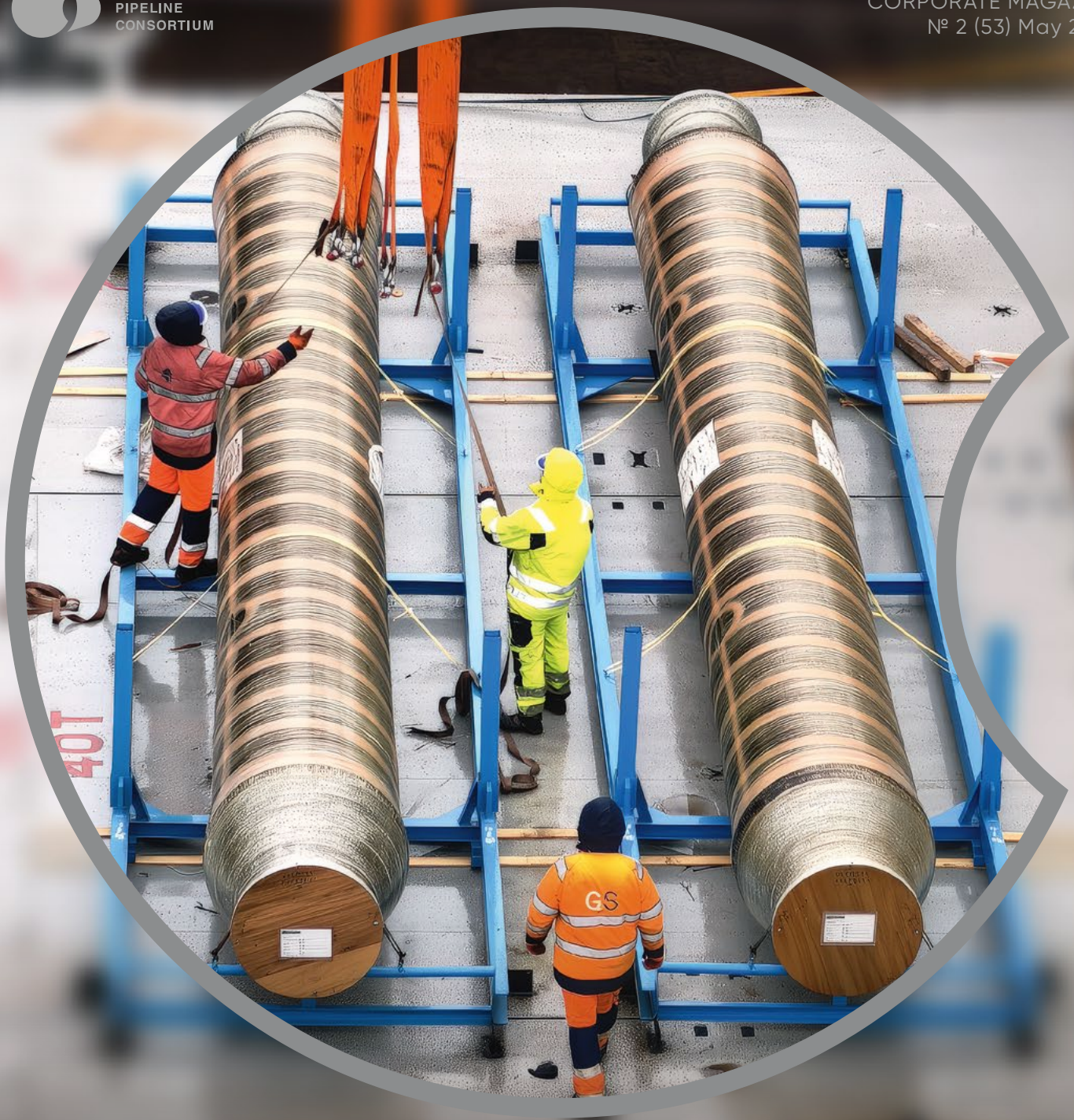
PANORAMA

CASPIAN
PIPELINE
CONSORTIUM

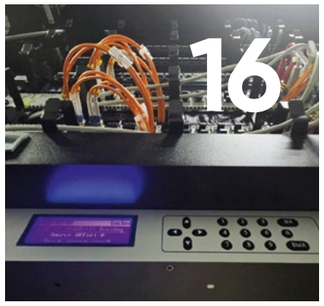
CORPORATE MAGAZINE
№ 2 (53) May 2026

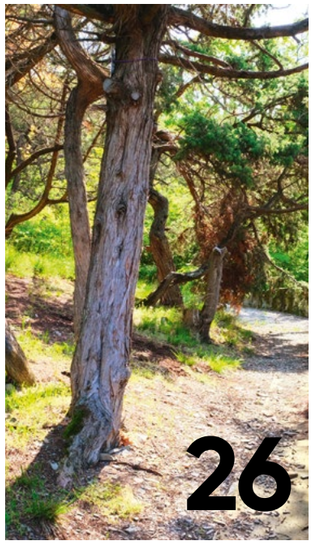


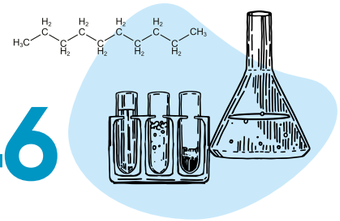
RESOURCES FOR GREATER EFFICIENCY (4)
SEAMLESS TRANSITION (16)
THE RED BOOK OF LANDSCAPES (26)
CREATIVE UNITY (50)

№ 2
2026

Major milestones in the project's history







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Dear colleagues and friends,

2026 is an anniversary year for the Caspian Pipeline Consortium: we are marking 30 years since the Consortium was founded, with Russia and Kazakhstan as its principal shareholders. Thirty years is a long time – long enough for the world to have advanced enormously in technology: information, medical, transport and much else besides.

In 2026 we are not standing still either. Several major projects are moving into active implementation: the upgrade of two single point mooring systems at the Marine Terminal, the replacement of mainline pump units with a switch to grid power supply at a number of pump stations, and the migration from SCADA to a Supervisory Dispatch Control and Operation system (SDCO) across all CPC facilities. These are complex, large-scale undertakings – and they are being delivered successfully.

Built in just two years, with expert input from scientists of international standing, the Tengiz–Novorossiysk pipeline system has served as Kazakhstan's primary export route for decades. Since CPC began operations, it has pumped and shipped one billion tonnes of oil – a milestone reached last year. The system keeps improving: reliability and efficiency continue to grow, and advanced scientific and technical solutions are being actively applied.

Thirty years of CPC means not only vast volumes of oil, dividends and taxes – it also means years of sustained, systematic social and charitable work in the communities where we operate: new schools, kindergartens, hospitals, cultural centres and more. Our priorities – education, healthcare and the environment – have never changed.

