

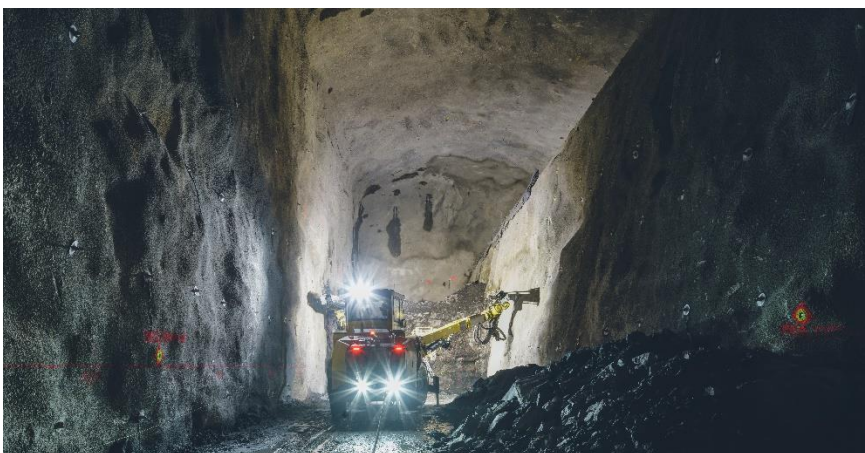
Underground repository, Rönnskär



Unique facility below the smelter

A total of 330 meters down in the rock below Rönnskär, Boliden is constructing a deep underground repository for process waste. The location of the repository was chosen because of the properties of the bedrock, and to minimize transportation. Nowhere else in the world is such a deep repository located so close to a smelter.

When the underground repository is commissioned at the end of 2021, it will consist of a 3-km-long ramp and eight storage rooms accessed via a connecting corridor. The rooms are 18 meters high and 50-240 meters long and have been designed to avoid water-bearing zones.



FACTS

WHAT: At a depth of 330 meters below the smelter, a deep bedrock repository for process waste has been created. Tunneling into the rock began in May 2015 and the underground repository is expected to be operational by the end of 2021.

WHERE: At Boliden Rönnskär's site in Skelleftehamn, Sweden. Just west of the laboratory.

WHY: Under new legislation, process waste containing more than 0.1% mercury must be deposited in a deep bedrock repository. Other process waste currently stored in different locations around Rönnskär's site will also be placed in the same storage facility.

Questions and answers

1. How much process waste can the underground repository hold?

The volume of the repository will be about 300,000 m³. There are environmental permits to store 13 types of process waste, both waste that is generated by current operations and waste held in storage at Rönskär.

2. How long is the repository expected to last?

The repository should last forever and should even be able to withstand another ice age! The reason for legislation on underground repositories for this waste is to ensure that storage is safe from a long-term perspective.

3. What is process waste?

The process of extracting metals also produces gases and water that need to be purified. The purification process separates sludge and dust containing metal contaminants, such as mercury, arsenic and cadmium. These contaminants cannot be recycled at the smelter, nor can they be used to make marketable products, meaning they have to be deposited as waste.

4. Is there a risk of leakage?

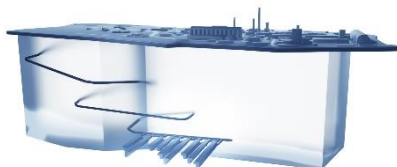
Studies by independent consultants have shown that there is very little risk of hazardous substances leaking from the repository. Storage deep in the bedrock is significantly safer than final surface storage in a so-called surface landfill.

5. How much has the project cost?

The underground repository is estimated to cost around SEK 650 million.

6. Will anything other than Rönskär's own waste be stored here?

Boliden is not permitted to deposit waste from other companies in this underground repository.



7. What advantages does Boliden see in having an underground repository?

It is an investment for the future. The repository will increase Rönskär's flexibility to receive and process complex smelting material containing both valuable metals and contaminants. At the same time, a long-term sustainable solution is created for waste management at the smelter. Boliden controls the entire chain, from raw material to waste. Negative environmental effects should not burden future generations, nor should they have to take responsibility for operation and maintenance. Once the underground repository has been sealed, it will require no maintenance.

8. What are the risks of moving the waste into the repository?

The waste contains hazardous substances, which is why a lot of resources are being put into designing facilities and working methods that minimize the risks. For example, underground there will be a vehicle wash facility to clean the vehicles after they have finished transporting the waste and a purification plant will be established for water.

9. What happens when it's full?

The eight storage rooms are expected to be filled by 2029. When they are full, the construction of additional rooms will probably take place. When it is no longer possible to expand the underground repository, it will be sealed with permanent plugs designed to prevent water from leaking out.

10. Where has the excavated bedrock gone?

A lot of the excavated bedrock is being used in the expansion of the Port of Skellefteå, and some is transported to Boliden's mine in Kankberg, where it is used to backfill the mine.

11. Fun facts

- In 2019, a race was organized for Rönskär's employees, which involved running up and down the 3-km-long ramp. The fastest time was 28 minutes.
- By the time the underground repository is complete, more than 824,000 tons of rock will have been removed.
- The development of an underground repository has required expertise in geology, law, logistics, hydrogeology, rock mechanics, waste management, planning and design, geochemistry and environmental permits, among other fields.