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JSC "The Research Institute for Fertilizers and Insecto-Fungicides Named after Professor Y. Samoilov" (JSC "NIUIF"), Russia

### Resource- and energy-saving technologies developed by JSC "NIUIF"

JSC "The Research Institute for Fertilizers and Insectofungicides named after Professor Y. Samoilov" (JSC "NIUIF"), the oldest (founded in September 1919) industry-oriented institute in Russia, has developed a number of innovative technologies in recent years. These technologies allow to recycle production wastes, increase the efficiency of natural resources consumption and reduce the negative impact on the environment. The technologies include, in particular:

1. An innovative, resource-saving process of joint processing of waste production of wet phosphoric acid (WPA) - phosphogypsum and fluorosilicic acid (FSA) into ammonium sulfate with simultaneous neutralization of fluoride compounds without using lime. This technology is currently being implemented at one of the large Russian plants.
2. Improved WPA technology by dihydrate-hemihydrate method in relation to various types of phosphate raw materials. This technology makes it possible to consume natural phosphate raw materials more effectively and fully, and to process production waste - phosphogypsum into gypsum binders and cement due to a lower content of impurities in it. Implementation of this technology in a number of Russian and foreign plants is under consideration now.
3. Innovative, no-analogue technology of slow-release granular PK-, PKS-, NPKS-fertilizers. This technology allows to process a number of wastes and by-products: conversion chalk, phosphogypsum, sludge from sodium tripolyphosphate production, etc. The technology was successfully implemented in 2014 at one of the Russian plants – JSC Metakhim (Volkhov, Leningrad Region).

All listed environmental technologies are protected by Russian and Eurasian patents.

JSC "NIUIF" continues to work on compound use of natural resources and reducing the environmental impact.

### Recent Publications

1. Tsikin M.N., Brizitskaya N.M., Dolgov V.V., Norov A.M. Processing of fluorosilicic acid as a waste of WPA production into the commercial products. NIUIF works 1919-2014, M., 2014.
2. Norov A.M., Malyavin A.S., Grishayev I.G., Sokolov V.V., Ovchinnikova K.N., Markova M.L., Bushuyev N.N., Pagareshkin D.A., Gribkov A.B., Litus A.A., Dmitriyeva L.A. The way of improving the production of phosphorus-containing fertilizers. International Scientific and Technical Conference "Resource- and energy-saving technologies and equipment, environmentally friendly technologies", 24-26 November 2010, Belarus, Minsk, Belarus State Technical University, part 2, p. 75-77
3. Bushuyev N.N., Davydenko V.V., Syrenkov A.Y., Norov A.M., Goncharenko A.A. The possibility of conversion of phosphogypsum into solutions of diammonium phosphate (DAP) and monoammonium phosphate (MAP)

for the purpose of its utilization as a mineral fertilizer. NIUIF works, M., 2009, p.130-136

4. Patent of the Russian Federation No. RU2462419C1 The method of utilization of by-products obtained in production of phosphoric acid. – Norov A.M., Dolgov V.V., Malyavin A.S., Brizitskaya N.M., Bukkolini N.V., Tsikin M.N., Gribkov A.B., Shibanov E.U., published on 27.09.2012.
5. Tsikin M.N., Brizitskaya N.M., Dolgov V.V., Bukkolini N.V., Norov A.M. Resource-saving technology of conversion of fluorosilicic acid and phosphogypsum to obtain ammonium sulfate. NIUIF works 1919-2014, M., 2014.

### Biography

Andrey Norov was born on 26 April 1957 in Russia (USSR). Upon graduating from Mendeleeev's University of Chemical Technology in Russia, for over 25 years Mr. Norov had been working at Mineral Fertilizers Plants. Since April 2007 he has been working for JSC "NIUIF", at the present moment his job title is Industrial Technology Director. Mr. Norov has got PhD in Engineering Science. He is an Honorable Chemist of the Russian Federation, he also has got governmental and industry-related awards. Mr. Norov is an author of 73 research articles and publications and 27 patents in the field of phosphorus-containing fertilizers technology. Mr. Norov took part as a speaker in 21 international conferences and symposiums.

### Notes: