

Newsletter - December 2014



Company's outline and profile

The North American Tungsten Corporation's Cantung Mine is the largest tungsten producer in the western hemisphere, producing 300,000 metric tonne units (22.4 pounds per MTU) from 410,000 tons of ore per annum. The mine is considered remote and is located in the Flat River valley of the rugged MacKenzie Mountains. Originally a fully self-contained town, with a population peaking at 600, employees now commute in and out of the site on a rotational schedule. The mine currently employs about 270 people (including contractors).

Operations commenced in 1962 with an open pit, at a nominal 300 tons per day, but have been subject to world tungsten prices and have incurred a number of shutdowns and re-starts.

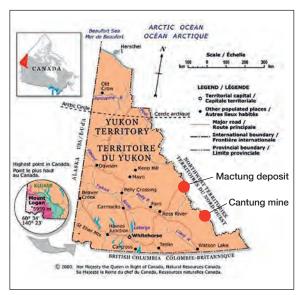
The last re-start was in October 2010, the operation, with a complete upgrade of surface facilities, plant and residential; a completed mine deepening program below the existing workings; new production and development equipment in the mine; new diesel generators and management systems; waste heat recovery system; on-going underground diamond drilling program; and a seasonal surface diamond drilling program. Cantung mine has just issued a 43-101 which now extends the mine life for another five years.

Location and geology

61 Degrees, 58 Minutes, North Latitude; 128 Degrees, 15 Minutes, Longitude; 3,750 feet above sea level.

Geological mapping of the Flat River area was conducted by Blusson during the 1962 and 1963 field seasons. Blusson described the area as underlain by a late Precambrian to Devono-Mississippian succession of miogeocynclinal carbonate and coarse and fine clastic sedimentary rocks. This succession is moderately deformed into a complex synclinal structure the axis of which trends Southeasterly down the Flat River. Subsequently the area has been intruded by a series of discordant Cretaceous granitic stocks. Detailed resolution of the local stratigraphy and structure is not fully complete even now. A number of workers including employees of the then Canada Tungsten Corporation (now NATCL) have contributed to the understanding of the local geology. Some of the more significant documented works include Crawford (1963), Read (1965), Abbott (1975), Zaw (1976) and McDougall (1977). Geology within the bounds of the flat river is poorly understood due to cover by surficial deposits. Further detailed geological mapping is required to properly assess the mineral potential of the region and to continuously prioritize exploration targets.

According to Zaw (1976) skarn mineralization in the E-Zone is more closely fracture and fault controlled, suggesting that these acted as channel-ways for skarn-forming solutions.

