

Case Study Fact Sheet: ArcelorMittal, Gijón/Spain

ArcelorMittal operates a Rail Mill and Heavy Plate Mill in Gijón, Spain with a cooling water circuit of 7000 m³. The cooling water is treated in a central Water Treatment Plant (WTP). A pattern of the cooling water circuit and the waste water treatment plant is shown in Figure 1. In the Rail Mill cooling water circuit occurs corrosion, scaling and biological activity caused by unavoidable production-related intake of oil, temperature, particle (scale) or the salting (e.g. accumulation of anions) of the water because of evaporation.

Aim of the work is the removal of dissolved salts after solid separation to reuse the water in order to decrease the corrosion (induced by salts) and the fresh water demand/waste water occurring about 40%. Further aspects are the decrease of sludge treatment effort (dewatering) by high concentrated sludge from magnetic separation and enhanced sludge dewatering as a decrease maintenance saving.

Objective in INSPIREWATER

The demonstration activities at ArcelorMittal in Gijón include the following specific objectives:

- ▶ Investigation of the long term behavior of the relevant technologies in treating abrasive solids, organic (oil/fat) and dissolved salt contain cooling water regarding e.g. interactions interaction of cooling water treatment chemicals with filter media/RO membrane and scaling
- ▶ Demonstration of different combinations of solid removal technologies (magnetic separator, 3layer filtration) followed by desalting/softening (reverse osmosis/innovative electro-precipitator)
- ▶ Optimization of operational parameters of the technologies

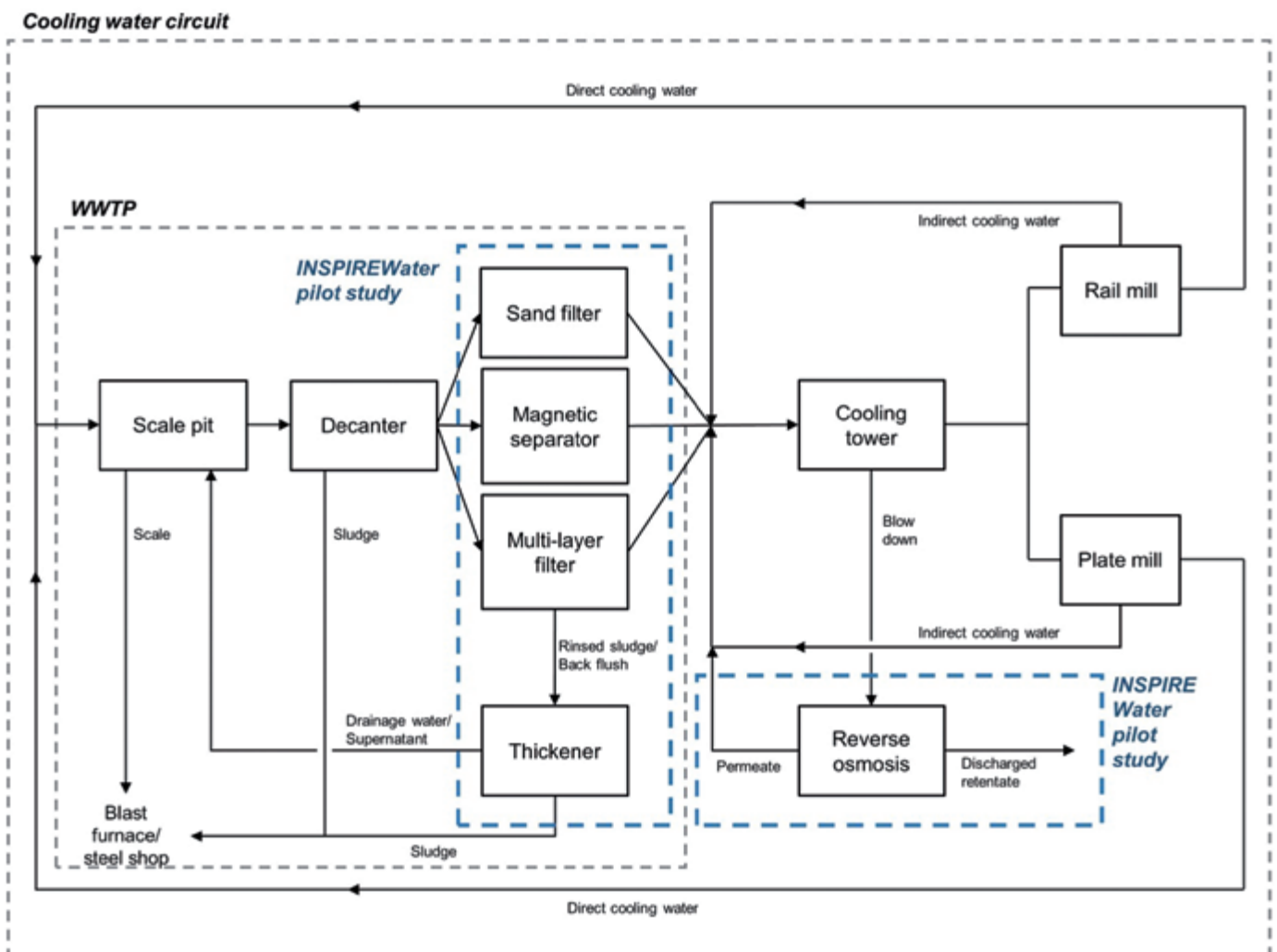


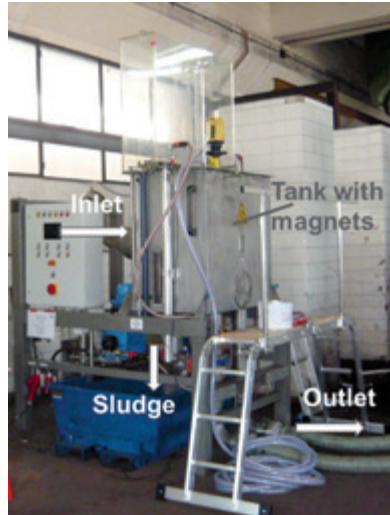
Figure 1: Pattern of the cooling water circuit and the waste water treatment plant

Technologies used for the treatment in the INSPIREWATER case study:

- ▶ Solid removal: Magnetic separator, 3layerfiltration
- ▶ Softening/Desalting: Innovative Reactor, Reverse Osmosis

INSPIREWATER activities and results

- ▶ Magnetic separator: treatment of approx. 23,000 m³ with achievement of outlet solid contents down to 10 – 15 mg/L (detection limit for solids: 10 mg/l).
- ▶ 3layer filtration: confirmation of lab results achieving outlet solid contents below 10 mg/L.
- ▶ Reverse osmosis: investigation of different concentration factors up to 10 and influence of antiscalant
- ▶ Innovative reactor: trials still ongoing



Magnetic separator



3layer-filtration






Reverse osmosis



Innovative reactor

Figure 2: Technologies in operation during the demonstration

	10 – 13% reduction in fresh water use with reverse osmosis	LCC	Operational cost can be reduced due to less resource and energy consumption
	Reduction in waste(water) production Magnetic separator 99% (sludge) Reverse osmosis 80%	LCA	Minimizing Water foot-print Enhance sustainability in the process industries
	66% less energy use with magnetic separator	Technology	Decouple production from fresh water utilization
Economic benefit Economic benefit 66% for magnetic separator			

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