



Brownfield Upgrade

Anglo American Platinum's Mortimer Smelter is the latest in the company's arsenal to receive an overhaul.

Anglo American Platinum's three operating smelters in South Africa, Waterval, Polokwane and Mortimer have engaged G&H Consulting Engineers to assist them with various stay-in-business and upgrade projects in recent years.

The last of these to be completed was the upgrade at Mortimer Smelter which wrapped up in the third quarter of last year. The capacity of the Mortimer Smelter furnace and its auxiliary equipment was upgraded, from 180 ktpa to 360 ktpa concentrate, and the plant was successfully commissioned in September 2011. A continued ramp up is underway.

The project to upgrade the smelter commenced in 2007 with the first phase wrapping up in 2008. Phase 2 then commenced in 2010, following the completion of the project's environmental compliance study a year before. South African consulting engineering firm G&H Consulting Engineers was contracted to complete the project.

G&H Director Rob Allen tells African Mining Brief that one of Mortimer's more significant upgrades has been the installation of the self cleaning furnace off-gas V-Duct and G&H is now also assisting Anglo American Platinum with preliminary studies to assess the amenability of

incorporating similar systems into other Anglo American Platinum smelting plants. These upgrades will reduce the amount of time required to clean horizontal duct sections with the intention of increasing plant availability.

First phase upgrade

During 2007, G&H commenced with Phase 1 of the Mortimer Furnace Upgrade Project. The requirement for this phase was that the rebuilt furnace operate at an improved operating factor. The project entailed upgrading the existing Mortimer furnace along the lines of the two existing furnaces at Waterval Smelter. The phase





1 sidewalls consisted of refractory brick, but in phase 2 the furnace was equipped with water-cooled copper plate coolers. A third matte taphole was included to improve on furnace availability. The furnace footprint was also enlarged to match the size of the two existing units at Waterval Smelter in order to optimise spares holding. One of the major challenges during this phase was to completely demolish the furnace and rebuild a newly designed furnace with associated upgraded peripheral structures for furnace access and operation.

Shorter shutdown achieved

Following the Environmental Compliance Assessment, Phase 2 commenced in the last quarter of 2010. During this phase, the furnace capacity was increased to 38 MW from 18,5MW based on the new furnace dimensions and a sidewall consisting of refractory bricks and plate coolers. The furnace power rating increase required upgrades in the majority of the plant areas

such as new transformers and new transformer building, upgrade of wet concentrate feed, drying, storage and transfer systems, upgrade furnace and transformers cooling water system and side walls cooling, upgrade slag granulation system, a new off-gas cleaning system for increased duty, new stack as well as upgrades of the plant and instrument air utilities.

The new off-gas cleaning system scope included the V-Duct uptake, a 4 fields Electrostatic Precipitator (ESP), off-gas dust return system from the ESP, two off-gas fans and a new 80 meter furnace stack.

While Phase 2 went smoothly, the disruption to the smelter's normal operation needed to be minimized and the peripheral areas needed to be upgraded whilst the furnace was operating. The major focus during this phase was naturally on safety since certain work needed to be done in close proximity to the operating furnace.

Careful planning during this phase was also paramount in order to optimize the furnace shutdown start and end dates for the upgrades to the furnace walls for the installation of the plate coolers and refractory bricks, and to minimize the overall shutdown duration. In the end, the tap-to-tap shutdown duration was 65 days. During this period the company managed to complete and test all furnace ancillary systems to ensure their safe operation once the furnace came back on line.

Most of the G&H project team who successfully completed the Phase 2 Mortimer Furnace Upgrade Project during Q3 2011 has now been allocated to the Slag Cleaning Furnace no 2 Project, currently underway at Waterval Smelter. G&H's scope of work on this project includes the EPCM services for the construction of a new 30 MVA circular furnace and ancillary equipment adjacent to the existing Slag Cleaning Furnace 1 at Waterval Smelter.

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