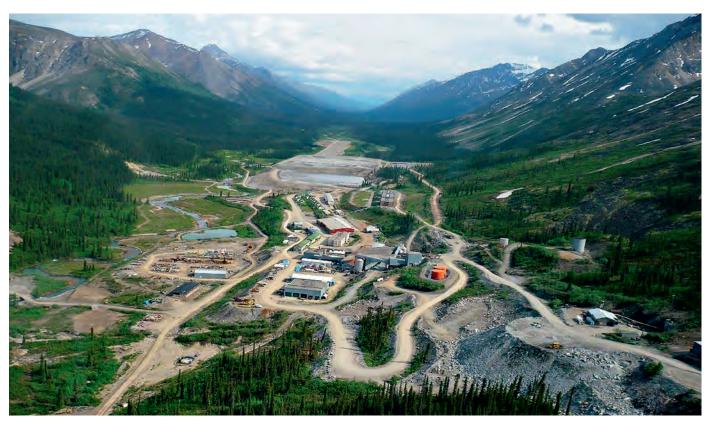


Location of the Cantung mine and the Mactung deposit

The proximity of skarn mineralization to the hanging wall and foot wall contacts of the Ore Limestone away from the pluton may suggest that lithological contacts form conduits for mineralizing solutions and that skarn mineralization develops along the contacts of rock units from which the chemical components of skarn mineralization are derived. This process occurs in the presence of an aqueous reaction medium, in part, of magmatic origin and is chemically favourable for the precipitation of scheelite. Uncomformities within the stratigraphic succession make correlation in the district difficult. A number of distinct units are present throughout the district and form the basis for definition of the more complex stratigraphy. Many discontinuous sedimentary deposits also occur in the Tungsten area and locally have profound expressions. The stratigraphic complexity of the area is demonstrated by the variation in the following stratigraphic sequences present at the Baker prospect, the mountain between 318 and Sawmill Creeks and the east side of the valley north of the Townsite. It is clear that detailed stratigraphic mapping is required in the more complexly deformed areas to resolve the problems of structural geology and hence identify favourable exploration targets.

History

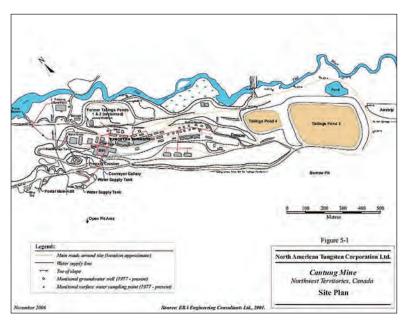
- 1954 Northwest Exploration Ltd, a subsidiary of Kennecott Copper, discovered the Axel copper showing on what is now the Open Pit Ore Zone. The showing was tested by diamond drilling but because copper values were low and scheelite was not recognized the claims were allowed to lapse in 1958.
- 1958 The summer prior to the claims lapsing, a prospector hired by the MacKenzie Syndicate had discovered tungsten by panning sands and gravels of the Flat River near Tungsten. He had correctly identified the heavy, light-coloured mineral as scheelite and, after further investigation, confirmed the existence of scheelite in the area which was to become the open pit. The property was immediately restaked by the MacKenzie Syndicate after the Kennecott claims lapsed.
- 1959 The MacKenzie Syndicate consisted of three men Karl Springer, James Redpath, and J.M.R. Corbet. The Canada Tungsten Mining Corporation (CTMCL) was formed by them, to develop the property. Redpath and Corbet have served continuously since then on the Board of Directors of CTMCL.



Aerial photo of the Cantung mine. Ore dressing plant in the foreground, tailings pond and air strip in the background

- 1960 427 tons of supplies were airlifted from Watson Lake, on to an ice airstrip, on the Flat River by Douglas C-46 and Bristol type aircraft.
- 1961 Initial open pit equipment was airlifted into Tungsten, including one 1½ yard shovel and three D7 tractors. And 55 miles of access road were completed by the Company and the Canadian Government.
- 1962 A 300 tpd concentrator was put into service in November.
- Normal operations were suspended in July as the price of tungsten concentrate dropped from \$18 to
 \$8 per short ton unit due to competition from foreign suppliers.
- 1964 Tungsten prices recovered to a high of \$28 per short ton unit during the year and normal operations resume.
- 1966 A fire, on December 26th, destroyed the concentrator and crushing facilities.

- A leaching plant to process scheelite float concentrates was commissioned in North Vancouver.
- 1967 The first foundations for a 350 T.P.D. mill were poured on May 8th and, by the end of November, ore was being processed.
- 1968 Open pit mining takes place over a period of 3.5 months per year with ore movement of 2,500 tons per day and waste movement 4,500 tons per day. Ore is stockpiled near the crusher to a nominal maximum inventory of 130,000 tons per year to sustain the mill feed over the off-mining season.
- 1970 Mill tailings were cycloned to develop a tailings product suitable for building retaining dams.
- 1971 Copper concentrate was stored at the minesite, as copper prices were too low to justify shipping to Japanese smelters.
 - The 'E' Zone was discovered by diamond drilling testing a Turam geophysical anomaly (Anomoly E).