This May issue carries a number of features reflecting the knowledge-intensive nature of CPC's operations. Where we previously reported on trials of new terrestrial laser scanning technologies on CPC tanks and other R&D work, this issue turns the spotlight on two themes: a predictive monitoring system for the technical condition of pipeline facilities – eventually covering everything from the Marine Terminal to the pump stations – and a phased transformation of the existing industrial safety, maintenance and repair framework into a fundamentally new model of asset management. Both topics were presented at the Oil and Gas 2026 International Forum, reaching the scientific community and a younger audience – our potential future talent pool – at the same time.

Another feature of this issue is a selection of the most significant operational milestones from the company's 30-year history. I am sure many of these moments will bring back personal memories – and perhaps remind you of other things happening in your lives at the time. Pump stations were built, equipment was upgraded – and alongside all of that, families were started, children were born and grew up.

The DNA image used in the company's achievement infographic symbolises both growth and the distinct "genotype" that I believe belongs to everyone who works at CPC: the unity and cohesion of a multinational team, a track record of mutual support put to the test time and again, the ability to tackle challenges of any complexity and to face the demands of the times with confidence. The year of our 30th anniversary sets new goals – and achieving them is down to each and every one of us.

N. N. Gorban
General Director
Caspian Pipeline Consortium

IAOT Discussion Panel Meeting

On 11 February 2026, a meeting of the International Association of Oil Transporters (IAOT) discussion panel on Safe Work Culture development was held in Baku in a hybrid format. The panel was set up at the 25th IAOT meeting in Sochi in June 2025. The February session brought together HSE managers from seven pipeline operator companies representing Russia, Kazakhstan, Belarus, Hungary and China: JSC CPC-R, PJSC Transneft, JSC KazTransOil, OJSC Gomeltransneft Druzhba, PJSC MOL, SOCAR, AziaTransGaz LLC, as well as CPC shareholder representatives.

Participants exchanged experience and reviewed best practices in incident-free operations, diagnostics and Safe Work Culture development. The meeting also included a debrief on the site visit to Atyrau PS by representatives of CPC shareholders Chevron, ExxonMobil and Eni.

"Through our interactions and mutual site visits, it is clear that despite our different geographies, regulatory environments and corporate histories, our views and approaches to production management are closely aligned", said CPC General Director Nikolay Gorban, addressing the panel members. "This is not a competition of performance metrics. It is a joint effort to develop effective practices for all members of the International Association of Oil Transporters".

CPC Delegation Attends XIII Kazakhstan Machinery Manufacturers Forum

On 2–3 April 2026, the XIII Kazakhstan Machinery Manufacturers Forum was held in Astana at the EXPO International Exhibition Centre. The event drew over 1,300 delegates from 24 countries, with 270 companies showcasing their products and technology solutions. CPC-K was among the forum's partners.

In his address to the plenary session, Prime Minister of the Republic of Kazakhstan Olzhas Bektenov stressed that, in line with the head of state's directives, work is under way to create a predictable and stable environment for the development of the engineering sector. The state and business share responsibility for ensuring fair and safe working conditions and developing social partnership.

Forum participants reported that Kazakhstan's engineering sector output reached 5.7 trillion tenge in 2025, with a physical output index growth of nearly 13%. Fixed capital investment rose by one third to around 376 billion tenge.

In 2025, for the first time, revenue from Kazakhstan's manufacturing industry surpassed that of the raw materials sector, reaching 30 trillion tenge – underscoring the growing role of industrial production in the country's economy. More than 60% of higher education grants in Kazakhstan go to engineering and IT. A Ministry of Artificial Intelligence and Digitalisation has been established, industrial robotics is on the rise, and assembly localisation is expanding.

A CPC delegation took part in the forum. The company is committed to closer cooperation with domestic manufacturers and increasing local content – both in the Russian Federation and in Kazakhstan. Examples include the cooperation agreement signed with the Ust-Kamenogorsk Valve Plant on 10 December 2025, among other projects.

Planned Changes

On 10 April 2026, the CPC pipeline system was returned to service following a 72-hour planned shutdown. During this period, scheduled maintenance was carried out on various pipeline systems, pump stations and the Marine Terminal.

In the Eastern Region, preparatory work was completed at Tengiz PS, Atyrau PS, Isatay PS and Kurmangazy PS for the SCADA-to-SDCO migration project. A gate valve was replaced at the L/R facility near Atyrau PS. Four repair structures were installed on the Eastern Region linear section.

In the Central Region, utility infrastructure preparation was completed as part of the new mainline pump building construction project at Komsomolskaya PS. Preparatory work for the SCADA-to-SDCO migration was carried out at A-PS-5A, PS-2 and PS-3.

The Western Region team at Kropotkinskaya PS fitted oil storage tanks with additional high-level alarms. Several mainline block valves were replaced, along with a tee at the inlet of the L/R facility at PS-4. Preparatory work for the SCADA-to-SDCO migration was carried out at PS-4, PS-5 and PS-8.

At the CPC Marine Terminal, control system hardware was upgraded across the Tank Farm's management systems, closed drainage system and fire suppression system.

Planned 72-hour shutdowns are carried out no more than twice a year. CPC plans them well in advance and agrees the timing with all shippers. This information is also taken into account by the Ministry of Energy of the Republic of Kazakhstan when drawing up the annual oil transportation schedule for the Tengiz–Novorossiysk pipeline. This allows all parties involved in oil production and transportation via the CPC pipeline to plan their operations in a coordinated way.

Bridging the Energy Sector and Science

On 21–24 April 2026, the International Oil and Gas Forum 2026 was held in Moscow at the Gubkin Russian State University of Oil and Gas (National Research University). The annual large-scale industry event – bringing together scientists, students, specialists and executives from across the fuel and energy sector – was organised by Gubkin University jointly with the Oil and Gas Industry Youth Council under Russia's Ministry of Energy, with the support of the federal Ministries of Energy, Science and Higher Education, and Natural Resources and Ecology, the CIS Executive Committee and the Government of the Russian Federation.

CPC management and specialists took part in the forum. CPC General Director Nikolay Gorban spoke at the strategic panel session "An Integrated Fuel and Energy System as a Key Driver of Industry Competitiveness and Innovation".

On 23 April, as part of the forum's congress programme, the XIX All-Russian Scientific and Technical Conference "Current Challenges in the Development of Russia's Oil and Gas Sector" was held. CPC General Director Nikolay Gorban participated in the panel session "Design, Construction and Operation of Hydrocarbon Pipeline Transport Systems and Oil and Gas Product Supply. Current Challenges in Ensuring Comprehensive Safety at Critical Fuel and Energy Facilities", presenting a paper entitled "Predictive Monitoring of the Technical Condition of Marine Oil Terminals".

CPC's second contribution to the session was a paper entitled "Transformation of the Industrial Safety, Maintenance and Repair System for Process Equipment at Hazardous Production Facilities", prepared by Dmitry Benderov, Head of the PS, Tank Farm and Shore Facilities Operations Service; Dmitry Zavalinich, Chief Welder; and Alexandra Rabinovich, Training Manager.

