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SMELTING NEWS

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New Flash Converter in Tongling

Dear reader,

Soon will be this year's highlight, Copper 2013 in Santiago, Chile.

As mentioned in the previous newsletter, Outotec will host a get-together on Monday 2 December starting at 19:00. We would like to invite our customers to join us for the Outotec cocktail party. You can receive a personal invitation card to the party from smeltingnews@outotec.com or from the Outotec booth at the conference. We hope to see you there!

Outotec would also like to welcome a new Flash Smelting family member, as the new Outotec® Flash Smelting and Kennecott-Outotec® Flash Converting Process have started up in Tongling, China! This is the second continuous Kennecott-Outotec converting process that has now been implemented in China. You can read more about this exciting development in this newsletter. Stay tuned, as our Flash Smelting family is expected to grow soon with another new member in China.

Outotec is looking forward to a very special year for smelting in 2014, when we will mark two major anniversaries and achievements: 20 years of continuous Kennecott-Outotec® Flash Converting at Kennecott, Salt Lake City, and 40 years of Outotec® Anode Casting Technology. To properly celebrate these technologies, the 14th International Flash Smelting Congress in 2014 will be held in Las Vegas/Salt Lake City – invitations will naturally also be provided to all Outotec Anode Casting Technology users.

This congress will allow the world's leading smelting industry representatives to meet each other to discuss current technology trends and new developments. Please reserve time in your calendar during the week beginning 10 November 2014 to participate in this not-to-be missed event. If you would like to be added to the invitation list, please send your contact details to mirja.lager@outotec.com. More information and invitations will follow.



» Kim Fagerlund
Vice President - Smelting

Copper market and TC/RCs

Heikki Puustjärvi

As commodity prices have declined along with equities over the past couple of years, mining companies have had to deal with escalating capital costs and declining returns. In an effort to redress this situation, they are having to reassess their project pipelines, delaying and/or deferring projects until it makes financial sense – particularly as the copper market is currently entrenched in a 6-year period of excess supply.

As a consequence, the project pipeline over the medium to longer term is becoming increasingly squeezed. However, it is expected that extra supply will have to be introduced in the medium term in order to maintain the equilibrium and retain a reasonable market balance over the long-term timeframe. Woodmac estimates that a long-term incentive price of \$7716/t (\$3.50/lb) in 2013\$ will be required to bring on adequate tonnage to prevent the market from falling into a structural deficit.

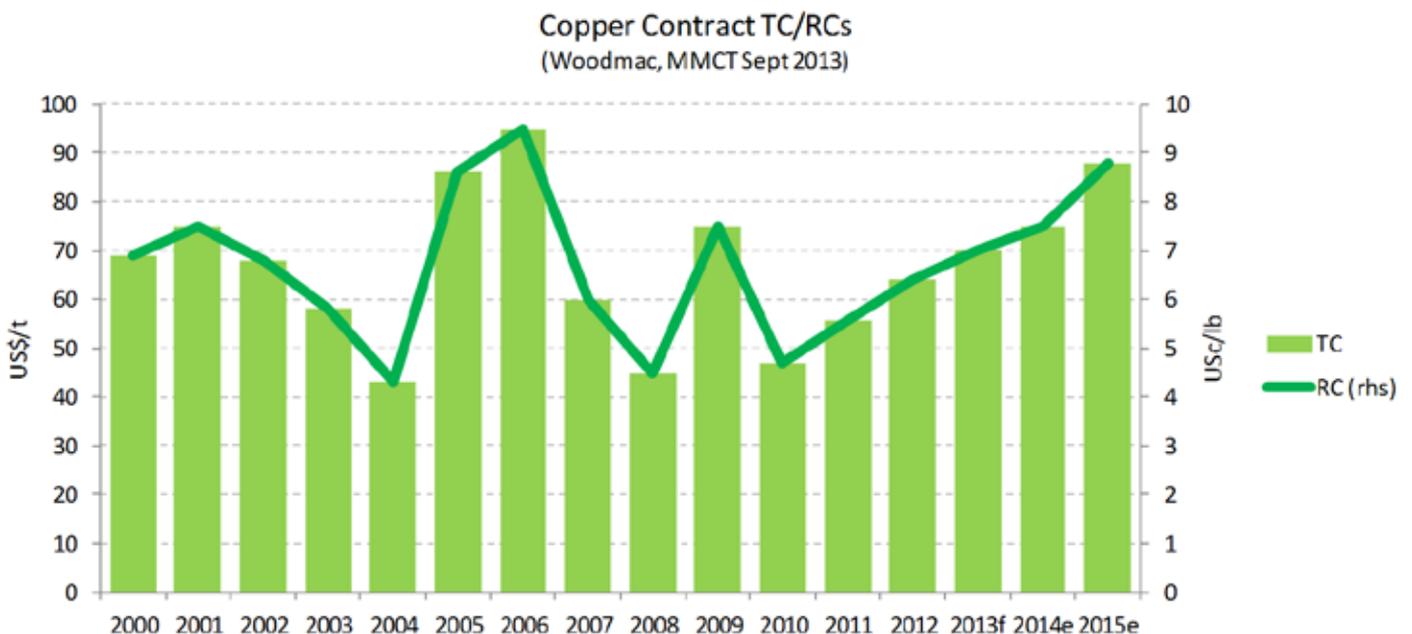
The supply side is providing little support for copper prices with a sharp increase in output. A surge in mined out-

