

BM
BASE METALS
2007



in collaboration with
The SAIMM Namibian Branch are organising the
Fourth Southern African Base Metals Conference
'Africa's base metals resurgence'



23-27 JULY 2007

SWAKOPMUND, NAMIBIA

Final Circular and Registration Forms

The Organisers of the Conference wish to thank the following sponsors for their support

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CONFERENCE

'Africa's base metals resurgence'

23-27 JULY 2007 · SWAKOPMUND, NAMIBIA

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Final Circular

Invitation from the Organising Committee

The past decade has seen a tremendous revival of the base metal industry in Africa, coupled with an unprecedented increase in the prices of base metal commodities in the last couple of years. The theme of the 4th Southern African Base Metals Conference, is therefore, 'Africa's base metals resurgence'.

This conference will explore the contributions made by the mining and metallurgical disciplines to the base metals industry in Africa. It will also investigate how the base metals industry in Africa can capture the maximum potential from the increase in base metal prices through research, innovative thinking, new ways of operating and project implementation.

The conference will also consider the influence of Europe's REACH programme on the base metal industry in Southern Africa.

The conference will include a technical visit to Rössing Mine (Uranium) and will be followed by technical visits to Ongopolo (copper), Skorpion Mine (zinc) and Rosh Pinah Zinc Corporation (zinc and lead).

The conference, to be held in Swakopmund, Namibia, also confirms the commitment of the Southern African Institute of Mining and Metallurgy (SAIMM), to hosting a regular forum on base metals in the Southern African region.

Swakopmund is an ideal conference venue for local and international mining and metallurgical professionals to be exposed to the latest advances in exploration, resource evaluation, projects and technological advances in Southern Africa's base metal industry.

The organising committee is looking forward to your participation at the conference in July 2007.

P. Fouche
Chairman
Organising Committee

Invitation from Exxaro Base Metals

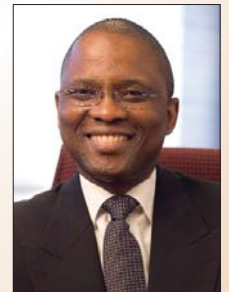
You are cordially invited to attend the 4th Southern African Base Metals Conference hosted by The Southern African Institute of Mining and Metallurgy in Swakopmund, Namibia, on 23-25 July 2007.

As a significant Southern African base metals producer, Exxaro's Zincor refinery in South Africa and zinc/lead mine in Namibia make up one of the world's few integrated zinc mining and refinery operations. The company is proud to support the conference, which we believe will offer an excellent forum for Southern African and global base metals role-players to engage in dialogue on challenges facing the base metals industry, discuss the REACH programme of Europe, and investigate a range of other topics. The conference will examine achievements and lessons learned in growing the base metals industry in Southern Africa over the past few years, and offer participants a host of networking opportunities.

Exxaro expects the conference to further strengthen the industry, offering insight and information that will benefit all role-players. Exxaro's Rosh Pinah mine in southern Namibia will be among the Namibian mines included in the post-conference technical visits.

The conference details are attached for you to consider.

We look forward to seeing you in Swakopmund!



Mxolisi Mgojo
Executive General Manager
Exxaro Base Metals & Industrial Minerals





CONFERENCE

'Africa's base metals resurgence'

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Organising Committee

P. Fouche (Chairman)

P. Ferreira W. van der Merwe
R.T. Jones T. Vermaak
A.F. Mulaba J. Wyethe
Q. Reynolds

Conference Secretariat

Conference Co-ordinator
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Website: <http://www.basemetals.org.za/Swakopmund2007>

Key dates

Submission of papers **31 May 2007**
Technical visit **14 July 2007** (deadline date for confirmation of charter flight bookings)
Conference **23-25 July 2007**
Site visit **26-27 July 2007**

Conference programme

The technical programme consists of keynote addresses, as well as papers, which have been provisionally accepted:

Monday 23 July 2007

08:00-08:05 **Welcome**
 Chairman of SAIMM Namibia
08:05-08:15 **Welcoming address**
 SAIMM President



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08:15-08:55 **Opening address**
 Namibian Chamber of Mines President
08:55-09:35 **Keynote speaker**
 M. Tyler, Nedbank Capital
09:35-10:15 **Keynote speaker**
 M. Mgojo, Exxaro for Base Metals, in Sub-Saharan Africa
10:15-10:45 **Tea/coffee**
10:45-11:10 **Research—An introduction to the European Union's REACH legislation**
 A. McKenzie
11:10-11:35 **Some practical aspects for the implementation of REACH**
 J. Katabua
11:35-12:00 **What the implications of REACH are for the base metal industry?**
 A. McKenzie
12:00-12:05 **Sponsor presentation**
12:05-13:00 **Lunch**

