

Shchekinoazot to Reach a Breakthrough

It is very lively now at the industrial site of JSC Shchekinoazot. Well, it has been lively here since 2005, from the very day when they made a decision to fully re-equip the plant technically and technologically. However, now the situation is special, as they are planning to launch four large-scale productions at once.

On the Way to Success

The M-450/A-135 production complex amazes the imagination of an amateur with its complexity: the unusual intertwining of pipes and sparkling metal containers look like an illustration to a fantasy novel. However, specialists find something else striking in this.



"This is the first installation of this kind in the world," says **Oleg MA-KAROV, deputy general director and head of a number of projects.**

"Usually enterprises synthesise ammonium and a little methanol. Our enterprise is different: The plant is designed to produce 450,000 tonnes of methanol and 135,000 tonnes of ammonium per year. This was made possible thanks to a new technology developed by our long-time partner and world-renowned licensor Haldor Topsoe."

Since the 1980s, Shchekinoazot has been producing ammonium exclusively as a raw material component for its own needs. Starting a new installation will allow the Company to return to the market with this product. Yet, it would seem not for long, as all volumes of ammonium will soon go again for processing: the plans for the development of methanol production by installing the M-450/A-135 are not limited to that. At the International Economic Forum in St. Petersburg, a memorandum of understanding was signed to enter a special investment contract between the Ministry of Industry and Trade of Russia, the government of the Tula Oblast, and JSC Shchekinoazot. Concluding the special investment contract gives the right to special working conditions, which in turn guarantees the successful implementation of the M-500 project, as well as the production of nitric acid with a capacity of 270,000 tonnes per year and ammonium nitrate with a capacity of 340,000 tonnes per year. This complex will also be built on the industrial site of Shchekinoazot. Moreover, the laying of the M-500 complex is already being planned in September – the launching day of the M-450/A-135 complex.



"If the first methanol plant M-450 launched in 2011 became, in fact, the second birth of the plant, our life ring, thrown into the abyss of market storms, and the second methanol project M-450/A-135 symbolises a stabilisation period for the company, then the M-500 is our success," says **Boris Sokol, president of UCC Shchekinoazot.**

And indeed the enterprise moves methodically and persistently to success: 16 investment projects have been implemented on the company's industrial site for 13 years. And all of them operate as a single production facility, not even stopping for a single day. Investments in these projects have already reached USD 882 million. And implementing the already drafted plans will require consistent sums of money in the near future. However, it's not just about money...

A Team We Can not Live Without

The M-450/A-135 project is on the home straight. The construction work is almost completed, and even a set of improvement mea-



Construction and installation works at the M-450/A-135 production complex are complete.



The central control panel of M-450/A-135 is preparing to start.

sures is nearing completion. Communication lines have been connected to the installation, and all the necessary resources have been supplied: steam, water, gas and electricity. Now they are conducting tests of the production plant's units: first, they will put the auxiliary powers to work and then the primary ones.



The leading engineer-technologist of the project Alexander Ivanov speaks about this. Eight years ago, he started as an equipment operator at Shchekinoazot

and went through all the career steps here: senior equipment operator, senior foreman, shift engineer... M-450/A-135 is his second project. Now Mr. Ivanov closely follows the work of his team. It wasn't easy to organise it as well. Boiler operator Igor Geinz and Alexey Andrianov were trained at the Pervomaiskaya TPP, which is a Shchekinoazot branch.

"We prepared people very thoroughly," says Mr. Ivanov. "After all, the requirements for the production safety here are equivalent to those in nuclear energy."

Equipment operators also prepared to work on the new equipment. Some of the personnel will be transferred here from the Methanol-450 unit; the newly-admitted personnel was also

trained at this production facility. And then everyone sharpened their skills and ability to competently and operatively act in any situation on a special simulator that not only accurately simulates the conditions of the operating production facility, but also simulates possible situations. Competent and well-trained personnel is the ticket to successful and stable work.

"Ideally, of course, I would like all our equipment operators to have a higher education, as you can't explain in simple words how such complex and smart technology works," the leading engineer-technologist continues.

The ideal does not seem to be far from being implemented. The equipment operator for the synthesis of methanol, Artem Evstigneev, has been working at the company for 2 years. He graduated from Tula State University. And he believes that a working profession in no way undermines the prestige of a university diploma. He says that the work itself is interesting and requires deep qualitative knowledge. And as a plus, there's an excellent team and a very decent salary. Besides, there are opportunities for professional and career growth.



And here comes a living embodiment of the possibilities of such growth at the building of the central

control panel – the head of the M-450/A-135 installation, and recently **the deputy chief of the M-450 complex, Alexander Leonov.** He does not have any time at all to remember his work history, and he does not even have time to shave. In addition to his training duties for 140 people of technical personnel, he also has to pay attention to the work of the equipment.

"This installation is like a child," A. Leonov either laments or is proud of this. "Nothing here is insignificant; nothing can be left without attention or neglected." We have to adjust everything, down to the very last node. There's a lot of equipment, and it is all complex. In addition, strict supervision is carried out on the site: the Japanese specialists check the operation of the compressors, and the Czech specialists check the boiler and pumping equipment. Representatives of the Danish licensing company Haldor Topsoe do a general checking. And the deadlines, deadlines...

A month is left before the launch.

Import Substitution and Much More...

The production facility of dimethyl ether on Shchekinoazot isn't a new thing. It is well known at the enterprise as a by-product of methanol synthesis following an old Italian technology of the early 1960s. Even the purification facility for dimethyl ether was in operation here, but its quality was different of course. It was explained simply: there were no relevant technologies in the country and, strictly speaking, there are none so far. There aren't any yet. But this can already be considered a matter of several weeks...

