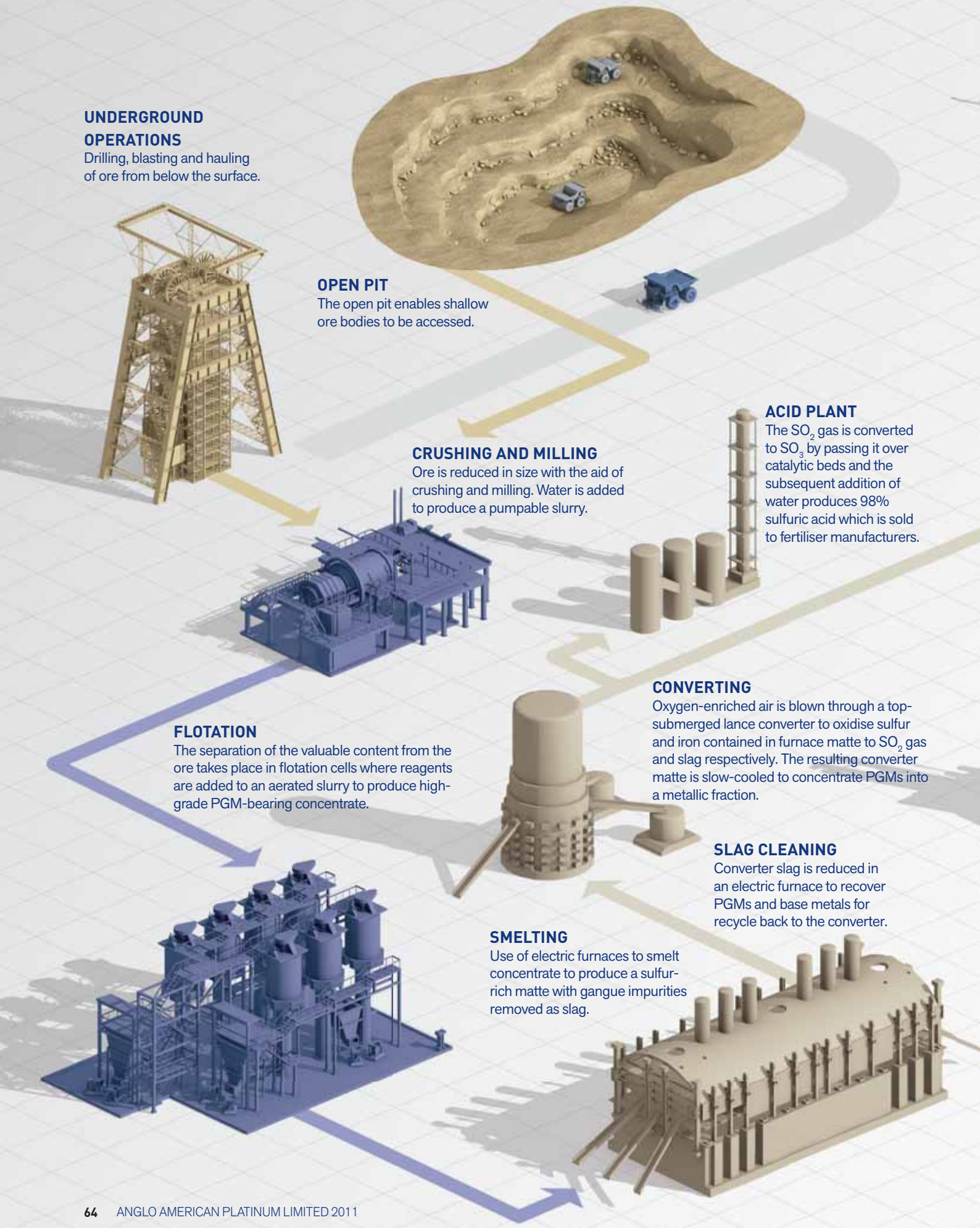
OPERATIONAL FLOW CHART



UNDERGROUND OPERATIONS
Drilling, blasting and hauling of ore from below the surface.

OPEN PIT
The open pit enables shallow ore bodies to be accessed.

CRUSHING AND MILLING
Ore is reduced in size with the aid of crushing and milling. Water is added to produce a pumpable slurry.

ACID PLANT
The SO_2 gas is converted to SO_3 by passing it over catalytic beds and the subsequent addition of water produces 98% sulfuric acid which is sold to fertiliser manufacturers.

FLOTATION
The separation of the valuable content from the ore takes place in flotation cells where reagents are added to an aerated slurry to produce high-grade PGM-bearing concentrate.

CONVERTING
Oxygen-enriched air is blown through a top-submerged lance converter to oxidise sulfur and iron contained in furnace matte to SO_2 gas and slag respectively. The resulting converter matte is slow-cooled to concentrate PGMs into a metallic fraction.