put could be observed from every mining giant’s production report.

World mine production is estimated to have increased by 8.8% in the first half of 2013 compared with production in the same period of 2012, mainly owing to a recovery in production levels from constrained output in early 2012. Concentrate production increased by 10.2% and solvent extraction-electrowinning (SX-EW) by 4.2%. The average world mine capacity utilization rate for the first half of 2013 increased to around 82% from around 79% in the same period of 2012.

Major risks concerning copper outlook are seen to be the ongoing mining supply disruption realization rate, the Chinese consumption growth rate and the demand contribution from the mature economics.

The ample copper concentrate supply is weighing on prices. For miners, this brings additional challenges, as increasing concentrate supply is shifting revenue from





miners to smelters through higher TCs and RCs. Projects already under construction may not be affected, but projects at an earlier stage of development could be delayed.

With global mining output increasing steadily during the first half of the year, imports of copper concentrate into China reached a record high of 939kt during July. With concentrate freely available, spot TC/RCs rose sharply during August to reach an indicative average of \$82/t & 8.2c/lb. With their immediate requirements mainly satisfied, Chinese smelters have started to limit their buying interest to better quality feed material. Any spot purchases by Chinese smelters during September are understood to have been at around the \$80/t & 8.0c/lb level.

With the narrowing price arbitrage (SHFE vs LME copper spot price) diminishing the attractiveness of processing imported concentrates, and smelters already amply supplied with material, the market in China is expected to remain soft in the run-up to the start of negotiations for 2014 long-term contract terms. Since alternatives to China for spot sales are limited, the upward pressure is expected to remain on TC/RCs over the coming months.

Agreed mid-year 2013 contracts amounted to \$72/mt smelting and \$0.072/lb refining with Japanese smelters, which was up from the annual benchmark but less than previously expected due to disruptions in mined copper supply. The 2013 benchmark for copper concentrate contracts of \$70/mt and \$0.07/lb established in March was up 10% from 2012. In mid-August, China's spot copper TC/RCs remained steady at \$75-\$80/mt and \$0.075-\$0.08/lb, and copper concentrate imports were up 5% from 2012. TC/RCs have edged up gradually in the second half of 2013 with increased copper concentrate supply. ■

Sources:

- Woodmac Q3 and September 2013 Metals Market Service reports.
- Consensus Economics August 2013 metal prices forecasts.
- Metals Economics Group July-August 2013 Strategic report.
- ICSG September 2013 press release on copper data.