Site plan of the Cantung mine

- 1972 A contract for 4,000 feet of access drift was awarded to Canadian Mine Services. This drift was to serve as a drilling base for underground diamond drilling and a production haulageway.
- 1973 An underground orebody was defined and plans finalized to begin production from underground in 1974.
- 1974 Starting on June 15th, all mill feed came from the underground orebody.
 Tungsten prices hit an all-time high of \$107.18 per STU.
- 1975 Mill testwork was successfully completed and equipment installed to remove talc from the underground ore which had been seriously reducing WO₃ recovery for the previous two years.
- 1976 "Mineable" underground ore reserves were estimated for the first time.
- 1977 In May, the Board of Directors approved a \$10,000,000 expansion program to increase the mill capacity from a nominal 500 T.P.D. to 1,000 T.P.D.
- 1979 Additions to the plant included a new mine dry and office complex, 800 feet of pavement in the underground main haulageway, increased compressor and

- underground ventilation capacity, and the installation of an underground workshop and two surface 150,000 gallon fuel tanks.
- 1980 Mine operations were shutdown from November 14th until the end of the year, due to a strike by the United Steelworkers of America.
 - A record 349,000 tons of ore were processed yielding a record 442,000 STU's.
- 1982 Mine production was reduced by 15% in November, due to falling demand for tungsten.
- 1983 Completed conceptual engineering and procurement for construction.
- 1984 Construction bids stopped due to deteriorating tungsten prices.
- 1986 Production suspended due to low world tungsten demand and continuing labour strife at the mining operation. Eventually, the town was abandoned, leaving only a caretaker staff on site.

NATCL ownership

- 1997 North American Tungsten Corporation Ltd (NATCL) acquires tungsten assets from AUR Resources Ltd.
- 2002 NATCL announces production resumption at Cantung Mine on January 31st.
- 2003 NATCL, on December 5th, announces suspension of operations and places Cantung Mine on Care and Maintenance.
- 2005 After a period of financial re-structuring, NATCL resumes operations at Cantung Mine on September 1st.
- 2009 NATCL announces that Cantung Mine will be placed on Care and Maintenance on October 15th, due to increased product inventory and declining tungsten prices.
- 2010 NATCL resumes operations at Cantung Mine on October 7th production commences.

Recent capital improvements

	2009	2010	2011	2012	2013 Q1 & Q2	total
Mine Development (West Extension Deepening)	1,418,591	566,598	12,453,000	13,573,600	-	28,011,789
Mine Infrastructure & Equipment	1,216,490	2,061,003	4,894,024	5,876,522	962,811	15,010,850
Mill	274,616	1,456,925	548,201	460,109	422,899	3,162,750
Surface	99,307	99,833	388,700	643,568	326,910	1,558,318
Power	760,162	1,798,336	4,145,037	993,416	170,107	7,867,058
Tailings Management	15,266	747,857	2,338,455	2,492,713	292,245	5,886,536
Environmental	44,665	116,469	538,428	32,072	-	731,634
Total Actuals	3,829,097	6,847,021	25,305,845	24,072,000	2,174,972	62,228,935
Reclamation	-	-	3,561,000	600,000	68,349	4,229,349
Total Actuals	3,829,097	6,847,021	28,866,845	24,672,000	2,243,321	66,458,284

All above figures are in Canadian dollars

Administration

Site management, supervision, employee relations, warehousing and ordering are all directed from the mine site. The Cantung mine site is a remote site with employees and materials either flown or transported to the site. There is an all-weather road to site from Watson Lake, Yukon and a 4,000 foot gravel airstrip at site. Charters transport employees from collection points throughout British Columbia and the Yukon. Employees outside of BC and the Yukon travel to Vancouver to catch these weekly charters.

The operational workforce commutes from all reaches of Canada and typically work a three week on – three week off rotational schedule. There are two 12 hour shifts, per day, worked on surface and in the mill, and two 11 hour shifts per day worked underground. Due to the continuous 24/7 operation, and the rotational schedules, half the crew is on site while the other half are scheduled off. All management and supervision positions have cross-shifts to maintain the continuous operation. Schedules are staggered into four groups for effective transportation, housing and commuting schedules.



