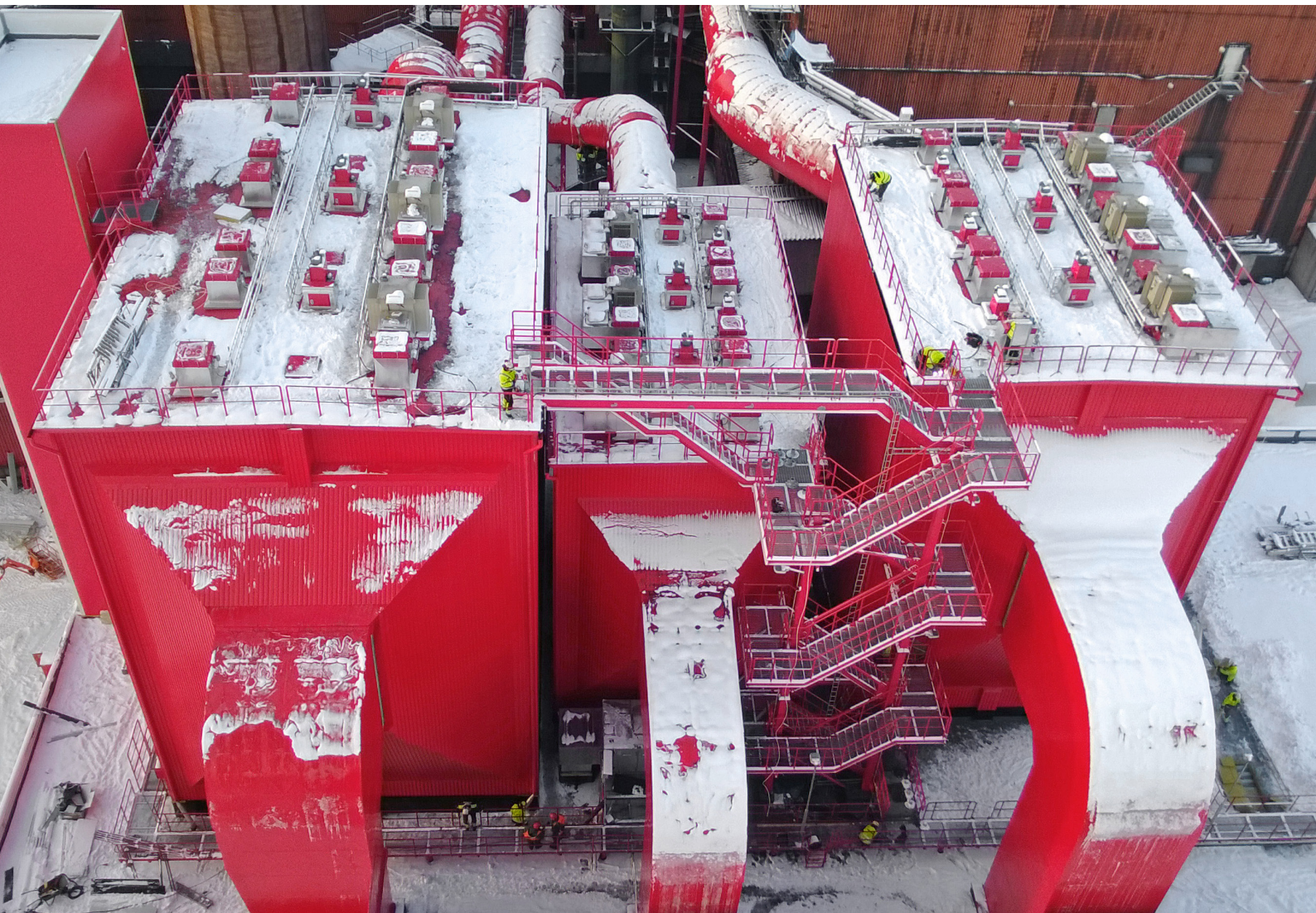


# Reducing emissions far below target of $10 \text{ mg/Nm}^3$



**One Source**

**CASE: LKAB pelletizing plant in Svappavaara, Sweden**

For LKAB to increase production, local authorities demanded that they also reduce emissions – all made possible by a turnkey solution from FLSmidth.