New Outotec® Flash Smelting and Kennecott-Outotec® Flash Converting process started up in Tongling, China

Lars Helle, Jimmy Du Jin

The new Flash Smelting and Flash Converting continuous copper process of the Tongling Non-Ferrous Metals Group (TNMG) has been successfully started up in Tongling, Anhui, China. This is the second continuous Kennecott-Outotec Flash Converting process that has now been implemented in China. The inherent advantages and powerful combination of the Flash Smelting Furnace and Flash Converting Furnace (FSF/FCF) process is based on sealed furnaces, which enable better controlled gas flows together with highly efficient and flexible process conditions. It is no coincidence that this benchmark technology can satisfy the highest environmental regulations while at the same time achieving the highest throughput and capacities in the industry with

the lowest operating costs. Indeed, the FSF/FCF solution has established itself as the most sustainable smelting and converting method for generations to come.

Mr. Lars Helle and Mr. Du Jin from Outotec China worked on the project from the beginning of basic engineering to the erection and commissioning of the plant on site in Tongling.

Outotec's engineering delivery covered basic engineering for the Flash Smelting Furnace (FSF) Area, FSF Matte Granulation, Flash Converting Furnace (FCF) and FCF Slag Granulation Area, as well as the FCF detail design with manufacturing drawings.



Outotec's equipment delivery for the FSF area consisted of loss-in-weight feeders for concentrate and dust, a burner with an air slide feeder for the dry charge concentrate mixture, and copper cooling elements for the reaction shaft transition area, as well as all the tap holes.

For the FCF area, Outotec delivered loss-in-weight feeders for matte and dust and a burner with an air slide feeder for the matte mixture. Outotec also delivered copper cooling elements for the reaction shaft transition area, settler walls, and Outotec BIC elements for the roof. In addition, cooling elements were delivered for the connection between the uptake shaft and waste heat boiler transition area, as well as all the tap hole elements.

Outotec also delivered for this project the anode casting facility and tank house equipment, such as an anode preparation machine, cranes and cathode stripping machines. In addition, complete spare parts supplies were



Lars Helle and Du Jin "Jimmy" on site in Tongling next to the FCF blister tap hole

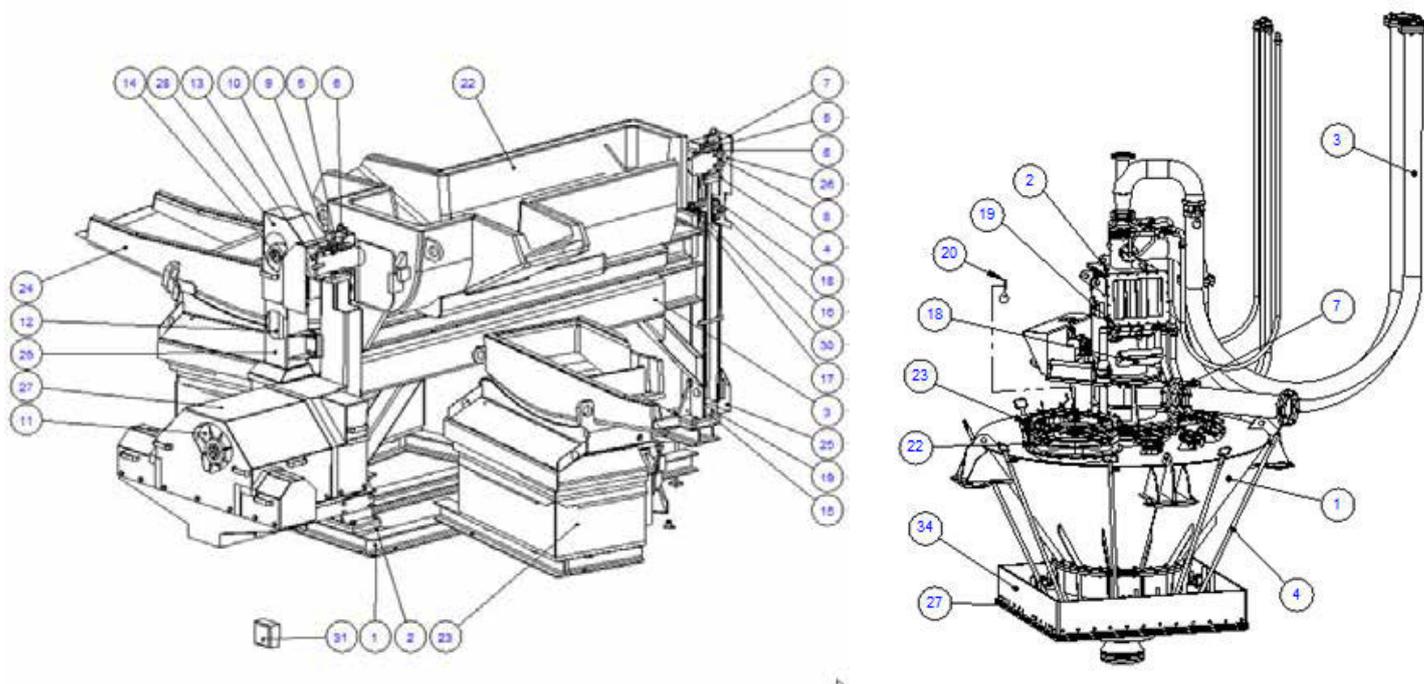
included for all of Outotec's deliveries together with supervision services for erection and commissioning.