Power generators with heat recovery systems



Air transport for the operational workforce

Outdoor recreation includes hiking, fishing and natural hotsprings on site. The catering and housekeeping are contracted out.

Mine operations

Mining methods

In the recent past, the mine used a variety of mining methods including room and pillar, cut and fill, and longhole stoping.

Currently, longhole methods are planned for virtually all of the remaining reserves, both for pillar recovery and for primary mining in the 3600 and PUG areas. The addition of cemented backfill and the transition from remnant mining to undisturbed ore bodies over 2011 will have a significant impact in productivity and costs at Cantung.

Ground conditions and rock mechanics considerations

The Cantung Mine is in relatively good physical condition. Ground conditions can be classified as generally good to very good, with the exception of localized weaker parts where the ground has deteriorated due to mining extraction, due to the occurrence of weaker rocks and structures, or a combination of both.

Within the ore body envelope, there are occasional weaker zones, mostly attributed to structural settings and these



Drilling operations

areas require more extensive ground control work than in other areas in order to maintain safe access and working conditions.

The primary access and infrastructure openings are well supported, large in size, and driven in good to very good ground. Primary ground support consists of different lengths of mechanical and friction type rock bolting, wire mesh screening, and strapping. Local ground conditions dictate the type of application, spacing, and length of rock bolts used.

There are areas in the old workings where pillars have failed and the hanging wall has deteriorated. Some parts of the remnant ore extraction zones have wide spans, in excess of 30 ft, across the intermediate backs. Wide-span back areas are supported with rebar and split set rock bolts, cable bolts and wire mesh screen. The area of hanging wall failure is expected to expand as pillar mining progresses; however, no threats to active areas are anticipated. Geotechnical monitoring of key areas and regular review of ground support practices and procedures are carried out based on the results.

Mining areas

The Cantung Mine workings extend vertically from 3600 up to the 4350 level and cover a strike length of approximately 5,000 ft. In order of size, the key underground mining reserve areas are:

- Pit Underground
- Amber Area
- E Zone Pillars

Mill Operations

Primary crushing

Ore is handled from the stockpile by a loader or directly dumped from haulage truck into a 30 ton receiving bin equipped with 42 in x 10 feet apron feeder, which, in turn, feeds a 42 in x 48 in jaw crusher. The jaw crusher is set to produce a nominal five inch crushed product. A conveyor transports crushed ore into a 1,000 ton capacity coarse ore bin. This bin acts as a surge bin for the secondary crushing circuit.

Secondary and tertiary crushing

A vibratory feeder and a conveyor feed a standard cone crusher set at 1 inch. The crushed ore is discharged via conveyor to a vibrating screen equipped with aslotted screen.



Crude ore dumping

The oversize feeds a 4¼ ft (tertiary) short-head cone crusher set at 3/8 in. The tertiary crusher discharge combines with the secondary crusher discharge to feed the screen in a closed-circuit recycle. Screened undersize (minus 7/16 in.) product is conveyed to two fine ore bins ahead of the grinding mills in the concentrator. Dust is controlled by the use of a wet scrubber with the discharge effluent returning to the mill.

Grinding, classification and talc flotation

The grinding circuit consists of rod mill, plus ball mill. The rod mill is fed from two fine ore bins via belt conveyors then discharges ground ore slurry into a sump along with discharge from the ball mill for pumping to vibrating screens. The screen oversize drops by gravity to a pump which then transports the slurry to a cyclone that removes excess water prior to further grinding of the solids in the ball mill. As noted above, ball mill discharge joins rod mill discharge for presentation to the vibrating screens. Water removed by the cyclone is reused for screen feed dilution. Particles larger than the screen openings will circulate through the ball mill until they are reduced in size sufficiently to pass through the screen openings.

Screen undersize also drops by gravity to a pump which then transports the slurry to a set of cyclones that classifies according to particle size. Particles larger than the cyclones cut point drop by gravity to the sands bulk sulfide flotation unit operation. Particles smaller than the cut also drop by gravity to a 38 foot diameter three tray stacked thickener. Thickener underflow at requisite density is pumped to the slimes bulk sulfide flotation unit operation. Thickener overflow water is recycled as process water.

