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Boris Pyankov, Deputy CEO – Technical Director of TMK, sat down with us to discuss the actions taken by TMK to minimize its environmental impact as well as the green best practices and key priorities of the Company’s environmental policy through 2027.

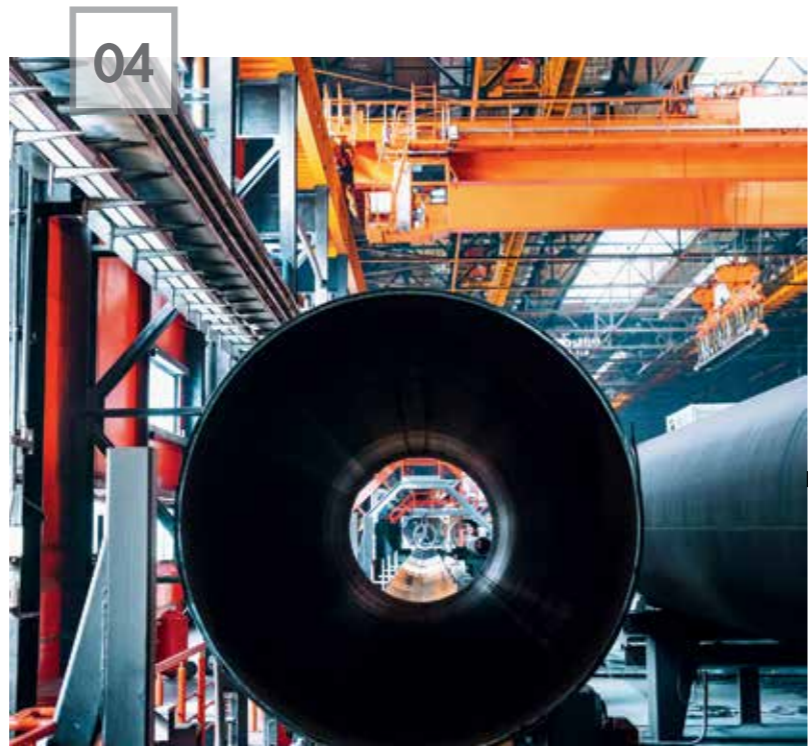
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The launch of AQA Balance, an industrial and storm water treatment facility, completes the upgrades of water use systems at Chelyabinsk Pipe Plant.

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TMK HOLDS SAFETY DAY FOR THE NINTH YEAR RUNNING

This April, TMK held its annual Safety Day. The event engages employees in improving occupational safety and involves senior TMK managers visiting 28 major production facilities across the country, learning about the progress being made to improve worker safety and taking bold measures for the future.

This year, key inspection topics focused on the electrical safety during the operation of electrical installations; pinching between objects, parts, or machines; electrical and gas welding operations; operation of manual tools; and the effectiveness of monitoring compliance with occupational health rules at the level of employees and heads of production sites and shops (1st and 2nd monitoring tiers).

Boris Pyankov, TMK's Deputy CEO – Technical Director, said: "TMK is committed to achieving zero injuries. This is an achievable goal, and we are making steady progress toward it by taking all necessary measures, from safety briefings and upskilling initiatives for employees to deployment of advanced equipment to reduce staff risks. Employees play a pivotal role in these efforts: each TMK employee can move the needle by ensuring that occupational health rules are met, monitoring workplaces, and identifying focal points. Most Company and partner employees are already involved in Safety Day, with as many as 46 thousand people taking part in activities in 2023. Each employee can make a substantial contribution to the overall mission by suggesting improvements to make our work even more comfortable and safe."

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RECOGNITION BY ECO-MIR

Taganrog Metallurgical Plant (TAGMET) and Pervouralsk Pipe Plant (PNTZ) have been named winners of the ECO-MIR 2023 International Environmental Award for their water treatment and biodiversity conservation projects.

PNTZ has received an award in the Resource-Saving and Environmentally Safe Technologies and Recycling of Industrial and Consumption Waste category for the completion of its program to construct new treatment facilities for chemically contaminated effluents. Since 2020, the plant has been operating the AQA Genesis treatment facility to ensure environmentally friendly water recycling for PNTZ's pipe production facilities and minimize river water withdrawal.

TAGMET's entry for the awards – the environmental project Installation of Fish-Protection Systems at the Beregovaya Pumping Station of the Plant's Power Shop – aims to protect and preserve fish populations living in the coastal area of Taganrog Bay from the impacts of water intake by the pumping station. The facility featuring combined two-circuit fish-protection systems is part of the plant's closed-loop water recycling system, which sends all used water through special water treatment facilities and feeds it back into the process.



TMK supports charitable theater tour

The Moscow-based Theater of Nations, supported by TMK, ran a charitable series of theatrical shows in Yekaterinburg as part of the Integration project, a joint program between the theater and the Sinara Foundation for Support and Implementation of Cultural Initiatives.

On April 24 and 25, the show Last Summer was put on at the Yekaterinburg Young Spectator's Theater. A total of 1,300 spectators watched the play over the two days. The play takes place in a dacha village near St. Petersburg during World War I, where the characters spend their time arguing about the fate of their homeland, philosophizing, and reading aloud, trying not to take note of the fact that their idyllic world is being displaced by a new cruel age.

The charitable element of the tour forms an important part of the project. Honored workers of industrial enterprises were invited to attend one of the performances. Tickets to the second show were publicly available for sale, while the Theatrical Initiatives charitable foundation of Yevgeny Mironov, Artistic Director of the Theater of Nations, will donate the proceeds to one of the region's cultural institutions.

The Sinara Cultural Initiatives Foundation will make a donation to the Drama Number Three theater from Kamensk-Uralsky in the Sverdlovsk Region. Kamensk-Uralsky is home to Sinara Pipe Plant, a major TMK enterprise that turns 90 this year.

NEW TOOL JOINT SOLUTION

Pervouralsk Pipe Plant has designed and operationalized a technology for manufacturing extra-thick-walled semi-finished pipes for tool joints. The plant has already manufactured and shipped over 3.3 thousand tonnes of new products to a customer.

Tool joint manufacturers can switch to a more effective technology by incorporating semi-finished pipes for manufacturing tool joints, instead of using solid billets. Tool joints are used for fast and reliable coupling of drilling string segments.