"The forum has firmly established itself as a platform for effective collaboration between leading industry companies, the scientific community and – crucially – young researchers and specialists who want to create and introduce innovations in production", said Viktor Martynov, Rector of Gubkin Russian State University of Oil and Gas (National Research University) and Full Member of the Russian Academy of Education. "The forum's close alignment with the practical challenges facing the oil and gas sector is a core principle. It allows for deeper engagement with industry issues and opens new avenues for collaboration".

AUTHOR

Pavel Kretov

Resources for Greater Efficiency

In March 2026, a meeting was held in Novorossiysk to review the Caspian Pipeline Consortium's operational and business performance in 2025. Department heads and heads of CPC structural divisions discussed the results of their collaborative work and plans for the current year

The results of 2025 – a record year in terms of oil loading volume (70.52 million tonnes) – were deemed satisfactory overall. Given the extraordinary external circumstances, including terrorist attacks on Consortium facilities, the pipeline's utilisation rate stood at 98.1%, and all planned work – including the installation of caisson anchors for two new Single Point Moorings – was completed on schedule.

"One of the key resources for greater efficiency is raising our Safe Work Culture to the next level", said CPC General Director Nikolay Gorban. "We protect our highest value – people's lives and health – while ensuring the reliable, uninterrupted operation of a major oil transportation system".

In 2025, 65.7 million tonnes of oil were pumped through the CPC Eastern Region – 20% more than in 2024. While handling these volumes, the CPC-K team maintained strong HSE performance.

"In 2025, 3.4 million man-hours were worked without injuries or incidents. Over the period from 2020 to 2025 as a whole, that figure reached 23 million man-hours", said Mukhit Mazhenov, Eastern Region Manager, in his address to the meeting. "Vehicle mileage without road accidents increased by nearly 6 million km last year, bringing the total to around 29 million km".

Safe Work Culture development in the Eastern Region is driven by strong engagement from operational staff and contractors. The most active team was at Atyrau PS, whose staff completed 2,600 observation cards. Among contractor organisations, the standout

performer was the private fire protection company Fire Safety LLP.

In 2025, four joint fire-tactical exercises were held at CPC Eastern Region facilities in cooperation with the Atyrau Region Emergency Situations Department and the fire and emergency response service of Tengizchevroil LLP. At Isatay PS and Kurmangazy PS, the exercises simulated fire suppression in the indoor switchgear (ISG) and packaged transformer substation rooms; at Tengiz PS and Atyrau PS, drills took place in the mainline pump unit areas.

Among the most significant work carried out in the past year, the Eastern Region Manager highlighted the overhaul of various types of storage tanks at Atyrau PS, as well as the replacement of mainline pump rotors at Isatay PS and Kurmangazy PS. On the linear part, 61 repairs were completed in 2025, including replacement of pipeline segments, mainline block valves, electrically insulating inserts and the installation of various types of couplings. In addition, power line support structures along the pipeline route were replaced.

65.7 million tonnes of oil were pumped through the Eastern Region in 2025

It is not the same employees filling in more observation cards – it is the overall reach across the workforce that is growing

West of the State Border

The Central Region, which receives crude from the Eastern Region, added 5.6 million tonnes in 2025 to the volume of oil transiting from Kazakhstan. HSE performance improved by 3.7 million man-hours without injuries or incidents and 8.7 million kilometres without road accidents. Cumulative figures since recording began now stand at over 27 million man-hours and 54.3 million km.

The number of observation cards completed at Central Region facilities tripled compared with 2024, reaching 6,500. The highest level of activity was recorded at Astrakhanskaya PS.

"To strengthen fire readiness across the region, six fire-tactical exercises and 288 fire-tactical training sessions were conducted with fire units and volunteer fire brigades at all pump stations", said Konstantin Rybak, Central Region Manager. "One of the command-and-staff exercises was chaired by the head of EMERCOM of Russia – it was a drill for fighting wildfires in the PS-3 pipeline protection zone".

The most significant work completed in the Central Region in 2025 includes replacement of the pig launcher at Astrakhanskaya PS, reconstruction of the LACT control room at the same station, construction of a new artesian well at PS-2, and replacement of the drainage tank area at A-PS-5A. Work planned for 2026 includes installation of the new mainline pump connection unit at Komsomolskaya PS and the inspection and upgrade of SVFRT-4800 tanks.

The Western Region carried out a substantial programme of reconstruction and production upgrades in 2025

In 2025, the Western Region team added over 3 million injury-free man-hours and more than 13 million accident-free kilometres to its HSE record. The cumulative total since recording began stands at 41 million man-hours and 114 million km.

Among the Western Region's pump stations, Kropotkinskaya PS was the most active in completing observation cards in 2025. Among contractors, the top result was posted by STARSTROY LLC, which outscored Kubanskaya Pozharnaya Okhrana LLC by ten cards.

"We are particularly encouraged that it is not the same employees filling in more cards – it is the overall reach across the workforce that is growing, and not just within CPC but in contractor organisations as well", emphasised Sergei Potryasov, Western Region Manager.

In 2025, the Western Region carried out a substantial programme of reconstruction and production upgrades. On the linear section, 11 new diesel generators were commissioned at valve station sites, and 20 electric actuators were replaced at valve stations and L/R facilities. At Kropotkinskaya PS, gas mist eliminators on the turbine units were replaced. At PS-4, PS-5, PS-7 and PS-8, the anticorrosion coating on process equipment and cable trays was restored.

"The Marine Terminal has successfully continued the inter-shift competition for the best Safe Work Culture performance, a practice launched in 2023", noted Alexei Pelipenko, Marine Terminal Manager, in his report. "The core idea of the competition is to develop a conscious commitment to safety among operational staff, reinforce hazard identification and risk assessment skills, and build reliable communication with contractor personnel".

In 2025, 587 tankers were loaded at the CPC Marine Terminal: 142 Aframax vessels and 445 Suezmax. That is three more tankers and 7 million more tonnes than in 2024. During the year, 113 training exercises were conducted for simulated emergency oil spill response at sea and shoreline protection, along with 20 marine firefighting drills.

As is customary, the meeting concluded with the results of the inter-regional CPC competition. Performance was assessed against HSE, industrial safety, fire safety and environmental protection indicators. The criteria also included road traffic compliance, quality of fault investigation and effectiveness of the quality management system. The Western Region team took first place for the third consecutive year, finishing one point ahead of the Central Region.

From the Personal to the Essential

As of early March 2026: 42.7 million man-hours worked without injuries and 98.5 million km covered without road accidents

In 2025, the Consortium's workforce completed personal HSE commitments for the first time. 99% of these commitments were met. Independent audits of the Risk Management System and Safe Work Culture showed positive momentum. More CPC and contractor employees completed observation cards across every region and division of the Consortium. On the environmental front, a reduction in industrial waste was recorded following the completion of the Debottlenecking Programme.

"Across the Consortium as a whole, 42.7 million man-hours have been worked without injuries and 98.5 million km covered without road accidents", reported Sergei Polovkov, Deputy Head of the HSE Division in the Russian Federation.

