



# REDUCING SULFUR DIOXIDE EMISSIONS AND PRODUCING SULFURIC ACID AT DUNDEE PRECIOUS METALS, NAMIBIA

**With our integrated solutions, Dundee Precious Metals now has a world-class process plant that is designed to reduce SO<sub>2</sub> emissions by more than 95% and meets the World Bank's environmental standards.**

## History of the Tsumeb Smelter

Dundee Precious Metals Tsumeb is located in Tsumeb, Namibia approximately 430 km north of the capital, Windhoek. Tsumeb is the closest town to the Etosha National Park and has a population of 14,000 people.

The smelter was constructed in the early 1960's to process concentrate from the Tsumeb copper mine and is one of only five commercial-scale smelters in Africa. It is linked by rail to the Atlantic port of Walvis Bay in Namibia. The facility consists of two primary smelting furnaces, the old reverberatory furnace as well as the refurbished Ausmelt furnace and employs close to 600 people, including contractors.

The smelter is one of only a few in the world which is able to treat arsenic and lead bearing copper concentrates and is therefore able to conclude long term favorable contracts to treat such concentrates. Both blister copper and arsenic trioxide (As<sub>2</sub>O<sub>3</sub>) are produced from the concentrates. The blister copper is delivered to refineries for final processing and the As<sub>2</sub>O<sub>3</sub> is sold to third party customers.

## CHALLENGE

- Complex ore concentrates, high in arsenic content
- Excessive sulfur dioxide emissions
- Environmental damage
- Operating license under threat

## SOLUTION

- Integrated process solution to sustainably treat off-gas
- Effluent treatment plant treats the process water required for the gas cleaning process
- 3.5 Mio construction hours were spent without fatalities or serious accident

## BENEFITS

- Sulfur dioxide emissions already reduced by 80%
- Meets World Bank environmental standards
- Reduced water usage
- Sulfuric acid produced as saleable by-product

## Project background

Dundee entered into a contract with Outotec in 2012 for the design and delivery of PS Converters, a gas cleaning system, sulfuric acid plant and related technologies downstream of the existing copper smelter. This was later converted into a full EPC contract.

Outotec's scope of delivery included the basic and detail engineering, procurement, supply erection and commissioning of PS Converters, a gas cleaning system and sulfuric acid plant, an effluent treatment plant as well as a sulfuric acid tank farm with a rail and truck loading station based on proprietary Outotec® technologies.

Outotec supplied the entire chain of Outotec technologies and services to complement the existing Ausmelt smelter, which is also part of our technology portfolio. With our integrated solutions, Dundee Precious Metals has a world-class process plant that is designed to reduce SO<sub>2</sub> emissions by more than 95% and meets the World Bank's environmental standards. For the entire project more than 3.5 Mio construction hours were spent without fatalities or serious accidents.

## Focus on environmental sustainability

Environmental sustainability was achieved by the treatment of smelter and converter gases. The gases high in sulfur and arsenic are now being treated and converted into sulfuric acid, which is sellable as a product.

The new converter hoods provide a much-improved gas capturing of fumes which are being generated in the copper converter process. This gas is cleaned in the new scrubber system and then sent to the sulfuric acid plant, where it is converted to sulfuric acid.

The newly installed effluent treatment plant treats the process water required for the gas cleaning process. The water is neutralized and impurities including arsenic are removed.

The new PS converters provide not only a much environmental friendlier solution but are larger in capacity and allow for the production of larger quantities of blister copper.

Lastly, a tank farm, truck and train loading facilities allow the safe handling of this product.

## Outotec's commitment to community investment

Outotec also initiated together with Dundee precious metals a community project to build a new dining hall at Ondudu Primary School in Namibia. This dining hall will allow young students to rest and prepare themselves for learning lessons. The project consist of more than just monetary support, and required the great enthusiasm, passion and commitment of our project teams

The dining hall was inaugurated on November 25, 2015, by the honorable Ester Anna Nghipondoka, deputy Minister of Education, Arts and Culture, in Tsumeb. Dundee and Outotec representatives expressed during the inauguration the importance of the social project and the commitment of both companies for social sustainability.

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Outotec develops leading technologies and services for the sustainable use of Earth's natural resources. Our 4,000 top experts are driven by each customer's unique challenges across the world. Outotec's comprehensive offering creates the best value for our customers in the mining, metal, energy, and chemical industries. Outotec had sales of approximately EUR 1.3 billion in 2018, and its shares are listed on NASDAQ Helsinki.

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