 2001

Reference Metals and its parent company are promoting the conference 'Niobium 2001', to be held in Orlando, Florida from December 2nd to 5th. All aspects of niobium technology will be covered: topics include mining, extraction, masteralloys, metallurgy, microalloying, applications of steels, and applications of other niobium materials.

For more details, contact Dr David G. Howden by fax at +1 740 965 2366 or e-mail to niobium2001@worldnet.att.net.

Sogem

At an Extraordinary General Meeting on September 3rd 2001, the name of the parent company of our member Sogem was changed from Union Minière to Umicore.