In 2025, the Capital Projects Department completed a full restoration programme for Kropotkinskaya PS, which had been damaged in a drone attack. Among the key projects, CPC Technical Director Igor Lisin cited the reconstruction of two pipeline sections near Astrakhanskaya PS and Komsomolskaya PS, the first phase of UPS replacement, and the upgrade of oil quantity and quality measurement systems in the Central Region. Projects in the pipeline include replacement of two SPMs, the transition from gas-turbine MPUs to electrically driven MPUs under the EPS Project, migration from SCADA to the SDKU dispatch control system, and other projects.

Upcoming projects: replacement of two SPMs, the EPS Project, migration from SCADA to SDKU

According to current plans, work on the EPS Project at Kropotkinskaya PS and Komsomolskaya PS will begin in 2026. Construction of production facilities and warehouses at Tengiz PS will be completed, and decommissioned buildings at Tengiz PS and Atyrau PS will be demolished. The mainline pump building at Astrakhanskaya PS – replaced as part of the DBN Programme – is to be repurposed as a materials and equipment warehouse.

The Western Region team took first place for the third consecutive year

"The Consortium is currently in the process of optimising a number of processes and procedures", said CPC General Director Nikolay Gorban in his closing remarks. "We are moving to new software products and improving procurement and other areas of production activity. Against this backdrop, the human factor must not be overlooked: regional and divisional management must pay close attention to the wishes of every member of the workforce, responding promptly and incorporating suggestions into decision-making. This, too, can be seen as a resource for greater efficiency – and for successfully delivering the goals set for 2026".

AUTHOR

Pavel Kretov

A Turnkey Pump

In early 2026, pilot testing began at PS-7 on a production-model mainline pump unit designed and manufactured by Uralskie Dinamicheskie Mashiny (UDM)

The testing of the new pump in the Krasnodar Krai is being carried out as part of the CPC External Power Supply (EPS) Programme – a transition that involves replacing gas-turbine-driven mainline pump units (MPUs) with electrically driven MPUs. Swapping imported equipment for domestically produced alternatives goes hand in hand with a comprehensive run-in of the new technology: the pump itself, its control systems and diagnostics. As CPC Panorama has previously reported, units of the same type as the one being tested at PS-7 are planned for installation at A-PS-4A, Komsomolskaya PS and Kropotkinskaya PS.

From Prototype to Full-Scale Operation

The programme to transition CPC facilities from gas turbines to external power supply has been under way since 2024, when pre-project surveys, field and desk-based engineering studies were conducted and the core design solutions were developed for A-PS-4A, Komsomolskaya PS and Kropotkinskaya PS.

In 2025, the Consortium and UDM LLC – a managing company within the PJSC Transneft group – signed a contract for the manufacture, supply and supervised installation of 11 mainline pump units. That same year, a prototype was successfully tested; now it is the production model's turn.

Extensive work was carried out at PS-7 by CPC, PJSC Transneft and contractor specialists. The existing imported pump was removed and replaced by a new unit manufactured by JSC TNN.

PS-7 Manager Vitaly Motrenko says installation work got under way straight after the New Year holiday – on 12 January.

"The pump has been delivered, and so have the components – the coupling and the control cabinet", says Vitaly Vladimirovich. "We completed the pipework connections, running into some challenges with the geometry of the new equipment. Parts of the drain system and leakage pipework had to be rerouted on site. At the same time, work was ongoing on mounting the control cabinet, laying cables and installing sensors".

At the time of the site visit (second half of January – Ed.), the pump was in the final pre-commissioning stage.

"The next step is a product pressure test", says the PS-7 Manager. "Then a test run of the electric motor to establish baseline parameters – and only after that, a loaded run with the other pumps".

Design: Stiffer, More Powerful, More Efficient

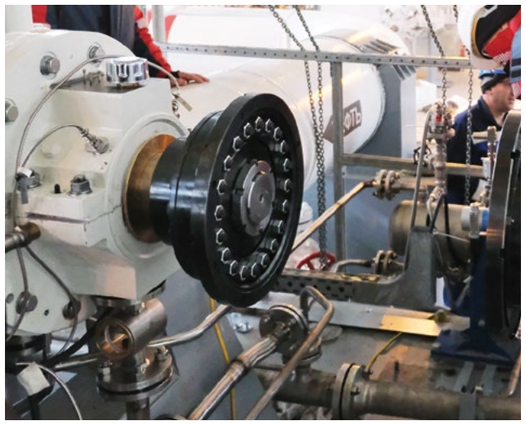
UDM LLC Lead Design Engineer Yuri Snegirev walks through the features of the new unit, designated ANM 4500-650. It will replace a Flowserve BFD 16×22×519 centrifugal pump.

"Our unit is a two-stage centrifugal pump with double-suction impellers and a horizontal split casing", explains Yuri Snegirev. "The stages are arranged in series, delivering a head of 650 metres".

The new pump manufactured in Chelyabinsk, delivers greater head and higher efficiency than its predecessor

Is that a lot? For units of this type, the typical figure is around 210 metres. In other words, one pump does the work of two or even three. Achieving that required the engineers to pay close attention to the pump's structural strength.

"We increased wall thickness at the highest-stress points and added stiffening ribs", notes Yuri Snegirev. "This significantly reduced vibration across the entire operating range. The results spoke for themselves: at acceptance testing, the



new pump's efficiency reached 87.2% – nearly 3% higher than its predecessor".

The net positive suction head (NPSH) figure has also improved – 21 metres versus 31 on the unit being replaced. This reduces inlet back-pressure requirements and, consequently, energy consumption. Equally important is the fact that the pump is made entirely from domestically sourced components, guaranteeing uninterrupted operation and maintenance regardless of import conditions.

Replacing a mainline pump is not simply a mechanical job. The unit must become an integrated part of the station's complex ecosystem.

"Oil pumping equipment connects not just to pipework, but to the pump station's automated process control system", explains Alexander Krinitsyn, Leader of CPC`s Automated Process Control System Team. "We need to integrate the pump and its sensors into the existing PS APCS infrastructure and into the SCADA system to enable data transfer and remote control from the main dispatch centre in Novorossiysk".

The scale of the work is illustrated by a single figure: around 200 sensors transmit SCADA signals from each mainline pump's connections. An additional complexity is that CPC is currently migrating from its SCADA system to a domestic SDCO dispatch control system. This means the pump under test must be visible in both systems – the existing one and the new one – out of the approximately 10,000 signals fed into the SCADA dispatch system from each PS.

Testing of the new pump is taking place without shutting down PS-7

Another key objective of the trial operation at PS-7 is testing Russian-made vibration diagnostic equipment. Until now, all CPC pump stations used the Bently Nevada system manufactured by General Electric. That equipment is no longer supplied and must be replaced.

Several Russian companies specialise in manufacturing equipment for machinery vibration protection and vibration and predictive diagnostics. As a Bently Nevada replacement, CPC is trialling products from the R&D and manufacturing company TIK. Equipment from this Perm-based company has already passed a CPC audit, and its software is listed in the Ministry of Digital Development's registry. Six TIK specialists are on site at PS-7 commissioning their vibration diagnostic equipment during the pump unit trials.