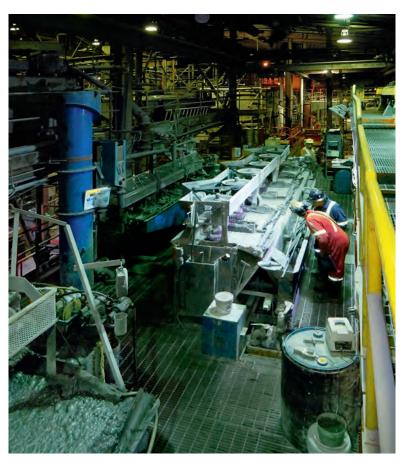
Sulphide flotation

Underflow from the size separation cyclones, after conditioning with appropriate promoters, collectors, depressants, and frothers, is directed to flotation cells to remove sulfide minerals which would be deleterious in the downstream scheelite recovery processes. Concentrates can be directed to a copper separation circuit or rejected to tails depending on copper content. Tailings are pumped to the scheelite gravity recovery circuit.

Overflow from the size separation cyclones, after thickening, is directed to flotation cells to remove sulfide minerals in the same manner as in the sands sulfide flotation operation. Concentrates can be directed in the same manner as well. Tailings are pumped to the Scheelite flotation recovery circuit as the particle size is too small for effective gravity recovery.

Gravity separation

Sands bulk sulfide flotation tails are distributed to triple deck shaking tables for rougher concentration of scheelite. Concentrate from these tables is cleaned on single deck tables



Flotation cells

then pumped to a final sulfide mineral removal flotation step then to a dewatering classifier before going to the high temperature dryer. Rougher table tails then join tails and middlings from other tables to undergo de-sliming with a cyclone. The cyclone overflow containing particles too small for effective gravity recovery and excess water goes to the scheelite flotation recovery circuit after thickening.

Cyclone underflow containing particles that remain amenable to gravity separation but are considered to be locked minerals as middlings that require further size reduction to liberate scheelite from gangue is directed by gravity to a ball mill. The ball mill discharges to a pump which transports the particles in slurry to another flotation step for removal of liberated sulfide minerals. Concentrate from this flotation step can be directed in the same manner as concentrates from the sands and slimes bulk sulfide flotation operations. Tailings are pumped to triple-deck tables for scavenging of gravity recoverable scheelite. The concentrate from these tables joins the concentrates from the coarse gravity cleaner tables for final sulfide removal and high temperature drying. Tailings from this fine scheelite gravity recovery operation go to scheelite flotation recovery.



Gravity separation table

The gravity circuit can be adjusted to produce a range of concentrate grades. Higher grade increases gravity circuit losses which increases the volume of flotation concentrate.

Scheelite flotation

Flotation feed consists of material that is too fine for gravity separation. This material is first thickened in two parallel 38 ft diameter three tray stacked thickeners. Underflow

slurry from the thickeners at requisite density passes through three agitated conditioner tanks where a pH modifier, depressants, collectors and a frother are added. The final concentrate is thickened in a 20 ft diameter thickener, filtered, and dried and bagged for shipment to markets. Dried concentrate is weighed and packed in two ton tote bags. Bagged concentrate is stored in covered areas while awaiting shipment.

Drying and magnetic separation

The gravity concentrate typically contains 60% to 70% WO₃. It is dewatered in a spiral classifier before entering the high temperature dryer. The dryer is an oil fired multiple hearth type with rotating rakes to move material from an upper hearth to a lower hearth and finally to discharge. Material discharging from the dryer is transported in two water jacketed screw type conveyors in series which cool the material prior to downstream transport and processing. Discharge from the second screw conveyor is transported vertically in a bucket elevator to a screen that rejects undesirable material which is recycled via the primary crusher. Undersize material from the screen goes to the first stage of dry magnetic separation which consists of two roll type separators in parallel. Each unit has three rolls, one rougher roll that produces a magnetic reject straight away then two scavenger rolls in series that produce a non magnetic final product and a magnetic reject that is passed on the second stage of dry magnetic separation.

