

WINDMURRA VANADIUM, AUSTRALIA

VANADIUM SCRUBBER



PROXA protects environment by cleaning off-gases from vanadium plant in Australia.

THE CHALLENGE

In order to meet legislative requirements, Windmurra Vanadium required the removal of particulate material (ie scrubbing) from rotary kiln off-gases using pregnant liquor containing a dilute solution of sodium vanadate and other salts as the scrubbing liquor. A secondary requirement was to utilise the energy in the off-gas to evaporate (and hence concentrate) the pregnant solution for maximum plant precipitation efficiency.

OUR SOLUTION

Given our vast experience in the global vanadium industry, PROXA was able to devise a cost effective solution that met both of the client's above objectives.

The bulk of the particulate material is initially removed in series of primary cyclones. The off-gas is then further quenched for recovery in a venturi scrubber utilising the pregnant liquor as scrubbing medium. The concentration of the scrubbing liquor is carefully controlled meeting the specific guidelines for downstream treatment processes. The off-gas is further washed in a secondary tray tower in which brackish water is recirculated to eliminate vanadium-containing mist prior to the gas exiting the stack.

HOW PROXA ADDED VALUE

In a conventional vanadium concentration plant, water is removed from the barren liquor, resulting in concentration and the generation of a sodium sulphate crystalline product for recycle to the kiln feed. At Windmurra the process was significantly different in that no salt recovery process was incorporated and the dilute pregnant liquor post leach was too dilute for the downstream precipitation step. This required that PROXA provide an innovative design whereby the pregnant solutions (prior to cleaning) would be exposed to the hot off-gas from the rotary kiln, resulting in the removal of approximately 18 tons per hour of water from the circuit (discharged up the stack). A venturi scrubber was provided using the high pH pregnant solution as the scrubbing medium, and the bulk of the droplets were removed using a large carbon

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steel separator, with the offgas finally polished through an efficient mist eliminator.

A secondary requirement was to polish the off-gas to within environmental specifications. A high efficiency tray type scrubber was added above the venturi separator (mist eliminator) utilising brackish water. All solution contact parts were manufactured in SAF2205 duplex stainless steel for excellent chloride resistance.

FEED

- ◇ Off-gasses from rotary kiln
- ◇ Vanadium containing pregnant solution
- ◇ Make up process (brackish) water

PRODUCTS

- ◇ Clean off-gas for discharge to stack
- ◇ Concentrated liquor for polishing prior to vanadium precipitation
- ◇ Purge wash water

PERFORMANCE TARGET

17 820 kg/hr evaporation

PROCESS

- ◇ Venturi scrubber
- ◇ Valve tray type scrubber

PROCESS RELIABILITY

The plant was commissioned in 2008 and is continuously meeting all client's key performance objectives.

Client: Windmurra Vanadium

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