The production-model pump is already visible in the dispatch system

Alongside the new pump domestic control and vibration diagnostic systems are being tested

One of the two control cabinets manufactured by TIK is being tested here at the station. The second has gone to the Tyumen region – to PJSC Transneft's PS-2 at the Torgili LODS – where, in parallel with the PS-7 tests, the electric motor manufactured by UDM LLC specifically for the Consortium is also being tested.

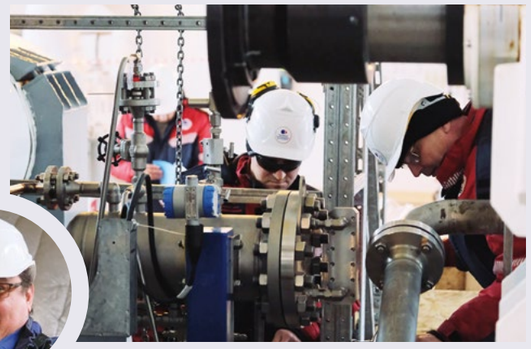
"We deliver a turnkey solution, including training and round-the-clock technical support", says Yuri Tsyganov, Key Account Manager at TIK.

For some period, the existing Bently Nevada equipment and the new TIK system will run in parallel. CPC Lead Engineer for Vibration Diagnostics Andrei Sakharnov explains the rationale.

"We have now put both systems into parallel operation", says Andrei Alexandrovich. "It is a side-by-side field test of both systems. The domestic diagnostics system is not a direct copy of Bently Nevada. In addition to monitoring, the Russian equipment offers predictive and automated diagnostics – a capability that did not exist before. The purpose of the diagnostics system is to assess the current technical condition of the pump unit, identify emerging faults, forecast how a fault will develop over time and estimate the remaining safe operating period".

To do this effectively, the automated diagnostics system needs time to build up a statistical baseline and calibrate its data comparisons. That is why, during the testing phase, the two fixed systems will be supplemented by additional checks using portable analysers. These measurements will help validate the reliability of the data being collected.

"The vibration diagnostics systems currently being introduced have good prospects", adds Andrei Sakharnov. "If they prove their effectiveness, oil pipeline companies will be able to shift to condition-based maintenance of mainline units rather than the current hour-based schedule – delivering significant savings. The regulatory framework does not yet allow a full departure from scheduled inspections and maintenance and repair procedures, but it is clearly time to start developing the legal foundations for rolling out systems and technologies that are demonstrating their effectiveness and the safety of new methods".



The electric motor of the new mainline pump unit is undergoing parallel testing at a PJSC Transneft pump station

The testing programme is scheduled to run for several months. Successful completion of the trial operation of the production-model MPU manufactured by UDM LLC will trigger the next phases of the modernisation project for key facilities in the pipeline system, securing stable, import-independent operation of the system for years to come.

AUTHOR

Pavel Kretov

Confidence in Every Litre

Three years have passed since three Lease Automatic Custody Transfer (LACT) systems were commissioned at the CPC Marine Terminal. Specialists from the Oil Transportation and Commerce Team share their assessment of the new LACT systems' performance

For over a decade, one of the bottlenecks in the CPC pipeline system was the 3+2 configuration – three Single Point Moorings at the Marine Terminal served by only two commercial oil metering stations. In practice, this limited simultaneous loading to two tankers. The situation was compounded by the need to take equipment offline for scheduled maintenance, and the overall increase in pipeline throughput capacity ultimately ran up against this bottleneck.

The Debottlenecking Programme changed everything. Within just two years, a new LACT complex was built on the Shore Facilities site: three metering stations with six measurement lines each. Four lines are active, supporting a maximum loading flow rate of up to 12,700 m³/h; two are on standby.

By order of the Black Sea and Azov Sea Marine Directorate of Rosprirodnadzor dated 31 July 2024, the State Environmental Review conclusion was approved for the documentation entitled "Justification of the Proposed Commercial Activity for Oil Loading at the CPC-R JSC Marine Terminal Using Three Oil Quantity and Quality Measurement Systems Simultaneously".

The expert panel – comprising leading Russian construction specialists, design engineers and environmental scientists – reviewed project documentation covering the proposed increase in oil throughput at the Marine Terminal to 81.5 million tonnes per year, the composition of Marine Terminal facilities, key technical solutions, environmental and climatic conditions, measures for organising production environmental monitoring, and measures to limit environmental impact from industrial and consumer waste.

The review concluded: "The documentation for the simultaneous use of three LACT systems complies with the environmental requirements established by technical regulations and the legislation of the Russian Federation in the area of environmental protection. Based on its review of the documentation, the expert panel considers the anticipated environmental impact to be acceptable and the implementation of the subject of the review to be feasible".

"If you compare the accuracy of LACT data with the 'backup' measurements made by surveyors on tankers using calibration tables, our metering stations are significantly more accurate", says Yuri Volgin, Deputy General Manager for Oil Transportation and Commerce.

Physics and Maths

The primary measuring instruments in the LACT systems are turbine flow transducers – essentially flow meters. Each measurement line also carries pressure and temperature sensors, both primary and backup. All measuring instruments are certified for use at production facilities in the Russian Federation and undergo annual state verification.

The stationary proving pipe prover (PPP) serves as the working reference standard for the flow transducers on the LACT measurement lines at the CPC Marine Terminal. It is used to verify and track the metrological performance of the LACT flow transducers.

"On the old LACT systems, the pipe prover was installed downstream of the metering stations, which made maintenance and state verification more difficult", explains Andrei Osipenko, Lead Engineer for Oil Metering

at the Marine Terminal. “In the new LACT systems we corrected that by positioning the PPP upstream of the measurement system. That eliminated the technical complications of taking the pipe prover offline for maintenance”.

Another key innovation was relocating the Pressure Control Units: the LACT systems are now built upstream of the PCUs. This creates a stable back-pressure that keeps the flow laminar – steady, without erratic fluctuations in velocity or pressure – and reduces measurement error to a minimum. This arrangement allows oil to be metered with greater accuracy, meeting the most stringent requirements and reducing the frequency of unscheduled verifications.

The CPC Marine Terminal LACT systems use an indirect dynamic measurement method, combining flow meter readings with density values and accounting for temperature and pressure. To this end, the LACT Quality Measurement Units (QMUs) are fitted with inline density transducers – densitometers – as well as other analysers such as water content meters and viscometers. Laboratory analysis of the oil sample also plays an important role. A 15–16 litre sample is collected throughout each tanker loading operation by the QMU’s automatic sampler. The sample container is then retrieved, in accordance with procedure, by a commission comprising a CPC laboratory technician, a representative of the LACT maintenance contractor, a shipper’s representative and the tanker master’s agent.