Semi-finished pipes are made of alloyed chromium-molybdenum steel grades, with an outer diameter of 117 mm to 174 mm and an inner diameter of 45 mm to 85.1 mm. They are manufactured from continuous cast billets with a minimal content of non-metallic impurities.



004



“GOING GREEN IS NO LONGER A TREND, BUT A REALITY OF DOING BUSINESS”

ENVIRONMENTAL STEWARDSHIP IS ONE OF THE TOP PRIORITIES FOR INDUSTRIAL COMPANIES WHEN DEVELOPING PROGRAMS TO UPGRADE THEIR PRODUCTION FACILITIES AND IMPROVE THE EFFICIENCY OF PRODUCTION AND DEVELOPMENT TECHNOLOGIES. **BORIS PYANKOV**, DEPUTY CEO – TECHNICAL DIRECTOR OF TMK, SAT DOWN WITH US TO DISCUSS THE ACTIONS TAKEN BY TMK TO MINIMIZE ITS ENVIRONMENTAL IMPACT AS WELL AS THE GREEN BEST PRACTICES AND KEY PRIORITIES OF THE COMPANY’S ENVIRONMENTAL POLICY THROUGH 2027.

Mr. Pyankov, what are TMK's priorities in reducing its environmental footprint?

Since its inception, TMK has been striving to minimize its environmental footprint, with a focus on keeping the environment safe for residents of the Company's regions of operation.

Following a large-scale capacity upgrade, TMK currently operates modern steelmaking and rolling facilities that are much more efficient in terms of natural resource consumption, environmental performance, and energy efficiency than legacy equipment operated 15 to 20 years back. Modern steelmaking units and technologies have helped to reduce negative environmental impacts many times over.

However, equipment upgrades are only one element of the Company's environmental strategy that is driven by three priorities. The first priority is green technologies. TMK continues to deploy advanced technology solutions. When selecting equipment, we always evaluate its environmental performance, energy- and resource-saving potential, and environmental impact. The second priority is green processes. For instance, the Company's industrial facilities practice environmental control of impact sources at the boundaries of buffer zones on a mandatory basis. If deviations are revealed, the causes and consequences of environmental impacts are promptly eliminated, and corrective and preventive measures are developed. The third priority is green products. TMK is focused on using and producing environmentally safe products throughout the entire production cycle, from raw materials, R&D, and design to ensuring that our products are safe for a vulnerable ecosystem.

We are seeing major positive effects from implementing these principles. In 2023, TMK reduced specific pollutant emissions into the atmosphere by 7.5% and cut gross discharge to water bodies by 14%. The share of recycled water supply at TMK's plants is currently at 96%. Waste generation decreased by 16%, and the share of recycling increased by 0.7% compared to 2022 and amounts to 92.7%. Waste disposal at our facilities was reduced by 44%.

Production upgrades are only one element of TMK's environmental strategy



Russia is actively building an environmental regulatory framework. What significant changes took place in the past three years, and how is TMK responding to these changes?

The government is focused on the environmental agenda. The 2030 national goals include the creation of a sustainable waste management system, reduction of emissions, sanitation of water bodies, and remediation of legacy



Modern steelmaking units and technologies have helped to reduce negative environmental impacts many times over

pollution. TMK takes these goals into account when planning its environmental efforts.

For example, Chelyabinsk Pipe Plant (CHTPZ) participates in the Clean Air federal project. Over the past few years, the plant has been upgrading its gas cleaning equipment. In 2023, thanks to a modernization of our facilities, CHTPZ's volume of emissions into the atmosphere was reduced by 30 tonnes. Since we began participating in the project, emissions of pollutants have decreased by 110 tonnes. Total costs amounted to 65 million rubles. We will continue modernizing our equipment through 2026.

Seversky Pipe Plant (STZ) has committed to decommissioning abandoned sludge storage facilities and obtained a positive opinion of the state environmental review office regarding

the project. Sludge dumps had previously been left unattended, and their infrastructure went to ruins. Currently the site is being remediated and monitored. It is now safe for the environment and local residents.

TMK continues to enhance its waste management system, with all enterprises sorting their waste and putting it back to economic use. In 2023, 92.7% of the total waste generated will be reused. The rest is neutralized and buried at specialized facilities.

TMK's production technology is a great example of the circular economy. The use of scrap

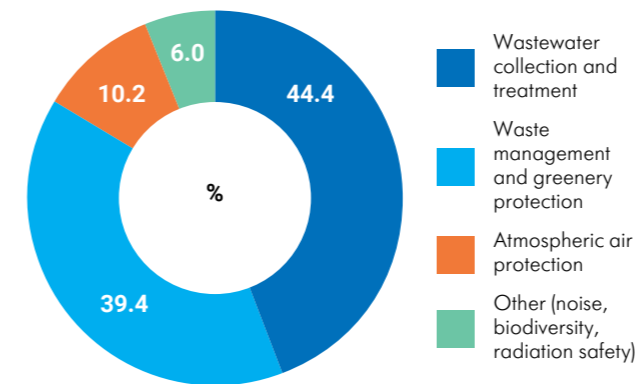
metal in our operations reduces our environmental footprint and significantly cuts down emissions as compared to full-cycle plants that use crude ore.

We are aware that nowadays the challenges of minimizing man-made impacts and the transition to green technologies are no longer a trend but an inevitable reality of doing business. Requirements for production facilities have changed dramatically. Production sites must now comply with environmental laws throughout their life cycle. Supervisory bodies actively monitor environmental compliance, from facilities design and construction to their closure.

The AQA Crystal complex was commissioned at Chelyabinsk Pipe Plant in 2020



ENVIRONMENTAL COST BREAKDOWN, 2023



Another significant change is the transition of natural resource users to new permits. The law requires that an integrated environmental permit be obtained by 31 December 2024. To date, the first integrated environmental permits have been obtained for Taganrog Metallurgical Plant (TAGMET) and Volzhsky Pipe Plant (VTZ). The Company's other production sites are preparing the relevant documents. This time-consuming and multi-stage effort will take about two years.

How is TMK's production upgrade program changing in light of the current environmental agenda?

The current environmental agenda is based on business' responsibility for the environment. Therefore, TMK's strategic planning of production development inevitably factors in the introduction of environmentally friendly, energy- and resource-saving technologies and environmental impact mitigation. New design solutions are subject to state environmental review. Industrial environmental monitoring is carried out, and local environmental conditions in the regions within the Company's zone of responsibility are monitored.