SESSION 1: Plant visit

12:05-16:45 **Rössing visit**

SESSION 2: Presentations

13:00-13:25 **Water balances in hydrometallurgical refineries**
 W.H. Botha, M.H. Fox, M. Kirsten, Impala Platinum Refineries, A.J. Lathwood, and J.A. Moolman, TWP Matomo Process Plant
13:25-13:50 **Microwave-assisted SO₂ flushed acid leaching of mixed cobalt-copper oxidized ores**
 A.F. Mulaba-Bafubiandi, J. Ndalamo, and B.B. Mamba, University of Johannesburg
13:50-14:15 **Outotec methodology to develop novel process solutions in hydrometallurgy—how to tailor new processes to optimize metallurgical performance and process costs**
 K. Haavanlammi, Outotec
14:15-14:40 **Tea/Coffee**
14:40-15:05 **Cu-removal from the Skorpion circuit using EMEW® technology**
 E. Roux, J. Gnoinski, I. Ewart, Electrometals Canada Inc. and D. Dreisinger, University of British Columbia, Canada

- 15:05-15:30 **The influence of water quality on the flotation of the Rosh Pinah complex lead-zinc sulfides**
R.F. Sandenbergh and Y. Wei, *University of Pretoria*
- 15:30-15:55 **An assessment of pentlandite occurrence in the run of mine ore from BCL mine (Botswana) and its impact on the flotation yield**
A.F. Mulaba-Bafubiandi, *University of Johannesburg* and O. Medupe, *BCL Mining and Smelting, Botswana*
- 18:00 Evening programme begins

Tuesday 24 July 2007

PARALLEL SESSION 1

- 07:45-08:30 **Keynote Speaker:**
- 08:30-08:55 **Rock support in Southern African hard rock mines**
D. van Heerden, *Minova RSA*
- 08:55-09:20 **Remote mine wide communications**
M. Woodhall, *GMSI Mining Operations Technologies*
- 09:20-09:45 **Grade control blending and selectivity for optimal process performance at the Skorpion Zinc Mine, Namibia**
G.B. Gnoinski, *Namzinc (Pty) Ltd, Namibia*
- 09:45-10:15 **Tea/coffee**
- 10:15-10:40 **Exploitation of a massive low grade zinc-lead resource at Rosh Pinah Zinc Corporation, Namibia**
H. Fourie, P.H. van Rooyen, *Rosh Pinah Zinc Corporation (Pty) Ltd, S. Rupperecht, T. Lund, RSG Global, and N.M. Vegter, and Exxaro Resources*
- 10:40-11:05 **Intelligent gearing system—Solution to understand and correct operational conditions that reduce the fatigue life of a girth gear**
D. van Dyk, *David Brown Gear Industries*

- 11:05-11:30 **Larox horizontal vacuum belt filter with side vacuum**
R. Kroukamp, *Larox*
- 11:30-11:55 **Development of a mineral flotation frother for Nchanga Mine on the Zambian Copperbelt**
H. Zimba, M. Chitambo, *Konkola Copper Mines Plc, S. Sondashi, and W.A. Grobler, Betachem (Pty) Ltd*
- 11:55-12:00 **Sponsor presentation**
- 12:00-13:00 **Lunch**

SESSION 1: Plant visit

- 13:00-16:45 **Rössing visit**

PARALLEL SESSION 2

- 08:30-08:55 **Planning a new analytical laboratory for an uranium mine taking automation into consideration**
P.K. Hofmeyr and J.G. Galloway, *IMP Automation*
- 08:55-09:20 **Tomorrow's technology—out of Africa—today**
P. De Waal, *Blue Cube Systems (Pty) Ltd*
- 09:20-09:45 **Can we decrease the ecological footprint of base metal production by recycling?**
D.R. Groot and P.C. Pistorius, *University of Pretoria*
- 09:45-10:15 **Tea/coffee**
- 10:15-10:40 **Oxidative precipitation of Fe and Mn by air/SO₂**
M. Mouton, J. van Deventer, *Mintek*, and J. Vaarno, *Outotec*
- 10:40-11:05 **Solvent extraction test work to evaluate a versatic 10/Nicksyn™ Synergistic System for nickel-calcium separation**
R. du Preez, *Mintek*, M. Kotze, *BHPBilliton*, S. Donegan, H. Masiina, *Tati Nickel, Botswana*, and G. Nel, *Lionore SA*
- 11:05-11:30 **A comparison of the effect of chemical and bioleaching on the kinetics of sphalerite leaching**
J.W. van der Merwe, D.C. Odendaal, *Exxaro Resources*, C. Strydom, *University of Pretoria* and M.I. Sampson, *GeoBiotics LLC, USA*