“The sample is split into two portions”, explains Andrei Osipenko. “One is taken straight to the testing laboratory to determine oil quality – specifically, its BS&W content: mechanical impurities, water and chloride salts. The batch mass is then calculated with sediment deducted. The second portion is placed in arbitration storage in case of any disputes over quality. The arbitration sample is kept in the warehouse for three months. In all my years working here since 2014, there has never been a single challenge to a batch’s quality or a request for independent assessment. Even so, we are required to keep these samples”.

The Space Question

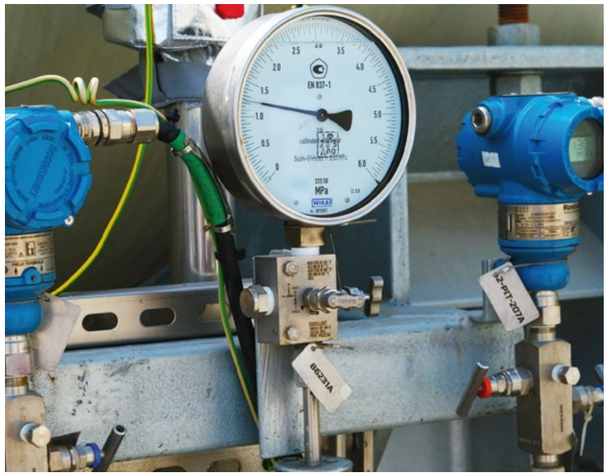
The commissioning of the new LACT systems also brought a dramatic improvement in working conditions for staff. In the early years of the original Marine Terminal LACT systems, laboratory technicians, operators, instrumentation and control specialists and maintenance contractors all shared a single small single-storey building. A dedicated laboratory was built in 2012, but that only partly resolved the space issue.

“In 2023 we finally moved into a spacious two-storey LACT control room building”, says the Lead Engineer for Oil Metering. “It has everything: a comfortable changing room, showers, toilets, an office for operational staff and, most importantly, a modern control room with automated workstations”.

The power supply system also deserves a mention. The electrical switchroom houses a modern uninterruptible power supply (UPS) providing triple redundancy. Even in the event of a power outage, all primary measuring instruments and primary and secondary transducers remain powered by the UPS.

LACT operators work around the clock on rotating shifts. Each shift includes, alongside CPC’s own operational staff, two employees from the contractor responsible for technical and metrological maintenance. This staffing level is sufficient to prepare the LACT systems for loading operations, monitor measuring instruments and automatic samplers, and carry out sample splitting and oil sampling.

While the tanker loading dispatcher at the Operation Control Centre manages the loading process directly and monitors commercial oil metering using LACT data, the operator verifies the metrological performance of the turbine flow transducers against the PPP – carried out every ten days – and monitors meter readings, temperature and pressure sensor values, and pressure differentials across the mud strainers, among other parameters.



The operator’s role goes beyond watching a screen. Before each loading operation, a walkround inspection of the equipment is conducted, sample containers are prepared, all measuring instruments are checked, and the flanges on the measurement lines and the LACT process pipework are inspected.

“It’s like aviation: take-off and landing are the most critical moments”, says Andrei Osipenko. “In our work, that’s the start and end of loading. Everything in between is a stable process under constant monitoring”.

Three years into operation, the evidence is clear: the three LACT systems at the Marine Terminal – built under the DBN Programme to replace the previous two – are performing reliably and accurately. The new systems have been tested at full capacity on multiple occasions, running simultaneous loading operations across all three SPMs at once. The specialists of the Oil Transportation and Commerce Team are confident in the quality of every litre of oil that leaves for the consignee.

AUTHOR

Alexander Krinitsyn, Team Leader, Automated Process Control System, CPS-R

Seamless Transition

The Caspian Pipeline Consortium has launched one of its most significant IT projects in recent years: the replacement of the pipeline control system. Preparatory work is under way across the company's facilities for the transition from the existing foreign SCADA system to a new Supervisory Dispatch Control and Operation system (SDCO) of Russian manufacture. The project will deliver technological independence and strengthen the cybersecurity of CPC's information infrastructure

Over the 25 years since the Tengiz – Novorossiysk trunk pipeline entered service, the SCADA supervisory control system has gone through several stages of development and upgrade. SCADA – an acronym for Supervisory Control and Data Acquisition – is a system designed for industrial supervisory control, real-time data acquisition and processing. In effect, SCADA acts as the brain of the enterprise: it provides a live picture of the current state of process facilities, monitored parameters and automated systems, displaying data on operator and dispatcher workstation screens in a format suited to analysis and decision-making.

From 2001, the brain of the CPC pipeline was the SCADA S/3 system supplied by Valmet (USA). At the time, the system met all international requirements for the organisation and operation of such systems and provided a high, reliable level of automation across the pipeline network, enabling real-time monitoring of all process facilities from the Operation Control Centre (OCC) located at Yuzhnya Ozereevka, Novorossiysk.

By 2006 the need to develop the SCADA system had become pressing, as preparations began for the CPC Pipeline System Expansion Project (2010–2018).

Construction of new facilities along the Tengiz – Novorossiysk route presented new automation challenges. A full overhaul of the pipeline's automated control systems was required. The number of pump stations (PS) grew from five to 15, new process facilities were added at the Marine Terminal and the Tank Farm, and new complex process automation algorithms, subsystems and applications also had to be integrated into the SCADA system.

Systems integrator specialists and CPC engineers have begun testing the SDCO hardware-software complex in various operating modes

The S/3 system gave way to a new SCADA-based automated control system with more capable processing mechanisms and algorithms to handle a larger volume of data. More than 300,000 process parameters were fed from over 500 programmable logic controllers (PLCs). The system's launch followed the Expansion Project implementation schedule closely and included factory acceptance testing in Calgary, Canada. Systems and subsystems testing with the new communications infrastructure took place at a Moscow data centre. The final phase of work took place on-site at CPC pipeline facilities.

New Challenges

CPC today faces new challenges related to import substitution, reliability improvement and achieving digital sovereignty in line with Russian Federation legislation governing the information assets of domestic fuel and energy sector enterprises. The cross-border transportation of oil from the Republic of Kazakhstan to the CPC Marine Terminal in Novorossiysk demands the highest standards of reliability and availability from all systems involved in pumping and loading oil onto tankers. This means the Consortium's hardware and software choices are subject to specific requirements set by the regulator FSTEC.

Work is currently under way to replace the SCADA system with a Supervisory Dispatch Control and Operation system (SDCO) for CPC. The project is being carried out by a Russian systems integrator with operations in the Republic of Kazakhstan as well. The SDCO selected for the project was developed by one of the leading Russian software companies in the field of industrial and infrastructure automation.

The system is built on a software platform designed for the creation of modern, multi-tier supervisory control systems of any scale. The new SDCO is an entirely Russian hardware-software solution, encompassing both the software and new hardware components. The system has already demonstrated its reliability and technical maturity in pipeline transport: pipelines and fuel and energy sector enterprises across Russia have been running successfully on SDCO since 2013.

Architecture

CPC specialists first encountered SDCO-based pipeline management in 2017, during visits to Transneft facilities. However, simply replicating those solutions for CPC was not an option – not least because of fundamental differences in the operational characteristics of the two pipeline systems, and because the CPC pipeline, linking two sovereign states, is unique in its own right.