TMK allocates significant resources each year to environmental projects. Over the past three years, total spending on environmental activities has run into RUB 11 billion, with 26% represented by green investments.

In 2021, Pervouralsk Pipe Plant (PNTZ) and CHTPZ became part of TMK. Their integration required significant investment resources, in particular, to ensure the environmental safety of production sites.

What areas of environmental protection are currently your priorities? What major green projects has TMK implemented in recent years?

It is impossible to prioritize certain environmental media over others. Clean air, pure water, and fertile soil are equally important and sought after. TMK comprehensively assesses its impacts across all environmental media and allocates

funds for environmental protection depending on such assessments. Expenditures on water pollution control measures obviously exceed other costs, such as land protection. This is due to the technological challenges and operational costs associated with relevant operations.

The most prominent projects implemented by TMK in recent years are the AQA Genesis complex at PNTZ and the AQA Crystal complex at CHTPZ. Once commissioned, these water treatment facilities helped cut pollutant content in wastewater by more than 2,000 tonnes, reduce freshwater withdrawal for process needs, and increase the water recycling ratio. For example, PNTZ has managed to reduce the amount of feedwater by 2 million m³ per year, while its water recycling ratio reached 95%.

To supplement the existing facilities, AQA Balance was launched at CHTPZ in 2023. We expect that the positive momentum in reducing water-related impacts will continue.

In terms of significant projects to control air pollution, I would like to emphasize the comprehensive efforts we've been putting toward the upgrades of our gas cleaning units at CHTPZ and PNTZ. Ladle dryers at TAGMET and STZ were equipped with an afterburning system for phenol and formaldehyde emissions. The upgrade of STZ's scrap yard aspiration system helped eliminate two sources of pollutant emissions.

Land restoration projects are being implemented at STZ and PNTZ. TAGMET purchased a crushing and screening plant to increase the efficiency of slag processing.

To preserve aquatic biodiversity, TAGMET has released more than 110 thousand Russian sturgeon into the sea over four years.

TMK is participating in the Save the Forest campaign for the second year in a row. With the Company's financial support and the help of TMK employees and volunteers, more than 36 thousand saplings of various species were planted across a total area of 10 hectares.

To reduce GHG emissions, TMK facilities are upgrading their lighting systems. Old lamps are being replaced with modern LED lamps that

TMK has spent RUB 11 billion on environmental protection over the past three years

In 2023, TMK plants



reduced air pollutant emissions intensity

by **7.5%**



cut discharge of pollutants into water bodies

by **14%**



sent

92.7%

of waste for recycling



brought water recycling ratio

to **96%**

have low energy consumption. The project is fairly comprehensive. Used fluorescent lamps, which are classified as Hazard Class 1 waste, are removed and transferred to the Federal Environmental Operator.

TMK is taking the first steps to implement offset climate projects. An experimental carbon farm is being set up at VTZ's industrial waste landfill. We are selecting tree species that are most effective in capturing GHG emissions, taking into account regional climate features.

What is the link between digitalization and environmental impact reduction at TMK enterprises?

At TMK, digitalization is integrated into environmental activities. Our enterprises use automated information systems to account for waste generation and pollutant emissions and discharges and to compile reports as required by environmental laws.

The Company works to develop an integrated automated software suite for environmental management – an environmental expert's workstation. The project provides for the creation of a vertically integrated environmental management system. The new system will be able to account for and calculate all environmental impacts while ensuring their transparency.

The development and enhancement of a digital platform for environmental monitoring will ensure effective management of environmental activities and environmental safety. PNTZ and VTZ have already made the first steps in this direction. To ensure continuous monitoring of air pollutant emissions, an automatic control system was deployed at PNTZ. Work is also underway to roll out an automatic emission control system at VTZ.

Going forward, we expect that artificial intelligence solutions will analyze monitoring data, forecast hazards, and automate decision-making processes.

What environmental challenges will TMK and Russian industrial companies focus on in the next five to ten years?

TMK has adopted its Sustainability Strategy to 2027, which sets targets for environmental protection and climate action.

To support these targets, special programs are being implemented to reduce air and water pollution, cut GHG emissions, and improve energy efficiency. We are building

a recycling ecosystem and scaling our best practices for conserving resources and reducing natural resource consumption. To eliminate environmental accidents, we implement preventive measures and conduct corporate internal environmental audits involving enterprise specialists.

TMK is extending planning horizons, setting output targets and making plans to boost labor productivity, developing a strategy to reduce GHG emissions, and modeling GHG emission scenarios through 2035. We are sizing the potential reduction in our GHG emissions and carbon footprint through energy conservation projects, the use of alternative and low-carbon fuels, and other measures. We intend to work out a long-term Environmental Strategy, envisaging the development of new tools and measures to prevent negative impacts on the environment.

At TMK, digitalization is integrated into environmental activities

Our enterprises are making extensive efforts to protect the environment. However, production volumes are increasing, and we are focused on local projects to eliminate environmental risks, deliver on our obligations in line with state requirements, and comply with updated process standards. For example, we have plans to develop AQA series water treatment facilities and implement projects to deploy continuous monitoring systems at emission and discharge sources, continue efforts to reduce noise pollution, etc. **YT**



The two-story ECO HOUSE TMK building in Volzhsky has rooms for analytical monitoring of various environmental media – atmospheric air, natural, fresh, and waste water, and workplace air – as well as the assessment of human exposure to physical factors, and offices for employees.

ONLY CLEAN WATER

TMK HAS LAUNCHED AQA BALANCE, AN INDUSTRIAL AND STORM WATER TREATMENT FACILITY, AT CHELYABINSK PIPE PLANT. THIS COMPLETES THE UPGRADES OF WATER USE SYSTEMS AT THE PLANT. HOWEVER, TMK CONTINUES TO IMPLEMENT THE AQA PROJECT COMPANY-WIDE AT ALL OF ITS PRODUCTION FACILITIES.



Sergey Chikalov, CEO of TMK (right) took part in the AQA Balance launch ceremony

Since water quality is instrumental to improving ecosystems, TMK is focusing on rolling out resource stewardship practices. This includes the construction of AQA Balance, an industrial and storm water treatment facility, in Chelyabinsk.