- 11:30-11:55 **Piloting of the Ishigaki Fibre-Wakishimizu—(Fibre media rapid filtration equipment) at Skorpion Zinc**
H.F. Fuls and K. Nong, *Skorpion Zinc*
- 11:55-12:00 **Sponsor presentation**
- 12:00-13:00 **Lunch**
- 13:00-13:25 **Uranium recovery from acid leach liquors: The optimisation of RIP/SX based flowsheets**
D. van Tonder and B. van Hege, *Bateman Engineering, South Africa*
- 13:25-13:50 **Parameters influencing the leachability of calcines emanating from microwave roasted sphalerite and pyrite concentrates**
A.F. Mulaba-Bafubandi and T. Phiri, *University of Johannesburg*
- 13:50-14:15 **Comparison of Cu removal from Co sulphate stream using ion exchange via pH-controlled solvent extraction**
S. Scott and J. van Deventer, *Mintek*
- 14:15-14:20 **Sponsor presentation**
- 14:20-14:40 **Tea/Coffee**
- 14:40-15:05 **Anglo Research (AR) experiences with integrated comminution and flotation plant modelling**
S. Naik and W. van Druinik, *Anglo Research*
- 15:05-15:30 **End-of-life mode of failure of a zinc sulphide concentrate fluidized bed roaster and its rebuilding**
C.B. Kohler, S. Venter, N.M. Vegter, and E.H.O. Meyer, *Exxaro Zincor*
- 15:30-15:55 **Technologies for the base metal casting industry in Southern Africa: The impact of rapid prototyping**
D.K. Nyembwe, *University of Johannesburg*
- 15:55-16:20 **The minerals industry and syndicated research**
R.D. Beck, *AMIRA International* and P.G. Gaylard, *University of Cape Town and AMIRA International*
- 18:00 **Gala Dinner**

Wednesday 25 July 2007

- 07:45-08:30 **Keynote Address: The changing face of copper production**
Dr T. Harvey

PARALLEL SESSION 1

- 08:30-08:55 **Base metals heap leaching applications and process parameters**
P.J. van Staden, *Mintek*
- 08:55-09:20 **Skorpion Zinc: Optimization and innovation**
J. Gnoinski, *Namzinc*
- 09:20-09:45 **Comparison of solvent extraction and selective precipitation for the purification of cobalt electrolytes at the Luilu Refinery, DRC**
L.M. Roux, E. Minnaar, P.J. Cilliers, M. Bellino, *Hatch Africa* and R. Dye, *KML*
- 09:45-10:15 **Tea/coffee**
- 10:15-10:40 **Manganese removal from cobalt solutions with dilute sulphur dioxide gas mixtures**
J. van Rooyen, S. Archer, *TWP Matomo Process Plant*, and M. Fox, *Impala Platinum Limited Refineries*
- 10:40-11:05 **Cadmium removal from cobalt electrolyte**
J. Deventer, R. du Preez, S. Scott, *Mintek* and S.R. Izatt, *IBC Advanced Technologies Inc. USA*
- 11:05-11:30 **A case study on the operation of a Flottweg Tricanter® centrifuge for solvent-extraction crud treatment at Bwana Mkubwa, Ndola, Zambia**
A. Mukutuma, B. Mbao, *Bwana Mkubwa Mining Ltd.*, N. Schwarz, *Schwarz Global Consulting*, G. Chisakuta, and A. Feather, *Cognis Corporation*
- 11:30-11:55 **Assessing the performance and capacity of matte leaching using predictive models**
F. Crundwell, *CM Solutions* and A.J. Lathwood, *TWP Matomo Process Plant*
- 11:55-12:00 **Sponsor presentation**

12:00-13:00 Lunch

PARALLEL SESSION 2

- 08:30-08:55 **Process development of the Nkomati PCMZ base metals sulphide ore**
R.L. Bowers and D.S. Smit, *Nkomati Joint Venture*
- 08:55-09:20 **Increasing the capacity of grinding circuits without installing more mills**
G.F. Barrios (presented by N.J. Barkhuysen), *Goldex SA*
- 09:20-09:45 **Copper and cobalt extraction from sulphate solution using natural clinoptilolite**
A.F. Mulaba-Bafubiandi, D. Nyembe and B. Mamba, *University of Johannesburg*
- 09:45-10:15 **Tea/coffee**

SESSION 1: Plant visit

12:00-16:45 **Rössing visit**

Conference venue

The Conference will take place at the Swakopmund Hotel, in Swakopmund.

The coastal town of Swakopmund (meaning the mouth of the Swakop river in German) is Namibia's second biggest town. The architecture and general feeling of the Swakopmund is of a timeless German village. It was founded in 1892 as the main harbour for German South-West Africa. A sizable minority of the population speaks German and has German roots. Swakopmund is approached through the Namib Desert, one of the world's largest wilderness areas. The boom of the surf on the notorious Skeleton Coast is an ever-present reminder of the icy Atlantic Ocean beyond.

The discovery of uranium at Rössing, 70 km (43 miles) outside the town, led to the development of the world's largest opencast uranium mine. This has an enormous impact on all facets of life in Swakopmund, which necessitated expansion of the infrastructure of the town to make it into one of the most modern in Namibia.



Registration

Registration fees include attendance at the technical sessions, all refreshments and lunches at the conference, and attendance at the social functions.

Conference registration fees

SAIMM members	R6 500.00
Presenting Authors	R6 000.00
Non-members	R7 500.00
Students/retired members	R2 500.00

All prices include 14% VAT. Tax invoices will be issued to all delegates. Please note that delegates will only be permitted to attend the conference only if their registration fees have been paid.

Cancellation

A 50% refund will be made for cancellations received before 30 June 2007. No refunds will be made for cancellations on or after 30 June 2007.