# A flexible, fast and dynamic approach

## Performance test results show a significant reduction in plant emissions.

UDD Exhaust	0.3 mg/Nm <sup>3</sup>
DDD Exhaust	0.7 mg/Nm <sup>3</sup>
TPH Exhaust	0.3 mg/Nm <sup>3</sup>

### The background

For over 25 years, FLSmidth has been helping LKAB to maintain and improve their plants in Kiruna, Malmberget and Svappavaara, located in northern Sweden. Today, FLSmidth has a strong and successful relationship with LKAB as one of their main suppliers of flue gas cleaning equipment and support services.

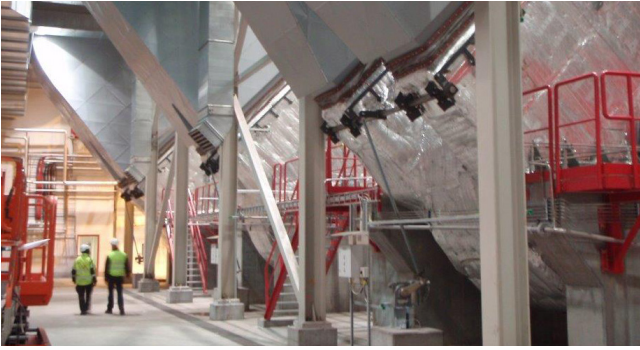
LKAB received a concession from the Swedish authorities to increase plant production. However, this came with the condition that the dust emissions equipment must be upgraded to meet new requirements at Svappavaara, a pelletizing plant with a capacity of 3.8 million tpy of iron ore pellets.

LKAB pelletizing plant in Svappavaara, Sweden

*"We are very satisfied with FLSmidth's performance during both the design and construction phases. It was very impressive how their team was able to successfully complete the erection work within the planned 10-day tie-in and how flexible they were in co-operating with our partners and suppliers."*

Joakim Winsa  
Planning and Design Manager  
LKAB





Auxiliary equipment installed in a building for convenient working in cold climate conditions

In 2012, LKAB secured the investment to replace Svappavaara's flue gas cleaning installations, which were originally built in 1969. Following this, LKAB invited three companies to present a solution that would enable the plant to lower dust emissions. In the middle of 2012, FLSmidth's proposal was chosen as a result of the overall quality of its technology solution, the proven reliability of equipment and its ability to execute a project under challenging conditions.

### The objective

The Svappavaara plant has only one planned stop per year for general maintenance; any additional unplanned downtime is extremely costly. In this respect, LKAB's primary objective was to meet the new emissions requirements with a solution that would deliver maximum reliability and availability over the long term.

### The solution

The Svappavaara plant is the smallest of the three pelletizing plants run by LKAB. Since the plant is located north of the Polar circle, weather conditions made the project's execution and the requisite time schedule important factors for consideration.

Nevertheless, FLSmidth's team worked closely with LKAB to deliver a turnkey solution, which covered the following scope of supply:

- Complete design and engineering according to LKAB's standard and formats
- Full equipment supply, including spare parts
- Mechanical and electrical installation
- Training
- Commissioning

FLSmidth provided three new electrostatic precipitators (ESPs) including plant equipment, designed to provide maximum efficiency and deliver highly reliable dust emission control. The specifications included:

- 3 ESPs type E with 3 fields for UDD, DDD and TPH Exhaust

- Dust transport system
- ID Fans including dampers
- Field instruments and Gas Analyzers
- Complete duct system including wear lining
- Complete set of access facilities

The planning for the entire project was started in close cooperation with LKAB at a very early stage and involved all necessary partners and suppliers. The project only allowed FLSmidth 10 days for tie-in, which after a high degree of preparation, was successfully achieved.