The second stage is a unit with a rare earth magnet and three electro magnetic units fixed over a moving belt. A final non magnetic final product joins the first stage non magnetics to be bagged for shipment to markets. The magnetic reject joins the first stage reject and is then returned to main process via the scheelite regrind mill. Dried concentrate is weighed and packed in two ton tote bags. Bagged concentrate is stored in covered areas while awaiting shipment.

Concentrate handling and storage

Dried concentrate is packed in two ton tote bags for shipment to the customers.

Tailings disposal

If sand fill is not being delivered to the mine all tailings are pumped to No. 5 Pond for solid/liquid separation and solids storage. Supernatent from No. 5 Pond is pumped to a new waste water treatment plant and then is discharged to the environment.



Tailings pond in winter

Mining opportunities

- Amber Zone The Amber Zone West was diamond drilled and delineated in 2013 and development has commenced on seven horizons to access the ore zone.
 Diamond drilling is underway in 2014 to delineate the Amber Zone east.
- Dakota Zone The Dakota Zone was discovered during the 2012 Surface Diamond Drilling campaign. Additional drilling will be conducted during the 2013 Summer Drilling season.
- Tailings reprocessing NATCL is investigating the opportunities that exist in reprocessing the existing 5.0M tons of historical tailings on site.
- Mill expansion NATCL is completing an increased mill throughput by nearly 20% with minor changes to the existing mill circuit and enhancing the capacity in the grinding circuit and fine scheelite recovery on the tailing discharge.
- Diamond drilling NATCL has a Five Year Exploration Program laid out to continue to find 'near infrastructure' resources.

Conclusion

North American Tungsten has invested significant Capital with a long term outlook at Cantung Mine. The Company currently has a world class operational team that have upgraded the property, procedures and processes at the mine site, which will ensure its viability for years to come.



Drilling for new reserves

ITIA news

The 27th Annual General Meeting, 21–24 September, Toronto

Opening the meeting, the President, Claude Lanners of CERATIZIT SA, addressed delegates as follows:

"Ladies and Gentlemen,

As my Presidential predecessors and I invariably open the proceedings at these AGMs with a few general and lighthearted remarks about the venue, I duly did some research on Toronto via Wikipedia. Apart from the fact that it is now a city of 2.5 million people, the British purchased its land in the 18th century from the indigenous people and the settlement was known as York. It was in 1813 that US forces attacked and defeated the British, sacking and looting the city. The British took their revenge, however, in an act the 200th anniversary of which was celebrated last month ... well, celebrated by some ... namely the burning of the White House and other buildings in Washington. It has been the only time in the history of the USA that foreign troops have set foot on its soil (the Alamo 1836 does not count because Texas did not become a State until 1845). Fortunately, the two countries have since been allies.



Claude Lanners, ITIA President, addressing delegates



Stacy Garrity of Global Tungsten and Powders Corp and Wolfgang Budweiser of HC Starck GmbH, both speakers at the 27th AGM.

As to tungsten itself, mining in Canada is confined to one company, North American Tungsten Corporation, which owns the Cantung scheelite mine in the Northwest Territories. Production began in 1962 as an open-pit operation and moved to a full underground operation in 1973 peaking in the early 1980s at over 3,500t.

As far as I am aware, only one other mine has ever produced tungsten and that was the Mount Pleasant tungsten-moly mine in New Brunswick. Its life was short: starting up in 1983, it produced some 1,600t before closing in 1985 because of the poor state of the tungsten market. There are, however, numerous deposits in Canada, some of substantial size.

