GLOSSARY

Acid leaching. Leaching with (solutions of) acids as reagents.

Agglomerate. Sintered ore produced as a result of the agglomeration process.

Agglomeration. A method for forming relatively large porous blocks (agglomerates) by sintering (roasting) fine or powder ore, where solid particles are joined together by solidifying fusible compounds.

Anode. Crude metal (nickel or copper) obtained from anode smelting and fed for electrolytic refining (electrolysis) whereby it is dissolved.

Cake. Solid residue from filtering pulp during leaching of ores, concentrates or metallurgical intermediates, and purification of processing solutions.

Cathode. Pure metal (nickel or copper) obtained as a result of electrolytic refining of anodes.

Concentrate. A product of ore concentration with a high grade of the extracted mineral, which gives its name to the concentrate (copper, nickel, etc.).

Concentration. Artificial improvement of metallurgical feedstock mineral grades by removal of a major portion of waste rock not containing any valuable minerals.

Conversion. An autogenous pyrometallurgical process where ferrous and other detrimental impurities are oxidised and removed as slag to produce blister copper (in copper concentrate smelting) or converter matte (in copper-nickel concentrate smelting).

Converter matte. A metallurgical intermediate produced as a result of matte conversion. Depending on the chemical composition, the following types of converter matte are distinguished: copper, nickel and copper-nickel.

Cuprous ores. Ores containing 20% to 70% sulphides, with the following metal grades: 0.2–2.5% for nickel, 1.0–15.0% for copper, 5–50 g/t for platinum group metals.

Disseminated ores. Ores containing 5% to 30% sulphides, with the following metal grades: 0.2–1.5% for nickel, 0.3–2% for copper, and 2–10 g/t for platinum group metals.

Drying. Removal of moisture from concentrates performed in designated drying furnaces (to a moisture level below 9%).

Electrolysis. A series of electrochemical reduction-oxidation reactions at electrodes immersed in an electrolyte as a result of passing of an electric current from an external source.

Filtration. The process of reducing the moisture level of the pulp by forcing it through a porous medium.

Flash smelter. An autogenous smelter for processing dry concentrates, where the smelted substance is finely ground feedstock mixed with a gaseous oxidiser (air, oxygen), which holds melted metal particles suspended. The heat from oxidation reactions is actively used in the process.

Flotation. A concentration process where specific mineral particles suspended within the pulp attach to air bubbles. Poorly wettable mineral particles attach to the air bubbles and rise through the suspension to the top of the pulp, producing foam, while well wettable mineral particles do not attach to the bubbles and remain in the pulp. This is how the minerals are separated.

Leaching. Selective dissolution of one or several components of the processed solid material in organic solvents or water solutions of inorganic substances.

Matte. Intermediate product in the form of an alloy of sulphides of iron and non-ferrous metals with a varying chemical composition. Matte is the main product accumulating precious metals and metal impurities the feedstock contains.

Metal extraction. The ratio between the quantity of a component extracted from the source material and its quantity in the source material (as a percentage or a fraction).

Metal grade. The ratio between the weight of metal in the dry material and the total dry weight of the material expressed as a percentage or grammes per tonne (g/t).

Mine. A mining location for extraction of ores.

Mineral deposit. A mass of naturally occurring mineral material (near to the surface or deeper underground) which is economically valuable in terms of quantity, quality and conditions.

Ore mixture. A mixture of materials in certain proportions needed to achieve the required chemical composition of the end product. The ore mixture for metallurgical production may include ores, ore concentrates and agglomerates, return slag, dust from dust collectors, and metals (mostly in the form of scrap).

Ore. Natural minerals containing metals or their compounds in economically valuable amounts and forms.

Oxide. A compound of a chemical element with oxygen.

Proven ore reserves. Estimated based on the economically mineable part of measured mineral resources, including possible dilution and losses during mining operations.

Probable ore reserves. Estimated based on the economically mineable part of indicated and, in some circumstances, measured mineral resources, including possible dilution and losses during mining operations.

Pulp. A mixture of finely ground rock with water or a water solution.

Pyrometallurgical processes. Metallurgical processes performed at high temperatures, including roasting, smelting and conversion, which are distinguished depending on their technological characteristics.

Refinement. The process of extracting high purity precious metals through their separation and removal of impurities.

Rich ores. Ores with high sulphide content (over 70%) and the following metal grades: 2–5% for nickel, 2–25% for copper, and 5–100 g/t for platinum group metals.

Roasting. The process of removing volatile components from and changing the chemical composition of materials (ores, concentrates, etc.) performed at elevated temperatures enabling various gas-solid reactions but insufficient to cause melting of the material's solid compounds.

Shop area. A part of a (metallurgical) shop.

Slag. Melted or solid substance with a varying composition that covers the surface of a liquid product during metallurgical processes (resulting from ore mixture melting, melted intermediate processing and metal refining) and includes waste rock, fluxes, fuel ash, metal sulphides and oxides, and products of interaction between the processed materials and lining of melting units.

Sludge. Powder product containing precious metals settling during electrolysis of copper and other metals.

Smelting. A pyrometallurgical process performed at high temperatures enabling the complete melting of the processed material.

Sulphides. Compounds of metals and sulphur.

Tailings pit. A complex of hydraulic structures used to receive and store mineral waste / tailings.

Tailings. Waste materials left over after concentration processes and containing mostly waste rock with a minor amount of valuable minerals.

Thickening. Separation of liquid (water) and solid particles in dispersion systems (pulp, suspension, colloid) based on natural gravity settling of solid particles in settlers and thickeners, or centrifugal settling of solid particles in hydrocyclones.

Underground (subsurface) mining. A set of stripping, preparatory and stoping operations.

Vanyukov furnace. An autogenous smelter for processing concentrates, where smelting is performed in a bath of slag and matte, with intensive injection of air-oxygen mixture. The heat from oxidation reactions is actively used in the process.

METRIC CONVERSION TABLE AND CURRENCY EXCHANGE RATES

METRIC CONVERSION TABLE

Length		Area		Weigth	
1 km	0.6214 mi	1 sq m	10.7639 sq ft	1 kg	2.2046 lb
1 m	3.2808 ft	1 sq km	0.3861 sq mi	1 metric tonne	1,000 kg
1 cm	0.3937 in	1 ha	2.4710 acres	1 short tonne	907.18 kg
1 mi	1.609344 km	1 sq ft	0.09290304 sq m	1 troy ounce	31.1035 g
1 foot	0.3048 m	1 sq m	2.589988 sq km	1 lb	0.4535924 kg
1 in	2.54 cm	1 acre	0.4046873 ha	1 g	0.03215075 oz t

CURRENCY EXCHANGE IN 2012–2016

This appendix provides currency exchange rates used to convert expenses denominated in RUB to USD.

RUB / USD	2012	2013	2014	2015	2016
Average rate for the year ended 31 December	31.09	31.85	38.42	60.96	67.03

INFORMATION ON TRANSACTIONS OF PJSC "MMC "NORILSK NICKEL"

Transactions with interested party and major transactions consummated in 2016, please see on the Company's website

http://www.nornik.ru/assets/files/2016/deals_2016_2.pdf