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IN HARMONY WITH NATURE

AQA Balance has been fitted out with the latest equipment, including a system of horizontal-flow sedimentation tanks, sand and coal filters, and other installations. In total, AQA Balance includes ten facilities and engineering structures, including the main building, a pumping station. Investments in the project totaled RUB 1.8 billion.

Advanced solutions enable cleaning storm water (collected from the enterprise's site) and industrial effluents of petroleum products, suspended particles, organic pollutants, heavy metals, and their salts. The treated wastewater is returned to production and reused in the systems that cool equipment, tools, and pipes during their heat treatment, while the excess water cleaned to meet the quality requirements for water in fishery water bodies (which are more stringent than the requirements for drinking water) is discharged to Lake Shelyugino.

One of the key facilities is the flow equalization storm water tank with an internal capacity of 10,000 m³, where industrial wastewater, storm water, and meltwater are gathered before filtering.

The launch ceremony of this green facility was timed to coincide with the anniversary of Chelyabinsk Pipe Plant (CHTPZ). Federal and regional officials as well as the Company's top managers took part in the ceremony.

Evgeny Gubanov, Managing Director of CHTPZ, said: "The launch of AQA Balance is the final stage of the ambitious CHTPZ project to upgrade its water use systems. With it, we are making a great contribution to improving the environment and protecting the region's water resources."

THE COMPANY'S WATER CYCLE

The AQA project was launched several years ago. The first step in delivering this large-scale multi-stage program to upgrade the water use system and reduce the impact on water resources involved the launch of Genesis and Crystal water treatment facilities in Pervouralsk and Chelyabinsk, respectively, in 2020.





Sergey Chikalov, CEO of TMK:

“Protection of water resources is among the top environmental priorities for TMK. We have cut water consumption and increased our water recycling ratio while leveraging advanced treatment technologies and supporting biodiversity conservation. This implies a whole range of projects to protect the environment and create a healthy living environment for future generations. The new CHTPZ facility treats both industrial and storm water runoff. We are committed to investing in clean water and resource recovery.”

In September, Pervouralsk Pipe Plant (PNTZ) launched AQA Genesis to serve its Pipe Rolling Shop No. 8. The facility can treat 33,000 m³ of water per day, reducing the discharge of the enterprise’s industrial wastewater by 30% and the content of suspended solids in water by seven times, iron by six times, and petroleum products by more than 100 times. Substances filtered during treatment are neutralized and disposed of at a specialized facility in the Sverdlovsk Region. Treated water is returned to the shop for reuse. But before that, the water is tested at PNTZ’s environmental health laboratory to make sure it has been cleaned to the required standards.

The AQA Crystal water treatment facility was launched at CHTPZ in November. The project reduced the enterprise’s environmental footprint by preventing industrial wastewater discharge into water bodies. Its technology involves a multitier system that treats acidic effluents generated during pipe manufacturing. The resulting chemically treated water is fed into a closed-loop production cycle to supply steam and hot water boilers at the power center of CHTPZ. Dewatered sludge and salts are sent to licensed organizations for landfilling or neutralization.

AQA Crystal enables daily treatment of close to about 600 m³ of wastewater from pipe production facilities. The treatment reduces the concentrations of total iron by 6,000 times, suspended solids by more than 35 times, sulfates by more than 100 times, and chlorides by 50 times.

TMK plans to further upgrade its AQA series water use systems by building another facility to treat chemically contaminated effluents from PNTZ’s neutralization stations.

RIVER BUSINESS

TMK plants have advanced wastewater treatment systems in place. Currently, their water recycling ratio exceeds 96% – only 4% of water used in production is taken from outside sources.

The water recycling ratio in water use at Seversky Pipe Plant (STZ) is 98.5% of the plant’s total water consumption, a previous target that TMK has already achieved.

In September 2023, the plant completed the first phase of building a closed-loop water supply system for its production processes. Industrial wastewater was partially redirected from the plant’s treatment facilities to the chemical water treatment section of the heat and power facility.

The upgrades to the water management system are planned to be performed in three stages. This will reduce wastewater discharge to the Severushka River by 1.5–2 million m³ per year and, at the same time, reduce the amount of pollutants discharged by about a quarter, improving the enterprise’s resilience to climate risks associated with the shallowing of water bodies that supply the plant and the city with process and drinking water.

Although the share of effluents from STZ’s own metallurgical processes in its total water discharge is insignificant (domestic sewage in the northern part of the city), the plant bears full responsibility for the quality of its effluents. Staff at treatment facilities continuously perform a wide range of tasks: research and development on optimizing the bio-module operation, assessment of the potential use of a bio-activator based on chlorella plankton (microalgae), studies to select and adopt new reagents at

the domestic sewage aeration and biological treatment station and more.

To reduce its negative impact on the Iset River, the Sinarsky Pipe Plant (STZ) has implemented large-scale water protection initiatives as part of its investing activities. For example, the plant has built a closed-loop water circulation system at Pipe Rolling Shop No. 2, featuring advanced equipment, including mechanical and reagent-based treatment facilities. The launch of the new facility will reduce water consumption and wastewater discharge by at least 155,000 m³ per year while cutting the discharge of pollutants: petroleum

AQA series facilities have been launched in Pervouralsk and Chelyabinsk



products by 2.5 tonnes and suspended solids by 8 tonnes.

The plant also plans to revamp the local closed-loop water recirculation system at Pipe Rolling Shop No. 3. This initiative is expected to boost the water recycling ratio to 97% and further reduce water consumption and wastewater discharge.

The construction of industrial and storm water treatment facilities at the plant is also planned, which will recycle treated water into the production processes. This initiative will eliminate or significantly minimize water discharge to the Iset River.

Apart from the above investment projects, the plant carries out annual improvements to the existing equipment at the power supply shop’s treatment facilities, including the cleaning of settling reservoirs that receive wastewater and a number of other activities.

BY THE DEEP BLUE SEA

TAGMET is supplied with water from two sources: drinking water from the municipal water supply system and process water from Andreyeva Bight in Taganrog Bay. TMK is running large-scale projects to eliminate losses and reduce seawater consumption by the plant. In 2023, the plant upgraded the metering units for water withdrawn from

CapEx in AQA construction (rub mln)

600

AQA Genesis

800

AQA Crystal

1800

AQA Balance

Water quality is analyzed at plants’ environmental health laboratories

the Bay by the plant’s pump stations. Flowmeters, both electromagnetic and integrated ultrasonic, were installed, with piping replaced. The enterprise uses a closed-loop process water supply system, with used water treated, cooled, and looped back for reuse.