Reverting to the ITIA itself, may I begin with a warm welcome to 262 delegates, of whom 160 are from 56 member companies represented here today. I would like to think that the increase in membership this year from 59 to 66 was due to my hard work as President, but it is probably more truthful to credit the Secretary-General and other colleagues and thank them for their strenuous promotional activities on our behalf. Another 63 Companies are represented here, many of which should be considering membership of ITIA.



GTP's Towanda plant where delegates were shown APT and powder production

This meeting is being generously hosted by 6 member companies based in Canada and the USA. Kennametal has taken the lead but Almonty Industries, Federal Carbide, Mi-Tech, North American Tungsten and Tungco are not far behind with their financial support. Such kindness is evidenced by their hosting of the dinner on Tuesday evening and the gift of a bottle of the famous Pittilleri Icewine to each delegate.

Our thanks are also due to GTP and Federal Carbide for permitting visits of their plants after the AGM. And by the way, in case anyone queries the absence of GTP's name as a host, remember their generosity in sponsoring events at last year's meeting in Sydney.

Later our Secretary-General will be covering the various activities of ITIA during the last year. Afterwards he will be followed by our HSE Director. But I should warmly thank, on behalf of all our members, my colleagues on the Executive Committee and our representatives on the HSE and Consortium Committees who devote valuable time to pursuing and defending the Association's interests — their only reward being your applause right now!

The support of all members is, as ever, greatly appreciated and, in return, I trust that this occasion in particular, and our work programme in general, brings you and your company benefits and enjoyment."

Closing the meeting, Lanners thanked the guest speakers for their excellent presentations, the ITIA staff for their diligent work and delegates for their contributions to a successful meeting. He welcomed the election of Mrs Ulrika Wedberg as the Vice-President, remarking that the appointment of a woman as an ITIA officer was long-overdue. Finally, he looked forward to seeing all delegates at the next AGM in Hanoi.



David and Sarah Avedesian of Federal Carbide Co hosting dinner at Centre Hills Country Club. With them are (left) George Chen, CEO of Asia Tungsten Products Vietnam Ltd, with his wife, Ye Qing and (right) Guo Haubin, Chairman of Jiangxi Yaosheng Tungsten Co.

ITIA membership

Welcome to:

Brazil Tungsten Holdings Ltd – Bodó scheelite mine in Currais Novas, Brazil

Dala Mining LLP - Koktenkol Molybdenum-Tungsten deposit located in Kazakhstan

ICD Alloys & Metals LLC - a trading company in the USA

W Resources Plc – a UK tungsten exploration and development company with a portfolio including the La Parrilla tungsten mine and tailings project in Spain

Wolf Minerals Ltd – developing the Hemerdon Ball Tungsten and Tin project located in Devon, UK



Ulrika Wedberg with Claude Lanners

Election of Vice-President and the Executive Committee

Members at the AGM unanimously approved the election of Mrs Ulrika Wedberg, President of Wolfram Bergbau und Hütten AG, as Vice-President in 2015 and the following as new members of the Executive Committee:

- Mr Jeffery Green, Global Category Manager,
 Raw Materials, Sandvik Machining Solutions AB
- Mr Kurt Heikkila, CEO, North American Tungsten Corp Ltd
- Mr Stephen Meuler, Director, Global Metallurgical Operations, Kennametal Inc

ITIA's 28th AGM, 20 to 24 September 2015

The ITIA's 28th Annual General Meeting will be held in Hanoi, Vietnam and the provisional outline programme is as follows:

Date	Meeting/Function
Sunday 20 Sept	Tungsten Consortium Technical CommitteeITIA HSE Committee
Monday 21 Sept	 Tungsten Consortium Steering Committee ITIA Executive Committee ITIA Reception and Dinner
Tuesday 22 Sept	• AGM
Wednesday 23 Sept	• AGM
Thursday 24 Sept	Optional Mine and Plant Visits

Further details of this annual event, at which the worldwide industry gathers, can be found on our website – www.itia.info and will be updated to include the expanded programme and registration form in May. Companies which are not ITIA members may attend (there is a fee) and receive presentations on a variety of industry and general topics.