### Results

Maintaining absolute quality across the entire project was a priority for LKAB, both in terms of project execution and the new equipment to be installed. FLSmidth was able to meet the customer's expectations by ensuring the most effective use of the latest technologies and process designs.

The project was a great success and LKAB have been satisfied with the outcome, including engineering, erection, tie-in and operation. They commented on FLSmidth's flexible and dynamic approach to project execution and on their ability to manage their teams and suppliers.

FLSmidth's optimized design made it possible for LKAB to deliver a significant reduction of dust emissions. The performance test, completed in January 2014, revealed exceptional results far below the target of 10 mg/Nm<sup>3</sup>:

Emission	UDD Exhaust	DDD Exhaust	TPH Exhaust
Measured	0.3 mg/Nm <sup>3</sup>	0.7 mg/Nm <sup>3</sup>	0.3 mg/Nm <sup>3</sup>
Guaranteed	10 mg/Nm <sup>3</sup>	10 mg/Nm <sup>3</sup>	10 mg/Nm <sup>3</sup>

### Installation of ESP casing frames

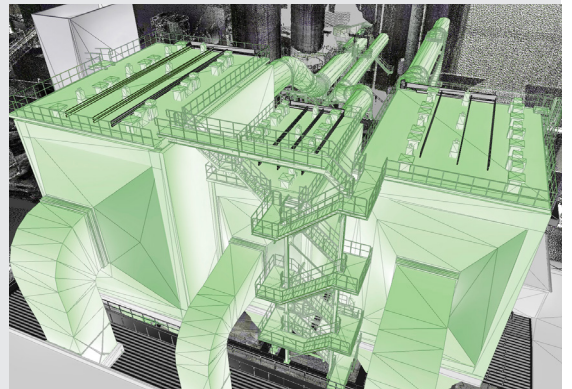
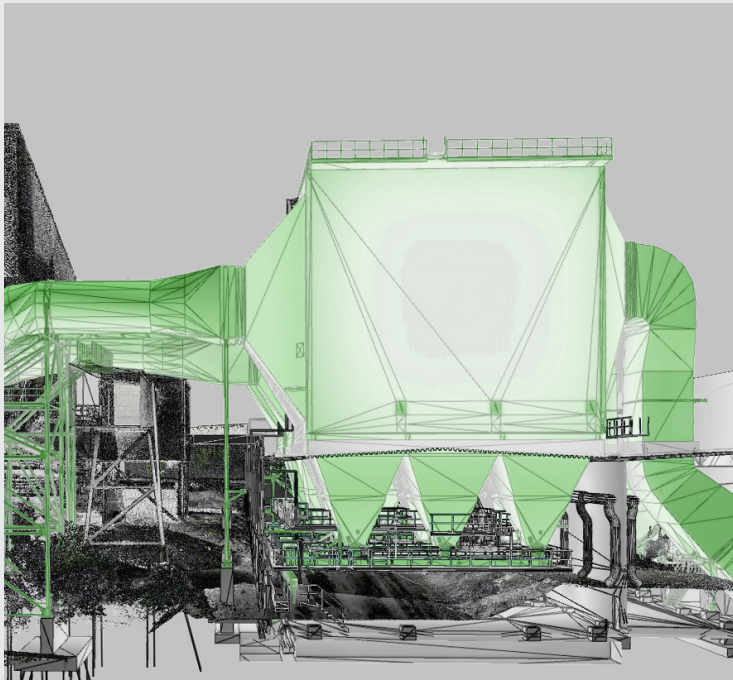


### 3D scanning

3D scanning is becoming an important tool to deliver efficient retrofit solutions by providing a complete overview of a plant and ensuring that any new equipment will fit into its existing layout before installation begins.

FLSmidth has its own 3D scanning equipment and trained operators. By generating a highly detailed 3D image of the Svappavaara plant, engineers were able to accelerate the entire planning process and avoid any potential incompatibilities between the new APC equipment and existing facilities.

3D model of three new ESP installations inserted into the 3D scan



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