

Leaching Plant, Rönnskär



More metals – less waste

Large volumes of residual material from production that still contain valuable metals are stored at Boliden Rönnskär's site. Boliden has long wanted to find a way to extract more metal from the material, while reducing the amount that has to be deposited as waste.

After several years of process development at Rönnskär's own laboratory, construction of a suitable plant was able to begin. The leaching plant has been designed specifically to handle residual material from Rönnskär. During the process, lead sulphate and copper/zinc sulphate are extracted – products that are either recycled on site or sold to external customers. The investment in a leaching plant enables valuable metals to be extracted.



FACTS

WHAT: The development of a method for leaching the smelter's residual material allows valuable metals to be extracted from what was previously considered waste. Extensive tests were carried out between 2016 and 2018 at a pilot plant at Rönnskär's laboratory. The construction project for the leaching plant began in August 2018.

WHERE: In the northwest corner of Boliden Rönnskär's site in Skelleftehamn, Sweden.

WHY: Boliden Rönnskär wants to extract as much metal as is technically possible from existing raw material. By investing in a leaching plant, we can do just that, while reducing the amount of material that has to be deposited as waste.

Questions and answers

1. Which residual materials will be processed at the leaching plant?

The residual materials for processing are gas purification dust and sludge from Rönnskär’s own facilities. E-sludge comes from the process of recycling electronics. Dust is produced during copper extraction and is called F1/K1 depending on whether it comes from the fuming plant or the converters. A large amount of F1/K1 has been stored for many years, but the leaching plant will also receive residual material from the smelter’s day-to-day processes.

2. How much residual material can the leaching plant process?

The leaching plant has the capacity to process 45,000 tons of residual material each year. To begin with, the F1/K1 that has been stored on site will take priority. In accordance with an environmental ruling, these stores must be emptied by 2029 at the latest.

3. Are other residual materials stored at Rönnskär?

F1/K1 are two of thirteen residual materials stored on site, but they account for about 50% of the total amount. The remaining materials will be deposited as waste in Rönnskär’s new underground repository.

4. What is the split between the final product and waste at the leaching plant?

Lead sulphate and copper/zinc sulphate account for 80%. The remaining 20% is waste (hydroxide and sulfide precipitates) that will be deposited in the underground repository.

5. Are there similar leaching plants in other places?

There are no other leaching plants that process these specific materials. The leaching process has been designed specifically to deal with our residual material.

6. How does the leaching process work?

The leaching plant has four process stages. The residual material is mixed with water and forms what is known as slurry. Sulphuric acid is added and the slurry is leached before being pressed and dried. At this point it consists mostly of lead sulphate – a product that can be recycled at Rönnskär or sold to external customers. The remaining three stages of the process are designed to purify the leachate. Once this has been processed, pressed, purified and boiled down, three materials remain. One is copper/zinc sulphate that is recycled on site at Rönnskär, and two are waste products that are deposited in the underground repository.

7. What advantages does Boliden see in having a leaching plant?

The leaching plant is an investment in sustainability and contributes to the circular economy. Instead of depositing residual materials as waste, we can recycle and use as much of the existing raw material as possible, and extract more valuable metals necessary for the electrification of society. The leaching plant is a Best Available Technique (BAT), which means that it has been built using the best possible technology from an environmental perspective. The flexibility of

the raw materials of the future also increases as a result of research and development of leaching methods.

8. How much has the project cost?

The leaching plant is estimated to cost around SEK 750 million.

9. How was the leaching method developed?

For many years, tests on a smaller scale have been carried out at Rönnskär’s laboratory. Initially, the leaching method was tested in half-liter containers. Following successful trials, a miniature leaching plant was built as part of a pilot plant.



10. Fun facts

- The sulphuric acid used in leaching is a by-product extracted at Rönnskär.
- A milestone was passed on February 26, 2021, when the first residual material was fed in to test the process.
- Did you know that the leaching process is similar to how a coffee maker works? Instead of coffee and hot water in the filter, it is the slurry of residual material and sulphuric acid that is leached. When the leaching process is complete, the material left behind in the filter, which is mostly lead sulphate, is dried and pressed!