TAGMET cleans the territory of Taganrog Bay’s water protection area to prevent surface water pollution. The quality of water is verified through laboratory tests as well as through observing the water body’s morphometrics and monitoring aquatic biological resources.

The plant also runs a range of biodiversity conservation projects. To this end, the plant has installed advanced fish-protection systems at the water intake of Pervy Podyom and Beregovaya pumping stations to minimize the loss of juvenile fish. Rectangular and circular sediment basins, cooling tower reservoirs, and water intake chambers are regularly cleaned.

To support the reproduction of aquatic biological resources and the growth of a valuable and rare breed of fish, TAGMET has released about 110 thousand sturgeon into the Don River over four years.

Volzhsky Pipe Plant (VTZ) also supports the biodiversity conservation initiative. This year, VTZ employees took part in a project to replenish the Russian sturgeon population in the rivers of the Volga-Caspian basin by releasing more than 14 thousand fish into the Volga River. The plant’s participation in the project is another example of the environmentally responsible policies that TMK pursues.

INVESTING IN WATER

TMK continues to upgrade its water management systems, which will enable the creation of a single closed-loop water treatment system at each plant and improve their environmental performance.

Elena Podgornyykh, Head of Environmental Safety at TMK, emphasized: “TMK is fully committed to ensuring a healthy environment everywhere it operates. In 2022, TMK’s environmental investments almost tripled compared to 2020. This surge was driven by the use of a risk-based approach when preparing targeted environmental programs and TMK’s annual environmental investment program.” **YT**

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PROPER TREATMENT

WASTE MANAGEMENT IS AN INTEGRAL PART OF ANY INDUSTRIAL PROCESS. TMK REUSES NEARLY 93% OF THE TOTAL WASTE GENERATED AT ITS FACILITIES, DISPOSES OF 6% AT SPECIAL ECO-FRIENDLY FACILITIES AND TREATS THE REMAINING 1%.



T

he circular economy is one of the key trends in the development of environmentally responsible production. Today, all of TMK plants separate their waste, putting it back into economic use. Operational metal waste is remelted, while slag, scale, and dust from gas cleaning are sold to third-party enterprises for use in construction, blast furnace steelmaking, and other industries.

SECOND LIFE OF WASTE

High recycling rates are achieved in a variety of ways. For instance, Pervouralsk Pipe Plant (PNTZ) reuses sand, a by-product of mold casting. Sand used to be disposed of at a cost exceeding RUB 4 million per year. Now, following a retrofit, waste is separated into three fractions. Two of them, rubble and sand, are used in construction,

road building, and land reclamation. The third fraction, metallurgical scrap, is sent for remelting to the Iron Ozone 32 electric arc furnace shop and then fed back into production at the same plant. The economic impact of this process change exceeds RUB 3.5 million per year.

The plant's "non-core" waste, such as scale, is sold to third-party organizations. What used to entail disposal costs is now generating revenue.

Oily scale was the target of a separate environmental project at Taganrog Metallurgical Plant (TAGMET). The introduction of separation using specialized equipment that was integrated into the process line has made it possible to produce a new sought-after product putting more waste back into economic use. More than 1,090 tonnes have already been separated since the beginning of the year.

The same approach is applied at Chelyabinsk Pipe Plant (CHTPZ). Along with

scale, refractory brick rubble left over after major furnace repairs is one of the most sought-after types of waste on the market. In total, the plant is able to sell more than 50 items that were previously disposed of or landfilled. Income from these activities will amount to RUB 50 million over the year. In 2024, TMK plans to expand the range of items sold with flux used in electric-weld pipe shops, which will generate around another RUB 15 million per year.

The technologies applied ensure complete isolation of waste

TMK piloted a project to set up a carbon farm at VTZ in 2023

LOOKING TO THE FUTURE

Non-recyclable waste is disposed of at dedicated eco-friendly sites set up using special membranes that protect the soil and groundwater by providing airtight insulation.

Some of the most advanced environmental protection technologies are employed at Volzhsky Pipe Plant (VTZ). This year marks ten years since the launch of a facility for storing Hazard Classes 3, 4, and 5 industrial waste.

During the design stage, it was envisioned as a future-facing facility. The technologies used here ensure complete isolation of waste and prevent pollutants from entering the environment: soil, groundwater, and air. Landfill cells sealed with geosynthetic material represent green capsules whose contents will be reclaimed and used in operations as soon as new recycling technologies emerge.

Sinarsky Pipe Plant (SinTZ) uses technologies to enable physical reduction of the volume of

10 ЛЕТ



It's been 10 years since VTZ unveiled its first modern landfill

high-moisture waste. Separation is carried out using geotextile containers where liquid slurry is poured under pressure. As a result, the liquid passes through the walls of the container, and the compacted and dewatered sludge remains inside to be subsequently transferred for treatment to a specialized licensed organization.

Due to the redesign of the system for Hazard Classes 1 and 2 waste management at the state level, waste can now only be transferred through the federal operator. Seversky Pipe Plant (STZ) amended the procedures for accumulation and shipment of the above-mentioned type of waste and set up new storage sites. A new complex of storage facilities was created on the premises of the production preparation shop, where waste from all shops across the plant is accepted, packed, and labeled in accordance with the requirements for the transport of dangerous goods.

REPAYING OUR DEBT TO NATURE

Thanks to advanced green technologies, plants can now recycle legacy waste and remediate former landfills.

For example, STZ started decommissioning the abandoned sludge dump of the former Polevskoy Cryolite Plant, located within the town. The 204-hectare facility posed a serious threat to the region's environmental safety. The remediation project has passed the state environmental review, the restoration of enclosing dams and drainage systems has been completed, material storage sites have been set up, and the first stage of backfilling is underway. Environmental operational control has confirmed that operating the structures is safe for the environment.

Legacy waste is treated at CHTPZ's slag dump. In 2023 alone, the plant recycled 3.8 thousand tonnes of oily scale and 132 thousand tonnes of slag. Since activities under the project were launched, more than 590 thousand tonnes of open-hearth slag and more than 23 thousand tonnes of oily scale have been processed. Once all the waste is removed, the disturbed lands will be remediated and restored through landscaping.

