

## Research and development

The main focus of Nornickel's R&D function was the Company's large-scale Processing Capacities Reconfiguration Programme. In the reporting year, it carried out several research and technological development projects, along with a number of feasibility studies.

The Company's operating efficiency programme for 2015–2017 aims to find unique solutions to streamline the mining planning process, increase overall recovery rates for nickel, copper, cobalt and PGM, re-process secondary resources (tailings, copper slags, and nickel bearing pyrrhotite with a low nickel content), and optimise the work-in-progress inventory levels.

Other programmes include upgrade of nickel and cobalt production technologies at Kola MMC, improvement of product quality and optimisation of production costs.

**In 2016, Nornickel acquired three patented technologies developed by employees of the Company and GiproNickel Institute.**

As part of its environmental protection programme, the Company is going to upgrade the equipment at its smelting facilities in order to reduce sulphur dioxide emissions

### KEY R&D AREAS IN 2016



#### Company Development Strategy

- feasibility study to choose the optimal design for the Company's copper refining facilities
- development of alternative methods for processing copper electrorefining sludge at Kola MMC



#### Production

- feasibility study on mining balance reserves of all ore types at Polar Division's mines
- development of operating procedures for processing ores at the Company's concentrators
- development of operating procedures for efficient processing of nickel bearing pyrrhotite with a low nickel content at Nadezhda Metallurgical Plant, and processing of Cu-Ni-Fe alloys at Copper Plant
- feasibility study on the efficiency as regards processing of the magnetic fraction of precious metal concentrates produced at Kola MMC



#### Environmental protection

- development of a technology to neutralise commercial sulphuric acid with natural limestone, and feasibility study to compare it with the elemental sulphur production technology used at Nadezhda Metallurgical Plant
- feasibility study to choose an acceptable option for setting up a third field of Lebyazhye tailings pit