Exchange rate

The current exchange rate as at May 2007 is approximately US\$ 1.00 = N\$7.40 and GBP1.00 = N\$14.20. The value of the Namibian dollar is equal to the South African rand. The present rate of VAT (value added tax) in Namibia is 15%.

Accommodation

The organisers have appointed Abenteuer Afrika Safari to secure accommodation at a variety of hotels and guest houses. Block bookings have been made for the following hotels but any bookings made after 14 June are subject to availability. A pre-printed copy of the booking form for recommended hotels close to the conference venue is included in this brochure. Please note that all quoted rates include breakfast and are per night. Delegates must complete and return the form together with the relevant deposit directly to Abenteuer Afrika Safari. Contact details:

Tel: +264 (0)64 404030 · Fax: +264 (0)64 464038 · E-mail: bushtrac@abenteuerafrika.com

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Swakopmund Hotel – 30 rooms

This is certainly Namibia's premier coastal holiday resort. This 4-star luxury hotel has been built around the impeccably restored 'Bahnhof' (old train station building) where the old ticket sales area has been transformed into the reception and hotel lobby. Colonial in style, the hotel is set around a large quad with immaculate lawns, a sparkling swimming pool and lofty palm trees. Enjoy the luxury of one of 90 en suite rooms, most of which overlook the pool. Seven TV channels, mini bar and fridge, baby-sitting service and 24-hour room service are available. The Station Grill and the Platform One Restaurant offer mouth-watering menus. Attached to the hotel is the lively entertainment centre with its rustic pub, casino, gym and conference facilities for up to 300 delegates.

Nett price per double rooms N\$1 770.26
Nett price per single room N\$1 108.96

Distance from the conference venue: *the conference will be held at the Swakopmund Hotel—therefore no transfer required.*

Hotel Pension A La Mer – 10 rooms

This hotel is situated in the heart of Swakopmund and offers you charming accommodation with en-suite bathrooms. Only 20 seconds away from the beach and jetty, this pension has 24-hour security. It has a warm friendly atmosphere and a sumptuous breakfast awaits you in the morning.

Nett price per double room N\$421.20
Nett price per single room N\$269.10

Distance from the conference venue: *Situated about 20 minutes walking from the Conference—therefore transfer required.*

Transfer cost: N\$60.00 per person nett, one way



Guesthouse Indongo – 6 rooms

Indonga is a stately home converted into a guesthouse with 6 en suite bedrooms, breakfast and bar facilities, lounge, sun deck and expansive gardens. It is 200 m from the beach and 10 minutes from the centre of town. Recently renovated, this house is equipped with



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all the modern conveniences and offers in-house guests the use of free wireless Internet that is accessible 24/7. Guests can enjoy full English or continental breakfast at the house, or dine at from a superb selection of nearby restaurants to suit every taste. If a personalized service is what you enjoy, then Guesthouse Indongo is your place to stay in Namibia.

Nett price per double room N\$742.00
Nett price single Room N\$640.00

Distance from the conference venue: *about a 10-minutes driving distance from the Conference—therefore transfer required.*

Transfer cost: N\$60.00 per person nett, one way

Deutsches Haus – 12 rooms (3 single rooms, 9 double rooms)

Deutsches Haus is conveniently situated only a few minutes away from the town centre. Comfortable guest rooms all have en suite facilities including self-dial telephones. Guests can relax in the attractive recreation area, with a solar-heated indoor swimming pool and sauna or, alternatively, at the private bar.

Nett price per double room N\$675.00
Net price single room N\$450.00

Distance from the conference venue: *about 10 minutes' walk from the Conference—therefore no transfer required. However if you do not feel comfortable walking.*

Transfer cost: N\$60.00 per person nett - one way



Pelican Bay Hotel – 25 rooms

Situated on the edge of the picturesque Walvis Bay lagoon, the Pelican Bay Hotel consists of 47 twin-bedded en suite rooms (24 non-smoking), a presidential suite, a junior suite and a room designed specially for the disabled. Each room has a stunning lagoon view where you can watch the birds or dolphins frolic from the privacy of your own balcony. Each room has the facilities the discerning traveller might require including satellite television, direct dial telephone, tea and coffee facilities, in room, individually controlled air conditioning, and infra red heating lamps in the bathrooms and room services.

Nett price per double room N\$866.00
Net price single room N\$712.00

Distances from the conference venue: *about 30 minutes' drive—therefore transfer required.*

Transfer cost: N\$130.00 per person nett - one way



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The Burning Shore – 7 rooms

Nestled amidst this ethereal beauty, on the edge of the largest sand dunes in the world, overlooking the mighty expanse of the Atlantic Ocean in between Swakopmund and Walvis Airport is the Burning Shore Beach Lodge. A modern, luxurious establishment, this ocean-side lodge is located on Long Beach just south of the unique quaint town of Swakopmund. It offers 7 luxury rooms and 5 luxury suites, all enjoying private bathroom facilities.



Nett price per double room N\$640.00

Nett price single room N\$490.00

Distance from the conference venue: about 15 minutes drive from the Conference—therefore transfer required.