Sinarsky Pipe Plant plans to remediate a section of a defunct sludge field. The project is currently



Celebrations were held in Volzhsky to mark the landfill's anniversary

at the design stage. A range of options such as constructing a geomembrane isolation screen, creating artificial terrain, and restoring disturbed lands with fertile soil (which is the most eco-friendly solution) are being explored.

GREEN SHIELD

Along with cutting production volumes, one of TMK's priorities is to restore the earth's natural protection against carbon emissions. The Company supports the all-Russian reforestation initiative, Save the Forest, on a regular basis: in 2023, employees of PNTZ, STZ, and CHTPZ took part in the campaign and planted saplings over an area of 5.6 hectares.

Boris Pyankov, Deputy CEO – Technical Director of TMK, said: "Our plants also run their own tree planting events both within and outside their sites and participate in city and regional initiatives. These joint campaigns boost the interest of local residents in environmental protection, which is a prerequisite for improving local environmental conditions. In 2023, we also initiated carbon farming projects at our plants to absorb greenhouse gases."

The first carbon farm was launched at VTZ; the project is run in collaboration with Bauman Moscow State Technical University. A total of 4,000 poplar cuttings of 12 varieties were planted at a sample plot laid out at the former industrial waste landfill site. The plot is set to become an experimental site for determining plants' absorption properties and testing a system for measuring sequestration (transformation of carbon in the air into soil carbon) and carbon emissions. Based on these data, in 2025, TMK will assess the scope for reducing VTZ's carbon footprint by implementing offset projects and expanding the initiative to other production sites.

The Recovery campaign to collect waste is held in Pervouralsk on an annual basis

DIALOGUE WITH SOCIETY

TMK is strongly focused on events and initiatives aimed at raising environmental awareness and offering the relevant training. These efforts include VTZ's ECOLAB environmental education project, in which the plant's environmental engineers share the experience gained by the enterprise and run social and educational events for school and university students, plant employees, representatives of supervisory bodies, non-governmental organizations, and the media. The ECO HOUSE TMK administration and laboratory complex, built in 2020 to accommodate VTZ's environmental team, also hosts scientific discussions between environmental experts and community representatives from the Volgograd region to foster further development and improve the environment.

In addition, VTZ has a public environmental council that is comprised of environmental engineers and representatives of the plant's trade



union and youth organizations. The council's task is to develop proposals and recommendations to enhance the plant's environmental efforts.

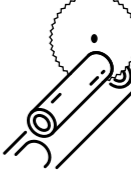
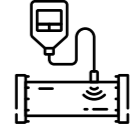
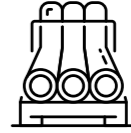
In Pervouralsk, PNTZ consistently supports the City of Firsts grass-roots environmental movement. Every year, volunteers hold about 200 events that bring together more than 13 thousand people. Popular events include the Recovery campaign to collect waste for subsequent destruction or recycling, as well as the Heroes of the Chusovaya project, in which participants raft down the river and collect trash. This year alone, volunteers cleaned 105 kilometers of river banks.

TMK2U Corporate University offers environmental training opportunities for Company employees. To date, more than 26 thousand employees have completed the Industrial Waste Management and Ecology for Non-ecologists e-courses. **YT**

THE LAUNCH OF THE YEAR

The facility's equipment:



-  Two pipe end trimming machines
-  A non-destructive testing unit
-  A pipe handling and packaging line

TMK COMMISSIONED A NEW STAINLESS STEEL PIPE FINISHING FACILITY AT VOLZHISKY PIPE PLANT. THE LAUNCH OF THE FACILITY WILL DRIVE AN EXPANSION OF THE PRODUCT MIX AND AN INCREASE IN THE OUTPUT OF PRODUCTS FOR USE IN ADVERSE CONDITIONS.

Over 100 colors were used to decorate VTZ's new facility, illustrating the changing color of metal as its heated up from room temperature up to its melting point throughout the pipe manufacturing process

The facility is intended for stainless steel pipe finishing and quality control as well as release for shipment to the customer. The facility's equipment includes two pipe end trimming machines, a non-destructive testing unit for product quality control, and a separate pipe handling and packaging line. With the new facility now up and running, Rolling Shop No. 2 will be able to produce and ship 55 thousand tonnes of pipe, including at least 27 thousand tonnes of pipe made of stainless and corrosion-resistant austenitic and martensitic grade steels, boost production efficiency, and reduce

The products of Volzhsky Pipe Plant's Rolling Shop No. 2 are used in the energy, chemical, petrochemical, pharmaceutical, and medical industries, and are suitable for corrosive environments

lead times thanks to the complete production cycle with continuous cast billets manufactured at Volzhsky Pipe Plant used as feedstock. While building the new facility, TMK also upgraded the workshop design by using advanced architectural solutions. Sergey Chetverikov, Managing Director of Volzhsky Pipe Plant, said: "Volzhsky Pipe Plant is undergoing a large-scale comprehensive upgrade, and new pipe production technologies are being operationalized. The launch of the new facility will enable us to expand the product mix and boost the output of tubular solutions for use in adverse conditions. At the same time, the best available technologies and advanced design solutions help create comfortable conditions for employees, and we're drawing interest from the general public to the site as a prominent piece of industrial architecture." The new facility was built within TMK's investment project to retrofit production lines for stainless and corrosion-resistant austenitic and martensitic grade steel pipes at Rolling Shop No. 2. The shop's pipe billet receipt and preparation facility had previously been upgraded. The next step will be the commissioning of new equipment for cold pipe straightening and treatment of the pipe's inner and outer surfaces. **YT**

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Vyacheslav Gagarinov,
Managing Director of Sinarsky
Pipe Plant:

“TMK is constantly expanding its production capacities using the best available technology and creating a comfortable workplace environment. With the new line now up and running, Sinarsky Pipe Plant will be able to increase the output of commercial couplings for tubing with triangular threads. We plan to turn this facility into a creative space and use modern designer solutions to build an environment that will help unlock each employee’s potential.”

