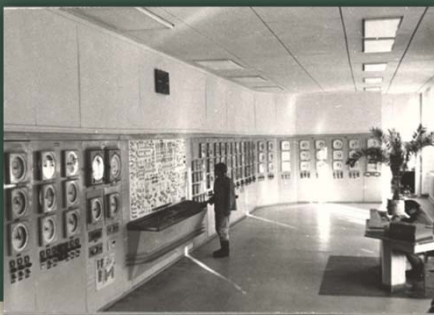




•OJSC “The Hydrometallurgical plant”

•In a few words about our company



- ▶ Hydrometallurgical plant was commissioned in Lermontov in 1954 by the Resolution of the USSR's Council of Ministers a.
- ▶ The plant was founded as a structural unit of the Mining and Chemical mining department (since 1988 SPA "Almaz").
- ▶ The main directions of its work were the processing of uranium ores and production of chemically pure uranium oxide. This works were completed in 1991.
- ▶ The group of scientists and industrialists of the plant were awarded the Council of Ministers' Award for the development of low-waste technological processes of mineral processing in 1987 .
- ▶ Industrialists were awarded by the Council of Ministers' Award for the development and implementation of production technology of scandium products in 1988.





- 1997 - SUE “The Hydrometallurgical Plant” was segregated into independent company of the Ministry for Atomic Energy of the Russian Federation.
- 2003 - SUE “The Hydrometallurgical Plant” was reorganized in OJSC “The Hydrometallurgical plant”, in 2009 the Company was privatized through a public auction.
- The shareholders of the Company are:
  - Sergey Makhov (50%) and
  - Sergey Chuck (50%).
- OJSC “The Hydrometallurgical plant” employs more than 1,200 people, including research team of 7 Doctors of Science, 10 Candidates of Science, and highly qualified engineering personnel.
- OJSC «The Hydrometallurgical plant” is city-forming company.

## •The major milestones of the plant

- ▶ November 17, 1954 - “The hydrometallurgical plant” was put into operation
- ▶ 1957 - the sorption extraction scheme was launched
- ▶ 1958 - Cleaner extraction was begun for the first time in the USSR
- ▶ 1958 - Industrial synthesis trialkylamine was produced for the first time in the USSR
- ▶ 1967 – The plant began to produce mineral fertilizers
- ▶ 1969 - The technology of scandium oxide industrial production was developed for the first time in the USSR
- ▶ 1979 - The technology of aluminum-scandium master-alloy industrial production was developed for the first time in the USSR
- ▶ 1981 - The technologies of Diammonium phosphate and phosphoric acid industrial production were developed for the first time in the USSR



## •The major milestones of the plant

- 1991 - Aluminum master alloys and alloys production workshop
- 1992 - Piezoceramic materials production technology
- 1998 – The technology of producing fluorine-free monoammonium phosphate from an extraction phosphoric acid
- 2000 - The production of copper sulphate
- 2002 - The production of technical monoammonium phosphate
- 2009 - The production of granular ammonium sulphate
- 2010 - Rare-earth elements
- 2012 OJSC “The hydrometallurgical plant” was granted a state guarantee of the Russian Government to implement the investment project *“Increasing of processing depth of phosphate raw materials at OJSC “The hydrometallurgical plant” with production of scandium and rare earth metals”* in the amount of 1.6 bln. Rub / \$25 mln.
- 2014 - The extraction scheme to separate rare earth elements
- 2015 - Potassium sulphate and monopotassium phosphate production.



- Current infrastructure



- The plant is equipped with modern technological equipment, providing a stable output and allows to change its nomenclature according to market demands.
- There are:
  - Railway (12 km),
  - Truck fleet (86 units of technical equipment),
  - Electrical and mechanical engineers for manufacturing non-standard equipment by using modern machinery equipment,
  - Engineering design office,
  - Scientific and research laboratory,
  - Laboratory of environmental protection,
  - Analytical laboratory for process control and quality control of manufactured products,
  - Warehouses,
  - Tailings pond of 140 hectares.

- The main products of the plant



► Highly efficient nitrogen-phosphorus fertilizers and classified phosphates feed and food-grade of high quality:

- MAP 12:39 (Ammophos);
- NPS 16:20:12 (Sulphoammophos);
- Monoammonium phosphate MAP 12:61 (technical, feed);
- Diammonium phosphate DAP 21:53 (feed);
- Monopotassium phosphate MPP 52:34;
- Potassium sulphate.



- Ammophos

- ▶ Characters: highly efficient granular product, free of nitrates and nitrites with optimal ratio of nitrogen and phosphorus.
- ▶ Appearance: light gray granules.
- ▶ Application: used on different soils, as well as in greenhouses and hothouses for all types of agricultural plants.

• Specification	• Composition, %
• Phosphorus pentoxide P <sub>205</sub>	• 39 ± 1
• Nitrogen N	• 12 ± 1
• Humidity	• ≤ 1 ± 0,5



- Monoammonium phosphate (MAP)

- Characters: water-soluble, free of nitrates and nitrites, fluorine-free, non-toxic, fire and explosion product.
- Appearance: white crystals
- Application:
  - as a highly effective fertilizer,
  - as feed additives for livestock,
  - for impregnating fabrics, plywood and wood to impart them flame resistance,
  - in the manufacture of fire-extinguishing powders

• Specification	• Composition, %
• Phosphorus pentoxide P <sub>2</sub> O <sub>5</sub>	• 61 ± 0.5
• Nitrogen N	• 12.1
• Humidity	• 0.1-0.3

- Diammonium phosphate (DAP)

- Characters: water-soluble, free of nitrates and nitrites, fluorine-free, non-toxic, fire and explosion product.
- Appearance: white crystals
- Application:
  - as a highly effective fertilizer,
  - as feed additives for livestock,
  - for impregnating fabrics, plywood and wood to impart them flame resistance,
  - in the manufacture of fire-extinguishing powders

• Specification	• Composition, %
• Phosphorus pentoxide P <sub>2</sub> O <sub>5</sub>	• 53 ± 0.5
• Nitrogen N	• 21 ± 1
• Humidity	• < 0.2

- Monopotassium phosphate (MKP)

- Characters: concentrated, water-soluble, free of nitrates and nitrites, fluorine-free, non-toxic, fire and explosion product.
- Appearance: white crystals.
- Application:
  - as a highly effective fertilizer.
  - It is effective on low-fertility soils for root growth and sensitive to chlorine crops. It is used in vegetable production for closed and open ground and for drip irrigation.

• Specification	• Composition, %
• Phosphorus pentoxide P <sub>2</sub> O <sub>5</sub>	• 52 ± 1
• Potassium K <sub>2</sub> O	• 34 ± 1
• Humidity	• < 0.3

- Awards



► “The Hydrometallurgical plant” and its workers were awarded Government awards of USSR and Russia, awards of the Russian Ministry of Atomic Energy, the Governor and the Government of Stavropol Territory for merits in the development of science and economics, strengthening the country's defense capabilities, employees’ high achievements in work .