Transfer cost: N\$70.00 per person nett - one way

Hotel Haus Garnison – 7 rooms

This establishment is very centrally situated within about 4 minutes' walk to the city centre and 500 metres to the beach. All rooms are equipped with shower/bath, toilet, a mini kitchen, telephone, cooling fan & heater. Beer, wine and non-alcoholic beverages can be obtained from our self-help bar facilities or served in the tranquil atmosphere of our lush garden.



Nett price per double room N\$470.00

Net price single room N\$310.00

Distance from the conference venue: about 10 minutes' walk—therefore no transfer required.

However if you do not feel comfortable walking.

Transfer cost: N\$60.00 per person nett - one way

Hotel Garni Adler – 14 rooms

The hotel has 14 individually decorated en suite bedrooms, each containing telephone, TV (satellite), hairdryer and underfloor heating—the luxury rooms have a fridge and a safe. Enjoy the indoor swimming pool and sauna. Relax on the roof terrace with a beautiful view over the ocean and the dunes. For your sundowner there is a small bar for house guests. Various good restaurants are close by.



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Nett price per double room N\$737.61

Nett price single room N\$569.74

Distance from the conference venue: about 30 minutes' walk—therefore transfer required.

Transfer cost: N\$60.00 per person nett - one way

Hotel Prinzessin Rupperecht – 9 rooms

You will find the gracious historical building built during German colonial times in the heart of Swakopmund. Accommodation comprises two family flats, 14 double rooms with en suite facilities and 5 single rooms. All rooms are equipped with telephones and a fridge and there is a TV in the comfortable lounge. Full or half-pension is possible.



Nett price per double room N\$ 265.00 per person

Nett price single room N\$ 240.00 per person

Distance from the conference venue: Situated about 30 minutes' walk—therefore transfer required.

Transfer cost: N\$60.00 per person nett - one way

Strauss Holiday and Overnight Flats – 9 rooms (2 double and 7 single rooms)

Strauss provides eight well-proportioned, tastefully furnished rooms and self-contained apartments with lovely single rooms and larger apartments for bigger groups. There are 4-Channel TV and fans in all the rooms, telephone and Internet facility. English breakfast is served overlooking the tranquil garden and water features.

Nett price per double room N\$488.37

Net price single room N\$376.45

Distance from the conference venue: about 15 minutes' drive—therefore transfer required.

Transfer cost: N\$60.00 per person nett - one way

Free Air Guest House – 7 rooms (block booking valid only to the end of June)

This guesthouse has 10 en suite rooms with breathtaking views of the lagoon. Rooms have television, safe and tea/coffee making facilities. There is secure parking and big screen TV in our fully licensed guest bar. A continental breakfast is served upstairs breakfast room boasting panoramic views of the lagoon. Small meals and refreshments can be ordered throughout the day.



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Nett price per double room N\$510.00

Net price single room N\$470.00

Distance from the conference venue: about 30 minutes' drive—therefore transfer required

Transfer cost: N\$130.00 per person nett - one way

Langholm Hotel Pension – 14 Rooms

The award-winning Langholm Hotel is situated close to the magnificent wetland of the Walvis Bay Lagoon, and at the edge of the Namib Desert. It has 13 double rooms each with bathroom en suite, television, telephone, safe and fridge.

Nett price per double room N\$520.20

Net price single room N\$591.60

Distance from the conference venue: about 30 minutes' drive—therefore transfer required.

Transfer cost: N\$130.00 per person nett – one way

Social functions

Sunday evening 22 July 2007

Registration will take place from 17:00–18:00 at the conference venue.

Cocktail party

This function will take place at 17:30 during and after registration and will serve as an 'ice-breaker' for delegates who register early for the conference. Please indicate your attendance on the registration form for catering purposes.

Cost: Included in conference registration fee.

Monday 23 July 2007

Restaurant tour

The evenings event introduces delegates to a wide range of exciting restaurants in Swakopmund. Delegates will be divided into three groups and, each group will visit a different restaurant for starters, main meal, and dessert. Please indicate your attendance on the registration form for catering purposes.

Cost: Included in conference registration fee.



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Conference gala dinner

Please indicate your attendance on the registration form for catering purposes.

Dress: Smart casual - please dress warmly.

Cost: Included in conference registration fee. A cash bar will be available.

Technical visit

The technical site visit, during the conference will be to Rössing mine.

The cost of the technical tour is included in the registration fees. Please note this visit will take place over three days (Monday 23 July, Tuesday 24 July and Wednesday 25 July 2007). Due to restrictions on the mines only 45 delegates will be allowed to attend per day.

Rössing: a large open pit uranium mine, is situated in Namibia, south-western Africa and started operations in 1976. It is located close to the town of Arandis 65 kilometres inland from the coastal town of Swakopmund in the Namib Desert in the Erongo Region of Namibia.

Rössing's product is uranium oxide (U_3O_8) and its customers the nuclear power utilities throughout the world where the uranium oxide is used in the generation of electricity in nuclear power utilities by countries in Central Europe, North America and South-East Asia. Rössing is one of the largest open pit uranium mines in the world; with solid reserves, it will continue to serve the world nuclear energy industry. The mine currently produces about 7.55% of the world's uranium.