Developing an SDCO for the Consortium required accounting for the system's geographic distribution and the scalability needed to serve pipeline facilities across the route. Reliability, security and ease of operation were equally high priorities. The system as deployed must support rapid configuration changes, load redistribution in the event of equipment failures, and multiple layers of redundancy – with alternative

The SDCO is not merely a like-for-like replacement for SCADA – it brings new functionality too

communications routes for transmitting process parameters and data – ensuring data availability, punctual delivery and integrity.

It is also worth emphasising that the system must be built around its users: the operational staff who monitor and manage facilities around the clock, working with interfaces and applications day in, day out. Interface and functionality requirements must likewise follow the core principles of high-technology system design: clarity of understanding and ease of use, to enable rapid identification of abnormal situations and sound decision-making.

The guiding principles of the new CPC SDCO are therefore: reliability, scalability, ease of operation and security.

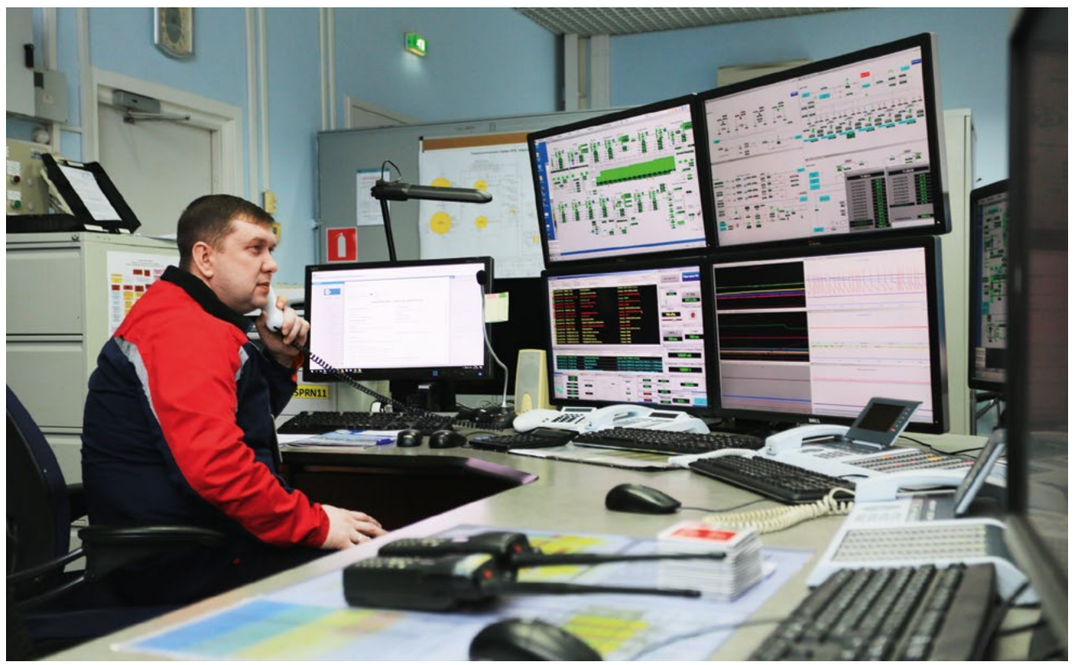
The CPC SDCO is not an off-the-shelf replica of existing systems – it is a bespoke solution

Running SCADA and SDCO in parallel will allow operational staff to adapt to the new system without interrupting production

Driver and Parallel Operation

The new SDCO will not simply replace the ageing SCADA system – it will also add fundamentally new functions and applications, driven by new capabilities, cutting-edge technology and requirements for enhanced reliability and information security in operating such systems.

The defining feature of the project is its seamlessness. The transition from SCADA to SDCO does not require taking pump stations out of service for extended periods to replace field equipment and controllers. All sensors, actuators and controller hardware will remain in operation throughout the project and into the subsequent operational life of the new system. Taking into account the controller fleet in use at CPC facilities, the systems integrator has developed a specialised driver-adapter that allows the new SDCO to collect data directly from the existing PLCs. Testing of the driver and its deployment on other SDCO projects have already confirmed that it is fully functional and fit for purpose in the SCADA replacement project.



The project entered its active phase in 2026. Factory acceptance testing of the system has begun at the systems integrator's test facility. Across a test bed covering half a football pitch, the complete digital infrastructure of the system has been deployed, replicating all the process characteristics of CPC pipeline facility management. In line with the factory acceptance testing schedule, systems integrator specialists and CPC engineers have begun testing the SDCO hardware-software complex in various operating modes against the specified project requirements.

Factory acceptance testing of the SDCO at the systems integrator's test facility

The guiding principles of the new CPC SDCO: reliability, scalability, ease of operation and security

From 31 March to 1 April, representatives of shareholder company Chevron visited the SDCO test facility. During their review visit they were briefed on the progress of factory acceptance testing and noted the high standard of testing organisation.

In parallel, installation work has begun at all 17 Consortium facilities – 15 pump stations, the Tank Farm and the Shore Facilities – to upgrade the existing infrastructure ahead of new control cabinet installation.

This is a technically demanding task. We are connecting to live equipment and must ensure that the work has no impact on the operation of the existing SCADA system, maintaining its availability and, by extension, the round-the-clock operation of the pipeline system at every stage of the project's implementation. Certain operations will therefore need to be synchronised with planned pipeline shutdowns.

2027: Full Readiness

According to plan, pilot operation will begin as early as 2026: the new SDCO will run in parallel with the existing SCADA system. This will allow the operational staff who manage CPC's facilities to build hands-on experience with the new system, get used to the new interface and verify the operation of algorithms without interrupting production. CPC already uses a high-fidelity hydraulic simulator – a digital twin of the pipeline system – to train control room dispatchers and shift supervisors, and to sharpen equipment management skills under SCADA. An equivalent simulator will be developed for the new SDCO.

SDCO server hardware

Full commercial operation of the SDCO is scheduled for 2027. By that point, management of the CPC pipeline system will not only be more secure and reliable, but entirely independent of foreign software and hardware. The CPC pipeline management architecture will gain the additional resilience and information security that current realities demand. In delivering this project, the Consortium is laying a digital foundation for the secure future of the CPC pipeline system for decades to come.

