



SPL treatment technology in industrial operation for 10 years has known a breakthrough with the LCLL Technology, offering significant energy savings and a step forward in by-product valorisation

As most of the aluminium smelters worldwide, Rio Tinto smelters in North America were facing the issue of spent potlining (SPL) management. As landfill was becoming less and less an acceptable option, the R&D teams developed an innovative process to treat SPL and capture the value of the by-products produced.

A genuine method

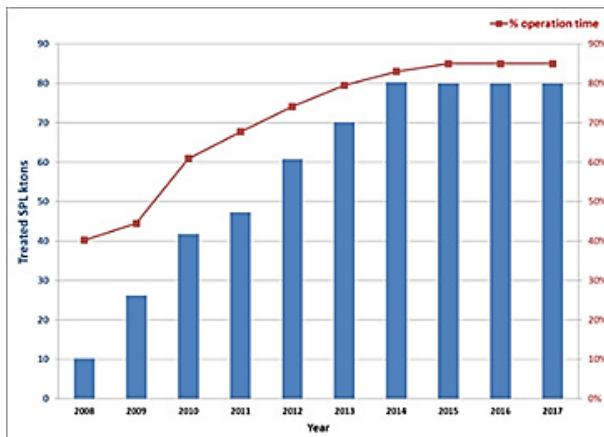
In 2008, Rio Tinto started its 225MUS\$ SPL treatment plant based on the Low Caustic Leaching and Liming (LCLL) process in Arvida, Canada.

LCLL has demonstrated its ability to efficiently treat SPL to eliminate toxic pollutants and produce by-products that are used as feedstock in other industries.

This 80kt/y LCLL plant is able to treat SPL from various sources:

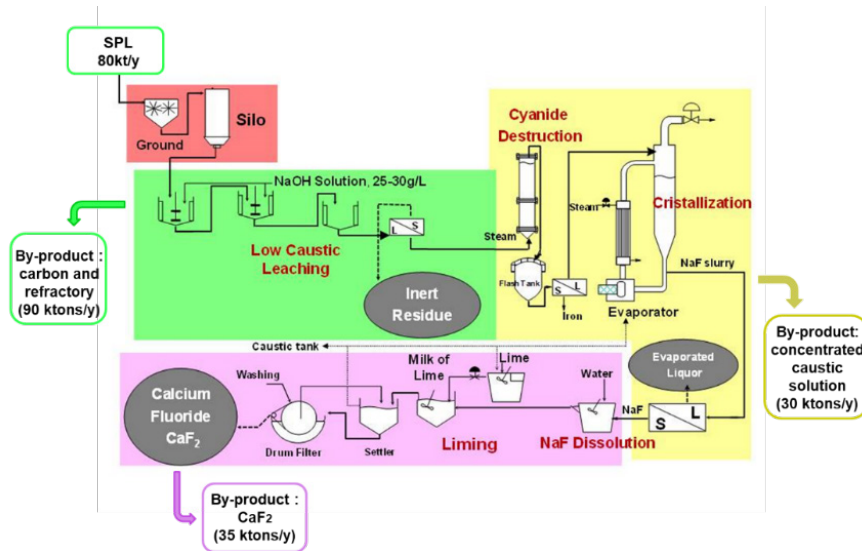
- Söderberg and prebaked
- fresh or coming from warehouses
- mixed or 1st/2nd cut

This technology is now available on the market along with the needed support to design, build and operate an industrial facility matching our client’s needs.



600 000 tons of SPL treated since 2008

2008 LCLL process flow



2018 LCLL process breakthrough

Through continuous process improvement and R&D work on the LCLL process, major improvements were implemented in the plant in 2018 on the evaporation/crystallization and causticisation (liming) sections.

They allow:

- 40% reduction of steam consumption,
- improved quality of the CaF₂ (or LCLL spar) by product.

By-product valorisation

Compared to direct SPL valorisation without any pre-treatment, carbon by-products (CBP: 70% of SiO₂-Al₂O₃ and 30% of C) contain five times less fluorides and sodium, allowing a much higher concentration in cement industry feedstock.

Caustic solution (27% of NaOH) is used as liquor in the Bayer process.

The improved LCLL spar (80 % CaF₂ and reduced humidity @ 33 % H₂O) opens the path for its full valorisation as raw material for the nearby AlF₃ plant as well as a fluxing agent in the steel and cement industries.

Cost savings

Following continuous process optimization, the total OPEX cost of SPL treatment with LCLL (including CAPEX amortization) is today much below landfill cost. The upsides coming from by-products valorisation bring additional value to the LCLL process.

Also, as the process design has been revised and simplified, the resulting CAPEX for a new plant has been greatly reduced.

- > Solves a long lasting aluminium industry issue
- > Removes hazardous properties and enable full valorization
- > Is the best available demonstrated technology

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