Rössing is part of the Rio Tinto Group of companies, which currently holds 68.6% of Rössing's equity.

At the heart of Rössing Mine are its more than 800 employees of whom 96% are Namibian citizens. The mine's most important objectives are that all employees work without any safety-related incidents; maintaining excellent levels of health and following sound environmental management practices.

Working closely with the Arandis community the Rössing Foundation strives to ensure an economically independent and self-sustaining town.

Mining: Drilling, blasting, loading and haulage recover the uranium ore at Rössing. Due to erratic distribution of minerals in the ground, waste and ore are often mixed together. Radiometric scanners measure the radioactivity level of each truckload. This determines

whether the material is sent to the primary crushers or to the low-grade stockpile. Waste is transported to a separate dump. The size of the open pit is 3 km long, 1 km wide and about 300 metres deep.

Processing plant: The Rössing uranium processing plant consists of the following unit operations:

- *Crushing and grinding:* ore is delivered to the primary crushers by haultruck and then by conveyor to the coarse ore stockpile. After a further series of crushers and wet grinding of the material by means of steel rods, a slurry is produced for leaching
- *Leaching and slime separation:* a combined leaching and oxidation process takes place in large mechanically agitated tanks. The uranium content of the pulped ore is oxidized by ferric sulphate and dissolved in a sulphuric acid solution. Slimes are removed from the leached slurry via cyclones and washing in Rotoscopes to remove traces of uranium-bearing solution, before the sand is transported via a sand conveyer to a disposal area.
- *Thickening:* counter-current decantation (CCD) thickeners wash the slimes from previous stages. A clear uranium bearing solution ('pregnant' solution) overflows from no.1 thickener, while the washed slime is mixed with the sands and pumped to the tailings area.
- *Continuous ion exchange:* clear pregnant solution from the CCD is contacted with specially formulated resin beads, where uranium ions are adsorbed onto the resin and are preferentially extracted from the solution. Resin is removed periodically to elution columns where uranium is eluted using an acid wash to produce a purified and more concentrated uranium solution.
- *Solvent extraction:* the acidic eluate from the ion exchange plant is mixed with an organic solvent that which extracts uranium. In a second stage, the organic solution is mixed with a neutral aqueous ammonium sulphate solution which takes up the uranium-rich 'OK liquor'. The acidic 'barren aqueous' solution is returned to the elution columns.
- *Precipitation and filtration:* the addition of gaseous ammonia to the 'OK liquor' raises the solution pH, resulting in precipitation of ammonium diuranate, which is then thickened to a yellow slurry. The ammonium diuranate is recovered on rotating drum filters as yellow paste—'yellow cake'.

- *Drying and roasting:* final calcining drives off the ammonia, leaving uranium oxide. The product is then packed into metal drums.
- *Loading and dispatch:* the drums of uranium oxide are loaded and exported to overseas converters for further processing. At full capacity, the plant can produce 4 500 tonnes of uranium oxide each year.

REF: www.riotinto.com; www.rossing.com

Post-conference technical visits

Thursday 26 July and Friday 27 July 2007

Technical tours will be organised to the following mines. **Due to flight number restrictions and mine restrictions, the technical visit registrations have now closed as the numbers have been exceeded.**

Tour price: R2 500.00 Ongopolo (Tsumeb) — 26 July 2007

Tour price: R3 000.00 Skorpion Zinc and Rosh Pinah Mine (Rosh Pinah) — 26 July 2007

Tour price: R5 000.00 Skorpion Zinc and Rosh Pinah Mine (Rosh Pinah) — 26 July 2007 and Ongopolo (Tsumeb) — 27 July 2007

Rosh Pinah Mine

Situated in south-western Namibia, 800 km south of Windhoek, this is an underground mine employing approximately 540 people. The mineral deposit occurs in complex structural settings, favouring silling and benching mining methods.

The mine has continually sought to increase operational efficiency and de-bottleneck processes have increased current production to 126ktpa of zinc concentrates, fully sold to Exxaro's zinc refinery at market-related prices. The lead concentrate is sold to international customers.

Intensive on-mine exploration is underway to add to the total mineral resource of 7Mt. The current economic mine life of six years is based on zinc concentrate production of 120ktpa. Limited exploration is also being conducted on targets outside the immediate mine area and the mine has



entered into an exploration agreement with Ambase Exploration (Namibia) (Pty) Limited which will allow the two companies access to select areas under each other's prospecting permits for exploration.

Exxaro holds 89.5% in Rosh Pinah, with Namibian empowerment groupings holding the balance. Negotiations are underway to divest of a further 39.5% to Namibian empowerment groupings. This will reduce Exxaro's shareholding in Rosh Pinah to 50% but the group will continue to manage this operation.

REF: www.exxaro.com

Skorpion Zinc

Situated 25km north of Rosh Pinah in southern Namibia, Skorpion Zinc is a world-first in zinc extraction and production. 150 000 tons of special high grade (SHG) zinc is produced per annum, which is shipped to worldwide markets through the southern port of Luderitz. Anglo American attained 100% ownership of the Skorpion deposit and the project was approved by the board of AA plc in September 2000 at a capital cost of US\$454 million. Construction of the world-class Skorpion Zinc mine and refinery commenced in January 2001.