Outotec continues to support the customer and wishes all the best and a prosperous future for TNMG Jinguan smelter, our new Flash Smelting family member. ■



Outotec® eCatalogue for easy, fast and reliable ordering of spare parts

Mervi Haahla



Outotec eCatalogue is an electronic spare parts catalogue providing an easy way to browse through the equipment structure with an illustrated user interface.

Outotec eCatalogue is available for selected new Outotec equipment. The eCatalogue is included as part of standard new deliveries of Copper Anode Casting Shops without having to be ordered separately. Upon request the eCatalogue for Copper Anode Casting Shops is also available for recent deliveries.

An eCatalogue for Outotec Flash Smelting main equipment, such as concentrate burners, is currently under development, and the first will be delivered towards the end of 2013.

Outotec eCatalogue is installation specific, containing OEM part numbers for each installation's equipment and plant. The eCatalogue is offered both as an offline and an online version with a user-friendly interface. Features such as the online shopping basket make purchasing smart and simple.

The eCatalogue improves maintenance efficiency with Outotec equipment by enabling visual recognition of parts. Finding the required part number in the eCatalogue is easy, fast and reliable, ensuring smooth maintenance and maximized plant availability.

For more information, please contact:
ecatalogue@outotec.com ■

Outotec has installed two Kaldo furnaces (TBRC) at Stillwater Mining Company in Montana, USA

Björn Ludvigsson

The two Kaldo furnaces (TBRC) at the Stillwater Mining Company in Montana, USA, were supplied by Outotec in 1999 and 2001. Stillwater Mining is the only US producer of palladium and platinum.

In the smelting process, mine concentrate and spent catalyst material is fed into the electric smelter furnace. Furnace matte is then tapped from the furnace and granulated. The granulated furnace matte is remelted in a Kaldo furnace or top-blown rotary converter (TBRC), which separates iron from the converter matte. The converter matte is then poured from the Kaldo furnace, granulated and transferred to the refinery for further processing. The granulated converter matte consists of copper and nickel sulfides along with PGMs.

Since their installation well over a decade ago, the two Kaldo furnaces have been operating successfully.

“The Kaldo furnaces have provided excellent service for us,” says Mr. Greg Roset, Vice President & General Manager - Smelting & Recycling Operations for Stillwater.

“They are very reliable furnaces, and their performance has exceeded our original expectations. The Kaldos provide flexibility that allows us to operate the plant with an eye towards maximizing efficiency,” he continues.

“The maintenance requirements for the Kaldos are very manageable, and we have been quite pleased with the availability of the furnaces. Our long-term plans allow for the installation of a third converting furnace, and without hesitating, I can say that we would install another Kaldo at that time. In short, I would definitely recommend consideration of the Kaldo furnace for operations similar to ours,” says Mr. Roset. ■



Outotec provides leading technologies and services for the sustainable use of Earth's natural resources. As the global leader in minerals and metals processing technology, Outotec has developed many breakthrough technologies over the decades. The company also provides innovative solutions for industrial water treatment, the utilization of alternative energy sources and the chemical industry. Outotec shares are listed on NASDAQ OMX Helsinki.