The production of LLC DME Aerosol is a joint venture with the German company PCC SE, and it is the first Russian plant for producing high-quality perfumery dimethyl ether.

"The German technology has already been tested in its historic homeland and has undergone some adjustments in view of some problems identified during its operation," says **Alexei Zubarev, deputy head of the future production.** "And the degree of purification of the final product is in principle not comparable to what it used to be."

The construction work on the site is completed. The pipelines have been installed, and hydrotesting is under way. Now the final installation of the control equipment is in progress, and they are installing communication lines with the central control panel. The degree of readiness approaches 90%.

Advanced technology will not only provide a high-quality product, but also significantly reduce the consumption of resources – mainly raw materials and energy. As well as labour expenses. According to A. Zubarev, only 20 people of the replacement personnel will be involved in the new production facility. At the same time, the plant's capacity is designed to produce 20 thousand tonnes of perfume-quality dimethyl ether per year. Even under the previous conditions, such volumes could be unimaginable...

To say that the product is in demand in the market is to say nothing: high-quality dimethyl ether is used in aerosol packages throughout the entire spectrum of production: from pharmaceuticals and perfumes to construction. And the demand for it is huge. Both domestic manufacturers and a number of firms in Eastern Europe have already announced their readiness for cooperation. So the new production facility is not just a import substitution project, but also one more opportunity to overtake the world market.

Harmless Acid

Shchekinoazot veterans can hardly believe it. They perfectly remember the oleum unit, which produced raw materials for the production of caprolactam and ammonium sulphate. And this strongly affects the environment. Therefore, it was one of the first units to be closed in the mid-eighties of the last century. For a long time, the enterprise had to purchase raw materials. Then a more modern production facility was set up in the Efremov branch of Shchekinoazot. Still, transporting oleum and acid for a hundred kilometres is expensive, and besides, the Efremov capacities are also somewhat behind the actual requests.

The sulfuric acid production project together with the Chinese company Jiangsu Qingfeng International Environmental Protection Engi-



The first production facility of perfume-quality dimethyl ether in Russia will come into operation this year.

neering can be considered the youngest one – it started in late 2015. The main features of the project are high production efficiency in combination with its environmental safety. The key to the latter is the strict Russian environmental legislation and the resulting serious improvement of the technology by the designer, the Moscow LLC Promstroyengineering with the participation of the long-standing partner of Shchekinoazot, Haldor Topsoe, which took on the task of delivering a more efficient catalyst.

The new installation of the SK-200 will produce 200,000 tonnes of products per year: 100,000 tonnes of sulfuric acid of the brand "K", improved high purity acid, and 100,000 tonnes of oleum for the production of caprolactam and also for delivery to the market. The project's potential provides for a 10 percent increase in operating capacity. So it's clear that the product will be in demand!

Still, the main priority in creating a new production is to reduce the impact on the environment, even in comparison with the maximum permissible indicators. This is achieved through the use of extremely pure raw materials, the use of a much higher class catalyst, as well as the presence of a gas-cleaning, two-stage plant with a powerful electrostatic precipitator. Moreover, the project provides for an energy efficient plan for using heat obtained during the oxidation of sulfur and the conversion of sulfur dioxide by generating it with the help of a 6-megawatt self-energy electric power plant with a steam turbine.



"3.5 megawatts is enough for the production of sulfuric acid, and the rest will be sent to other production facilities," explains **Vyacheslav Kurganov, the technical director of JSC Shchekinoazot.**

He assures us that the technology far exceeds the one used today at the Efremov branch, both in terms of environmental safety and efficiency. For example, only 50 specialists will work at the installation, while there are 356 people working at the Efremov production plant. The staff is trained at the branch and directly at the site.

Now they are finishing construction and installation works on the site. Then they will start the commissioning activities. Commissioning the facility will fully meet the needs of the enter-

prise in sulfuric acid, even taking into account the development of the production facilities. And nevertheless, this does not involve shutting down the Efremov branch. V. Kurganov stressed that new modern projects are being developed for the Efremov branch.

There Are Treatment Facilities!

Suffice it to say that the discovery of new and growing volumes of existing production facilities requires qualitative and up-to-date sewage treatment. Therefore, along with the other projects in the calendar this year, there is one more, albeit an auxiliary, but not less important one. We are talking here about new treatment facilities.

The general contractor for the construction of sewage treatment plants, the Moscow-based LLC Stroyindustriya Management Company, built the facility and landscaped the territory at a good pace. Despite their small size, the treatment facilities include a complex system of tanks and reservoirs, a mechanical cleaning building, a production building and pumping stations. During the preparation of the site, the builders drained the swamp and paved the driveways.

The developer of the Ecopolymer-M project (joint-stock company MAY PROYEKT) won a tender, in which 22 companies took part, which undoubtedly testifies to the brilliant reputation of the customer and the excellent choice given to him. The multi-variant technical and technological solutions offered by the winner of the competition made it possible to achieve an optimal price-quality ratio. Although the volume of investment in cleaning industrial and storm water can not be called modest, it amounts to RUB 800 million. The technological plan proposed by the company is characterised by a high degree of efficiency: the waste stream is so clean in terms of mechanical, chemical and microbiological safety that it can be almost completely returned to replenish the water rotation cycles and the negative impact is almost completely excluded when dropped into water.

The treatment facilities are designed for both existing and planned production facilities for this year, and for further development of the enterprise. Shchekinoazot is going to reach a breakthrough. And it doesn't plan on stopping.

Natalya ZELINSKA.
Photos by Alexander KOLESNIK.



The modern production facility of sulfuric acid is set apart by its efficiency and environmental friendliness.