In keeping with the vision to 'establish Skorpion Zinc as the leader of excellence in the global zinc market', the mission remains to 'maximize production, in both quality and quantity, in a safe and responsible manner through efficient processes and empowered people'. At Skorpion, a high premium is placed on the continuous development and empowerment of the workforce, while keeping in line with the latest technological innovations to ensure the supply of discerning world markets with the high quality product to which they have become accustomed.

Geology: the Skorpion orebody is unique and comprises an oxide deposit due to intense weathering of previous zinc sulphide ore minerals. Limestone is inter-fingered with the zinc-oxides to form a very complex body. Integrated grade control is required for selective mining. The resource contains > 20 million tons of zinc ore at a grade of 11%, resulting in ± 2.2 million tons of zinc.

Mining: the essential grade control requires regular liaison between Mining and the

Refinery. the mine will extract on average 1.5 million tons of ore per annum from the open pit with 10 m bench heights. A combination of blasting and hydraulic excavation is used to expose the ore for hauling with a fleet of 5 tipper trucks. The final shape of the pit is to be 1 km long x 800 m wide. The entire mining fleet is maintained on site.

Refinery: The Skorpion Zinc Refinery comprises of the following circuits:

- **Comminution and tailings:** zinc ore and limestone, from mining, are crushed and milled. The products are thickened for feeding into the leach and neutralization circuits respectively. The residue from the refinery process is sent by conveyor belt in a cake form to the tailings dump some 3 km away.
- **Leaching and purification:** the zinc ore is leached with sulphuric acid, followed by neutralization for impurity removal. Residue is sent to the tailings dump, while pregnant leach solution (PLS) is fed to the solvent extraction circuit. A portion of the PLS is fed to the Cu/Ni cementation circuit.
- **Acid plant:** the sulphuric acid plant is a sulphur-burning plant, producing two types of acid i.e. industrial and chemically pure acid. The waste heat generated from the acid plant is used to produce steam and keep the refinery at temperature. There are also two 14MW electrode boilers to produce steam if the acid plant is down at any time.
- **Solvent extraction (SX):** Zn is extracted from the PLS in the SX circuit using mixer-settlers. SX raffinate (Zn diminished solution) is recycled to the leaching circuit. Loaded organics, after chemical and mechanical washing to remove impurities, are stripped with electrolyte to produce a loaded electrolyte for electrowinning. HCl is used to regenerate the organics, which are reused. A reverse osmosis plant provides demineralised water.
- **Electrowinning:** this section uses large amounts of electrical power (90MW) to plate zinc out of the loaded electrolyte solution and onto solid cathodes. The cathodes produced are of special high grade quality (99.995% pure zinc).
- **Cast house:** the zinc cathode sheets stripped out of electrowinning are fed into melting furnaces. From here ingots or jumbo forms are cast for sale to the international markets.

REF: www.skorpionzinc.com.na

Ongopolo Mining and Processing Ltd

Weatherly International assumed management of Ongopolo Mining and Processing Ltd in April 2006 under an interim management agreement pending completion of the acquisition

three months later. In acquiring Ongopolo, Weatherly has gained a highly skilled and experienced workforce of some 1200 people. This in itself represents an extremely valuable long-term asset as the company continues to build a world-class mining and processing company in Southern Africa.

All of Ongopolo's operations are located along a strategically important and efficient transport route in southwest Africa, stretching from the port of Walvis Bay on the Atlantic coast to the major copper producing areas of Zambia and DRC.

The company's main operating assets currently consist of three mines, three concentrators and a smelter. The Otjihase and Matchless mines are located in central Namibia close to the capital Windhoek, while the Kombat mine and the nearby smelter at Tsumeb are in the north of the country. In addition, a new underground mine, Asis Far West, is being developed to replace the declining Kombat mine. An 800-metre shaft has been completed at Asis Far West and lateral development of the main orebody is underway. Other development projects include the Tsumeb West and Tschudi mines.

Weatherly has a number of promising exploration projects, including copper deposits at Gross Otavi Central and below the Farm Berg Aukas lead/zinc mine; Harasib, where three zones of lead and zinc mineralization have been delineated; and an interest in the Valencia uranium deposit in western Namibia.

The Tsumeb copper smelter, comprising three furnaces, is a key asset. The current operating capacity of the first smelter is 24.000 to 32.000 tons per annum, while the second, larger copper furnace and the zinc furnace require refurbishment. Weatherly intends to examine the feasibility of expanding Ongopolo's smelting capacity significantly in the future, which could eventually enable it to process much larger volumes of ore concentrates from other mining companies in the region, and potentially from its own extensive Luanshya deposit in Zambia.

REF: www.weatherlyplc.com

Accompanying person's programme

Cost to register and participate in the accompanying person's programme is R1 500.00. This price includes all conference lunches and social events, but not the technical visits. Each accompanying person will receive a gift, programme and name tag. Please consult our website for a range of private tour operators that can organise tours for you.

Website: <http://www.basemetals.org.za/Swakopmund2007>

General information

Banking / credit cards / foreign exchange

In all major centres in Namibia, there are banking institutions that are affiliated with international banks. Visa, Master card, Access and American Express are acceptable in most good tourist hotels and restaurants etc. Banking hours: 09:00 to 15:30 Monday to Friday; 08:30 to 11:00 Saturday. Currency restrictions: importation of local currency limited to N\$500. Importation of foreign currency unlimited. Exportation of local currency limited to N\$500. Exportation of foreign currency limited to the amount imported.

Car rentals

Avis Namibia Rent a Car - Central Reservations—Tel (Intl): +264 6420 7527

Budget Rent a Car - Central Reservations—Tel (Intl): +264 6420 4624

Europcar Interrent - Central Reservations—Tel (Intl): +264 6420 3651

Imperial Car Rental - Central Reservations—Tel (Intl): +264 6420 7391

As a rule, hired cars may not be driven across the border to other African countries.

Climate

The days are warm and dry but nights are cold. Rainfall on the coast is very low, and a little higher inland. The average annual rainfall in Windhoek is 360 mm / 14 inches and the maximum daily temperature is 20 to 30 Celsius / 68 to 86 Fahrenheit. Please pack warm clothing.

Currency

Namibian dollar (N\$) divided into 100 cents. The value is equal to the South African rand. The South African rand is also legal tender in Namibia.

Electricity supply

The electricity supplied in Namibia is 220 to 240V (50Hz)—3 x round pin 15 amp plug. Hotels usually provide dual voltage 2-pin razor sockets (100–120V and 220–240V).

Flight information

Sheduled flights into Namibia from South Africa are as follows:

Between Johannesburg and Windhoek in both directions:



CONFERENCE

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Mondays and Fridays: 6 flights a day: 2 on SAA, 2 on SA Express, 1 on BA Comair and 1 on Air Namibia

Tuesdays to Thursdays: Same as above but Air Namibia offer a second flight

Saturdays 5 flights: 2 on SAA, 2 on Air Namibia and 1 on BA Comair

Sundays 4 flights: 2 on SAA, 1 on Air Namibia and 1 on BA Comair

Between Cape Town and Windhoek in both directions:

3 flights per day, 2 on Air Namibia and 1 on SA Express

Between Johannesburg and Walvis Bay:

1 flight daily with the exception of Saturdays, on S A Express

Between Cape Town and Walvis Bay:

2 flights a day with the exception of Saturdays: 1 on SAExpress and 1 on Air Namibia

Between Windhoek and Walvis Bay:

1 flight daily with the exception of Saturdays, on Air Namibia

Please note that Walvis Bay is the nearest airport to Swakopmund offering a the gateway to sheduled flights. It is about 35 km away.

International flight times are available from the Airports Company of South Africa under Flight Info. Tel: +27 (011) 921 6262 or Fax: +27 (011) 921 6385.

Website: <http://www.airports.co.za>

Information desk

An information desk will be staffed daily in the conference office from 07:30 to 17:30.

Language

The language of the conference will be English. Official languages in Namibia are English and Afrikaans. There are several local languages including Ovambo, Herero, and Khoisan. German is common among the Europeans.

Lunches and refreshments

The cost of the lunches and morning and afternoon refreshments during the conference is included in the registration fee.

Messages, telephones, facsimiles and photocopying

The information desk in the conference office will take incoming messages for delegates. A facsimile transmission facility will be available. Delegates will be requested to pay for all outgoing calls. Photocopying facilities will be available at the organiser's office.



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Speed limits

The general speed limits in Namibia are, according to the Road Authority of Namibia:

- 60 km/h on a public road within an urban area (may be lifted to 80 km/h on some major urban roads).
- 120 km/h on every tarmac freeway.
- 80-120 km/h on non-tarmac freeway ('gravel' road).

Standard time

Time difference for Namibia, when you are in: USA East +6 hours, USA West +9 hours, Great Britain +1 hour, Nigeria +0, South Africa -1 hour, India -4½ hours.

Tipping

Tipping is expected only in upmarket tourist establishments where a service charge is not included. In this case, a 10% tip is suggested. Tipping is officially prohibited in national parks and reserves. Hagglng for local handicrafts at roadside stalls is quite acceptable.

Visas

Countries whose nationals do not require a visa include:

Angola, Austria, Belgium, Botswana, Brazil, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Kenya, Lichtenstein, Luxemborg, Mozambique, Netherlands, Norway, Russia, Singapore, South Africa, Sweden, Switzerland, Tanzania, UK, USA, Zambia, Zimbabwe (visiting for tourism only).

Countries whose nationals do require a visa include:

All countries not shown above.

Zimbabwe for business puposes.

Visas are issued at Namibian Embassies.

Waiver of liability

The conference organisers have taken reasonable care in making the arrangements for the conference, including technical visits. The organisers do not accept liability for any loss or injury sustained, or for unforeseen changes to the programme. The organising committee reserves the right to cancel any tour or visit due to insufficient interest.

