OUTOTEC RED MUD FILTER PRESS TECHNOLOGY HELPS ETI ALUMINYUM CUT ITS WATER CONSUMPTION AND ENVIRONMENTAL FOOTPRINT

Turkish aluminum producer ETI Aluminyum (ETI) was searching for a solution to improve the performance and environmental footprint of its red mud dewatering process. After extensive trials of a variety of different technologies they turned to the Outotec Red Mud Filter Press due to its superior performance in terms of cake dryness, liquor recovery rate, and capacity.

ETI's Konya Seydişehir aluminum facility, located in Turkey's Mediterranean Region, is the country's only integrated aluminum plant capable of handling production from mining to final product. The facility has benefited from a multimillion-dollar renovation in recent years, and currently treats 550,000 tons of bauxite ore and produces 250,000 of aluminum oxide (alumina) annually. This production level results in the generation of approximately 260,000 tons of red mud, which was previously disposed in a residue disposal facility.

CHALLENGES

- Large volumes of supernatant liquor associated with red mud, affecting the containment dam lifetime and presenting an environmental risk
- High consumption of fresh water during red mud washing process

SOLUTION

- Outotec Red Mud Filter Press – a one-stroke, fast-opening filter press featuring with in situ cake washing and modular design to reduce installation costs and simplify maintenance

BENEFITS

- Significantly reduced filter cake moisture, resulting in:
  - Minimized risk of containment dam failure
  - Smaller environmental footprint
  - Reduced fresh water consumption
  - Improved caustic recovery
- Fully automated operation increases safety and efficiency of the red mud treatment process

Finland, February, 2020

Identifying a solution to the red mud problem

The accumulation of large volumes of red mud and the associated supernatant liquor is a significant problem for alumina refinery operations as it requires a large disposal area. Furthermore, high volumes of liquor significantly reduce the lifetime of the disposal facility and may present a risk to the environment due to the challenges associated with wet material storage.

ETI trialed several different technologies in order to identify a solution that would improve the performance of its red mud dewatering process. These included deep cone thickener, vacuum filtration decanter centrifuge, and filter press technologies. The best performance in terms of cake dryness, liquor recovery rate, and capacity was achieved with the horizontal press filter technology supplied by Outotec.

A state-of-the-art, fully automated solution

The Outotec Red Mud Filter Press is a one-stroke, fast-opening filter press available with filtration areas from 100 to 1000 m^2 and features a modular design to reduce installation costs and simplify maintenance.

Filter operation is controlled automatically by the programmable logic control (PLC), and the filter can be operated in the desired mode: with or without cake washing, and with or without drying. The plate pack is located between two rigid plates that are opened and closed using hydraulic cylinders. The entire pack is opened to facilitate cake discharge, and cloth flushing takes place after discharge. In the closed position the plates form a solid plate pack of sealed chambers with two filter cloths between each pair of plates.

Slurry is fed into the filter chambers through a top feed channel. The slurry inlet, filtrate collection, and drying and pressing air supply are integrated into the polypropylene filter plate. The slurry feed channel is cleaned and emptied using flushing and blowing steps after each filtration cycle before cake discharge.

Delivering environmental and process benefits

Red mud can be a challenging material to process, particularly due to its fine particle-size distribution. The Outotec Red Mud Filter Press has helped ETI solve these challenges, and the solution is meeting all performance expectations, especially with regard to cake moisture content, which has been significantly decreased. The average moisture content following the introduction of the filter is below 30%.

Furthermore, the Outotec Red Mud Filter Press will allow ETI to reduce both the size of the red mud disposal area and the plant's consumption of fresh water for mud washing, as well as minimize the potential for the release of caustic-rich liquor to the surrounding environment and maximize the volume of liquor that can be recovered for reuse in the plant.