ALL LINED UP

A NEW COUPLING THREADING LINE HAS BEEN LAUNCHED AT SINARSKY PIPE PLANT. STATE-OF-THE-ART EQUIPMENT WILL MAXIMIZE THE LEVEL OF PROCESS COMPLIANCE MONITORING AS WELL AS ENSURE HIGH PRODUCT QUALITY. THE GRAND OPENING CELEBRATION TOOK PLACE IN FEBRUARY AND WAS TIMED TO COINCIDE WITH THE ENTERPRISE’S 90TH ANNIVERSARY.

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he new coupling threading line launched in the plant’s OCTG shop (T-4) will drive an increase in the output of tubing couplings. Finished products will be sent to other TMK enterprises further down the production chain.

The line comprises a range of high-tech equipment, such as billet cutting saws with identification die stamping stations, CNC coupling threading machines with gantry loaders, visual and dimensional quality control points, coupling surface cleaning stations, a coupling magnetic particle inspection point, and finally a robotic arm for stacking finished couplings into containers.

The equipment comprising the line is tightly arranged in a single continuous production chain, from feeding coupling pipe to cutting machines to the robotized stacking of finished couplings into a container to be sent on to the anti-galling coating

The launch of coupling processing was carried out by TMK General Director Sergey Chikalov

line. This solution enables the application of the best available technologies for mass manufacturing of similar products and internal logistics optimization. Specifically, unnecessary intermediate storage is eliminated.

The movement of couplings across key production stages is monitored by a machine vision traceability system that promptly provides real-time information on performance. The equipment is fully automated.

Going forward, the facility will be expanded by installing additional equipment for coupling phosphating and impregnating. Other plans include expanding the line’s capacity for the thermal diffusion zinc coating of couplings. The facility’s interior will also be transformed to feature a creative space using designer solutions, which will help to boost employees’ morale. **YT**

Up to **900** thousand couplings per year – capacity of the new coupling threading line

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GOLDEN TIME CAPSULE



ARCHAEOLOGISTS HAVE DISCOVERED THREE BURIAL SITES WITH AN ABUNDANCE OF HISTORICAL AND CULTURAL ARTIFACTS UPON EXCAVATING AN ANCIENT MOUND ON THE TERRITORY OF VOLZHISKY PIPE PLANT.

The Sarmatians were nomadic Iranian-speaking tribes who, from the 4th century BC to the 4th century AD, inhabited a vast territory from the Northern Black Sea region to the Southern Urals. They migrated north and south with herds of sheep, depending on the season. Free children of the steppes, brave and skilled warriors, they did not leave behind cities or writing, and only the steppe mounds preserve the secrets of their culture.



The mound, listed in the Register of Cultural Heritage Sites under number 20, is located on the boundary of Volzhsky Pipe Plant's industrial waste landfill. An archaeological excavation was launched in August, with financial and organizational support by the plant. At the time, experts did not expect to make major discoveries. Olga Shinkar, the head of the expedition, archaeologist at the Volgograd Regional Research and Production Center for the Protection of Historical and Cultural Monuments, said: "Unfortunately, many burials were looted back in the 17th–19th centuries, and even today unique finds are barbarously destroyed by illegal archaeologists, known as 'black diggers'. When we first came to the mound, we found a sinkhole in its center, so we assumed that our mound had suffered the same fate. However, the results of the excavation were nothing short of sensational!"

INTO THE DEPTHS OF TIME

Once excavation began, scientists were able to reconstruct the events of centuries ago from the cultural layers in the mound. Different colored layers were found that suggest the mound was filled several times. Multiple burials of kinsmen were a common thing among Sarmatians as well. The first discovery at the excavation site was of horse bones. Archaeologists believe that it was a sacrifice, a part of the funeral feast that accompanied a ritual to honor those buried under the mound. The burial site in the center of the mound had been looted, just like archaeologists assumed. Human bones were scattered all over the burial chamber. Other discoveries included funerary items (an iron sword, arrows, pieces of bronze and iron objects, glass beads, and

All the finds will be transferred to the Volgograd Regional Museum of Local History



Sergey Chetverikov,
Managing Director of VTZ:

"The mound with Sarmatian finds became a kind of time capsule. By opening it, we were able to learn about bright and interesting pages from the history of these people. The excavation site will become part of the route in the corporate industrial tourism program."

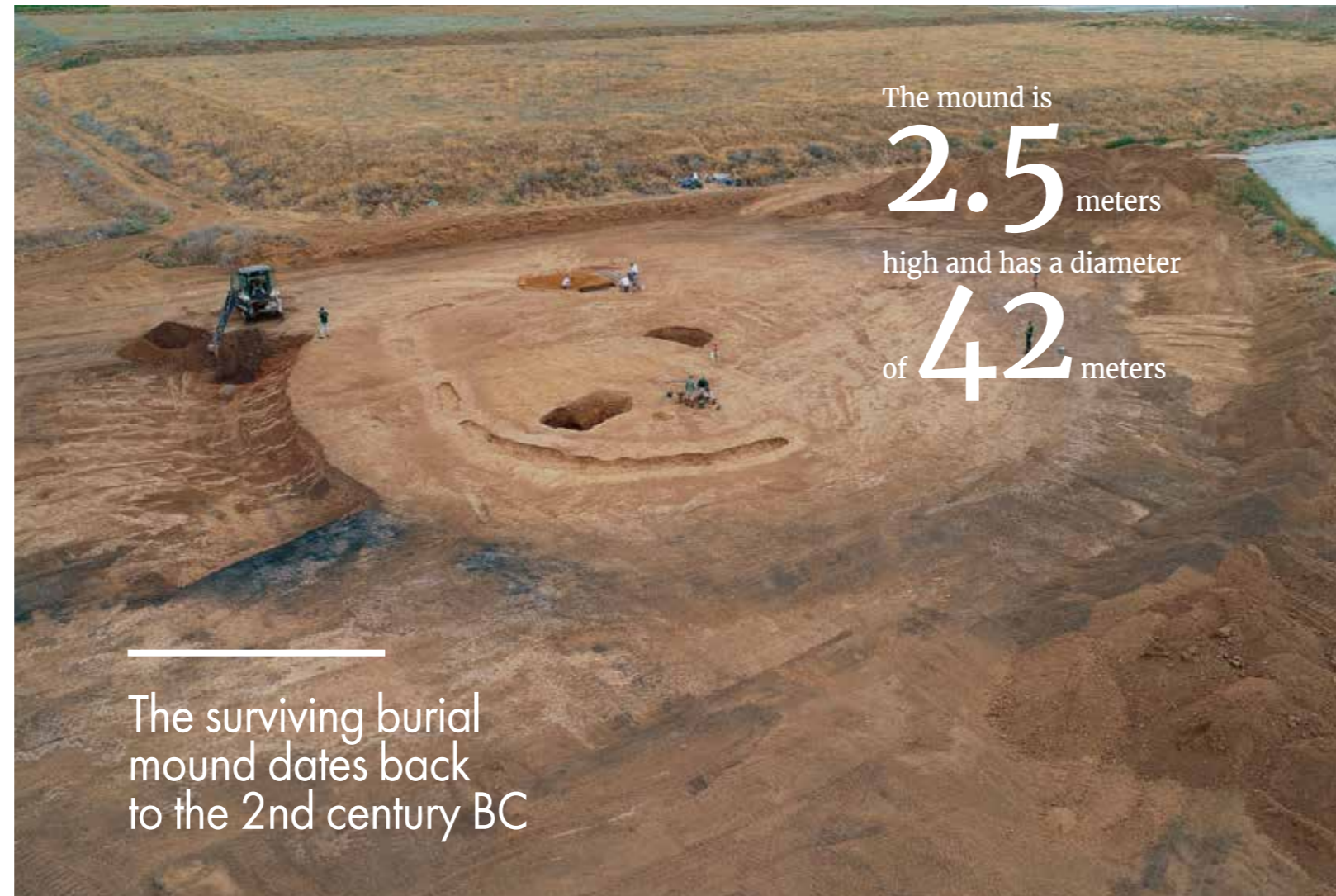
animal bones) that had been broken and smashed by looters. Having looted the central burial chamber, treasure hunters of past centuries left the mound. Archaeologists found two more adjacent burials, dating from a few years after the central chamber. The burials were completely untouched by looters. The presence of these burials confirmed the hypothesis that this was an ancestral mound, with the most important person (the chief and the head of the family) buried in the center surrounded by princes or noble relatives.