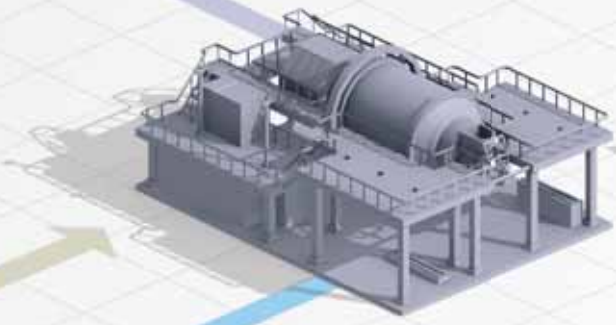
SLAG CLEANING
Converter slag is reduced in an electric furnace to recover PGMs and base metals for recycle back to the converter.

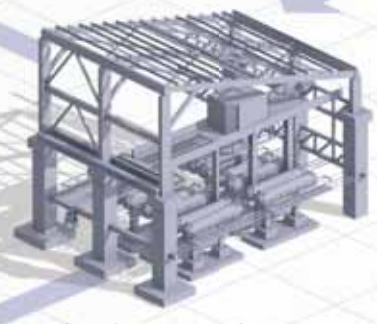
SMELTING
Use of electric furnaces to smelt concentrate to produce a sulfur-rich matte with gangue impurities removed as slag.

LEACHING
Base metal-rich solids are leached in high-pressure autoclaves and contacted with MCP leach solution to yield separate nickel and copper streams.

PURIFICATION
The separate nickel and copper streams are purified. During this process cobalt sulfate is recovered.

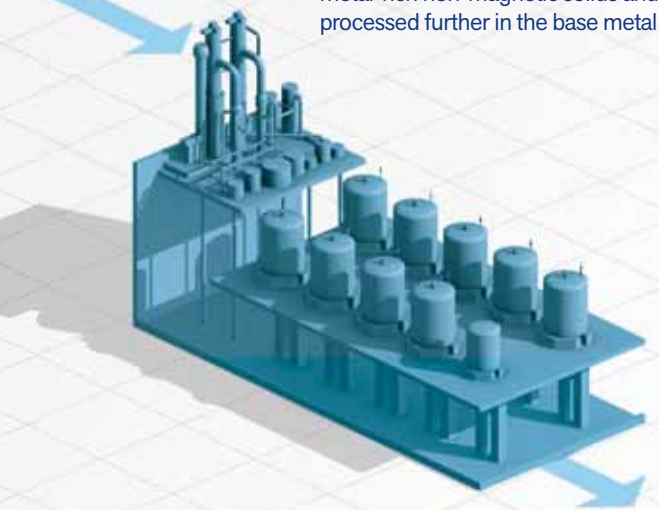
BASE METAL PRODUCTS
COBALT SULFATE
NICKEL
COPPER
SODIUM SULFATE



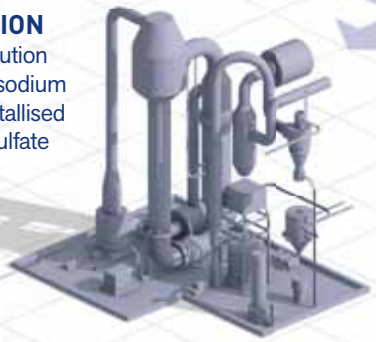


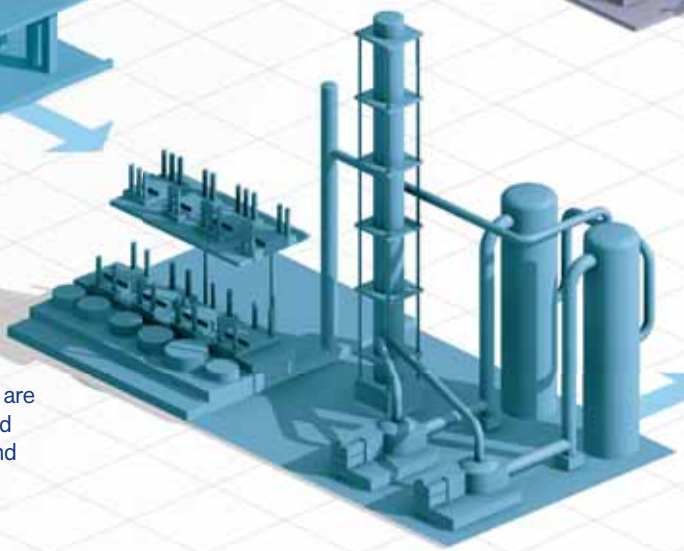
ELECTRO-WINNING
Nickel and copper metal cathodes are produced by passing electrical current through the separate purified streams.

MAGNETIC CONCENTRATION PLANT (MCP)
Crushed converter matte is milled and the PGM fraction is separated magnetically. This is pressure leached to yield a solid final concentrate that is sent to PMR. Base metal-rich non-magnetic solids and leach solution are processed further in the base metal refinery.



CRYSTALLISATION
Excess sulfur in solution is neutralised with sodium hydroxide and crystallised to form a sodium sulfate product.





PRECIOUS METAL PRODUCTS
PLATINUM
PALLADIUM
RHODIUM
IRIDIUM
RUTHENIUM
GOLD

PGM REFINING
Final concentrate is dissolved using hydrochloric acid and chlorine gas. PGMs are sequentially separated and purified to yield platinum, palladium, iridium, ruthenium and gold. Osmium is precipitated as a salt.