NOBLE RELATIVES

The first burial site to be discovered contained the remains of a Sarmatian warrior. It was pure archaeological luck when an outline of a gold bracelet decorated with animal heads and the handle of a bronze cauldron emerged from the layers of soil.

Shinkar explained: "We excavated a male skeleton, apparently of a warrior. He had a very characteristic hole in his skull, probably left by an arrow or a dart. He sustained this wound while he was still alive, as there was evidence of the wound being healed. All his clothes were decorated with gold plaques. Around his neck, he had a two-and-a-half-turn gold torc. Nearby, we found an iron sword

Scientists were able to reconstruct the events of centuries ago from the cultural layers in the mound



The mound is
2.5 meters
high and has a diameter
of **42** meters

The surviving burial mound dates back to the 2nd century BC

in a sheath decorated with gold plates, a quiver set with iron arrowheads, and a bronze mirror with a bulky handle made of elephant tusk.

Perhaps soon anthropologists will be able to reveal the cause of death of the Sarmatian warrior. It is noteworthy that next to the mirror there were pieces of solidified myrrh resin and rhubarb seeds that have medicinal properties – a sort of ancient medical kit.

The second burial site contained the skeletons of an adult male and a boy between 5 and 7 years old. Archaeologists have yet to determine their relation to each other. The answer to this question can be found from genetic expertise and craniofacial reconstruction. The cause of their deaths also remains unknown.

Next to the man and boy, there are also a number of battle artifacts: several iron swords decorated with gold plates, spears, a quiver of arrows, and an iron helmet. Such a set can be considered typical of Sarmatians' male burial sites since these nomads were trained in battle craft from childhood and the chief of the tribe and his inner circle had to be skillful warriors.

ARCHAEOLOGIST'S LUCK

The vast quantity of gold items found in the mound left no doubt that tribal aristocracy had been buried there. The burial site of a man and boy revealed many jewelry items and gold plaques sewn onto clothes. The child's belt had an



The composition of the Sarmatian gold is close

to **21** karats

astoundingly beautiful gold buckle featuring an image of a hoofed animal with its head turned backwards, which is typical of the Sarmatian culture. The edge of the buckle was decorated with miniature hedgehog figures. All the gold pieces have managed to retain their pristine beauty. The composition of the Sarmatian gold is close to 21 karats.

However, the scientists' greatest delight was two silver goblets manufactured in ancient Greece. Such artifacts can allow historians to reconstruct the intertwining between different cultures and peoples. The Sarmatians came to own these items either as diplomatic gifts or as a result of conquests during distant campaigns. The finds are perfectly preserved, and even Greek inscriptions are discernible. Archaeologists hope that linguists will be able to determine the goblets' age based on the style in which the letters were written, thus narrowing the current dating of the burials, determined as the 2nd century BC, to 50 or 25 years.

"This find is unique in that the outer walls of the vessels feature figures in what architects call high relief (volumetric figures), depicting the deeds of gods and heroes of Greek mythology. A similar, though not identical, goblet is exhibited in the Louvre, but it dates back to a later period. Russian museums have no comparable exhibits, and finding something like this is a global sensation," Olga Shinkar explained.

FOR FUTURE GENERATIONS TO REMEMBER

Researchers also took an interest in two gold-inlaid rhytons (vessels made of animal horns) found in the burials, a bronze mirror with a glass handle, and three large bronze cauldrons. Each of these vessels contained horse bones, presumably left as food for the deceased by their tribesmen. The Sarmatians believed in the afterlife and thought that the dead should take everything they need with them to the next life. The discovered artifacts were sent for restoration and reconstruction. Each item must be photographed,

Even today unique finds are barbarously destroyed by illegal archaeologists, known as 'black diggers'

drawn, and scientifically described, analogues will have to be found, origins will be determined, and hypotheses will be tested. After that, all the finds will be transferred to the Volgograd Regional Museum of Local History.

Olga Shinkar concluded: We've been extremely lucky as archaeologists. You make a discovery like this once in a lifetime, and it doesn't happen to everyone. It is the first burial of Sarmatian nobility found in the Volgograd Region; no royal burial mounds dating back to the time of the early Sarmatians had ever been discovered here before. We are more than grateful to management of Volzhsky Pipe Plant for making this expedition a reality!" **YT**