AUTHOR

Pavel Kretov

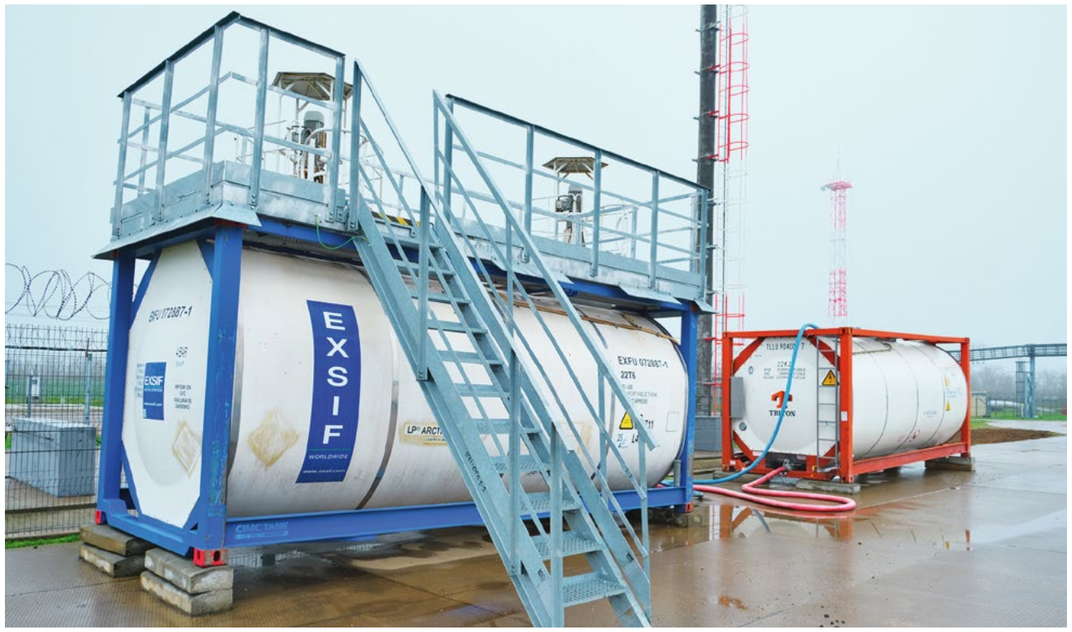
Ahead of the Curve

In 2021, an energy efficiency benchmarking exercise conducted by the Transneft Research Institute as part of the International Association of Oil Transporters' specialist working group ranked CPC first in this area among IAOT members. Where does CPC stand today, and which energy-saving technologies are the company's priorities?

As in any pipeline system, energy costs are one of the largest items in CPC's operating expenditure. For every operating mode the pipeline is due to run in, engineers from the Consortium's Process Calculations Service prepare in advance an optimised calculation based on the most efficient use of all resources, and pass it to the dispatchers at the Operation Control Centre. The document sets out in detail which stations to bring online, which pumps to run and how much drag-reducing agent to inject.

"CPC is a commercial enterprise: the less it costs to transport oil from Tengiz to Novorossiysk, the more CPC's shareholders earn", says Alexei Andrushchenko, Head of the CPC Process Calculations Service. "The transportation tariff has not changed since the pipeline entered service, which makes every aspect of energy efficiency particularly important for the company".

In a pipeline system, the main energy draw during pumping goes on overcoming hydraulic resistance inside the pipe and changes in elevation. The components of hydraulic resistance fall into two categories: fixed – determined by the diameter of the steel artery and other



design parameters – and variable, which include throughput rate, deposits on pipe walls, oil density and viscosity, and a number of other factors.

The condition of the pipe clearly plays a significant role in energy efficiency. Paraffin deposits reduce the pipe's effective bore and increase the load on pump unit motors – an effect particularly noticeable on the section from Tengiz to Atyrau. To prevent this, CPC carries out regular pipeline cleaning with specialised pigs every two weeks. The pipe's condition after cleaning is immediately reflected in the load on pump station equipment: energy consumption across all MPUs falls while throughput volumes remain unchanged.

To manage the pipeline system's operation, the Consortium uses its own proprietary hydraulic simulation models. These allow engineers to model various operating modes for the pipeline and pumping equipment. Every planned pumping request is processed through this continuously refined "hydraulic calculator". A Process Calculations Service engineer develops the optimal operating mode based on two key criteria: profitability ratio and energy efficiency.

The methodology developed and introduced at CPC a decade ago has reduced the gap between planned and actual figures to a minimum. An analytical report enables real-time tracking of electricity, gas and drag-reducing agent (DRA) consumption. If actual operating parameters diverge from the simulation model, the system immediately flags the reason – a change in throughput volume, equipment deviation or something else.

One of the most effective tools for cutting energy costs is the use of DRA products. These agents work by reducing resistance between layers of oil in transit and between the oil and the pipe wall. DRA applications have cut electricity consumption by as much as several tens of percent. The agent is injected downstream of each pump station, since the pumps fully neutralise its effect with every pass.

"DRA serves several purposes: compensating for insufficient pipeline throughput capacity, insufficient pump equipment power, and directly reducing energy consumption", notes Alexei Andrushchenko, Head of the Process Calculations Service.

At the same time, DRA is itself a costly resource, and its use must be weighed against economic justification.

Say we are currently pumping 10,000 m³/h and plan to increase to 12,000 from midnight. To prepare for that mode, we need to inject elevated volumes of DRA into the pipeline for several hours beforehand

The cost-effective consumption of DRA depends in part on shipper discipline.

"Say we are currently pumping 10,000 m³/h and plan to increase to 12,000 from midnight. To prepare for that mode, we need to inject elevated volumes of DRA into the pipeline for several hours beforehand", Alexei Vladimirovich explains. "Now imagine the shippers do not deliver the additional oil volumes on time. That means the DRA was injected for nothing".

The utilisation rate also affects energy and DRA consumption – and CPC's is higher than the industry average worldwide.

"Suppose CPC needs to pump 6 million tonnes in a month", says the Head of the Process Calculations Service. "If a planned shutdown for maintenance falls within that period, the pumping rate for the remaining days has to increase – consuming more electricity, gas and DRA alike".

When the CPC Pipeline System Expansion Project was being designed – implemented between 2011 and 2018 – engineers sited all 15 pump stations to maximise efficiency. The longer the distance between stations, the more energy is needed to push the oil to the next PS. At CPC, the average inter-station distance is an optimal 100 km. Each PS runs high-pressure mainline pumps in parallel, delivering differential head

of between 400 and 800 metres. For comparison, other pipeline companies operating at similar throughput rates need to generate pressures of up to 10 MPa (1,500–1,700 metres).

As part of its energy efficiency measures, CPC specialists also monitor pump efficiency closely. The higher a pump's efficiency rating during operation, the lower the energy consumption. This is achieved through timely maintenance, increasing impeller dimensions and other measures to keep equipment in peak operating condition.

The installation of variable frequency drives (VFDs) at pump stations under the Debottlenecking Programme has also had a positive impact on energy efficiency. Electricity costs fell dramatically. Previously, excess pressure in the pipeline was bled off by flow control valve throttling – effectively wasting energy. Today the savings from this measure alone run to tens of millions of roubles.

When calculating operating modes, CPC engineers no longer factor in flow regulation via throttling. The flow control valves are still retained at stations, but only to assist VFDs during brief transitions between operating modes.

"Under CPC's pump-to-pump operating mode, shutting down even a single station is likely to trigger a system-wide shutdown", explains Alexei Andrushchenko. "To prevent this, the dispatcher throttles the regulator and steps down to a lower operating mode before reconfiguring via the VFD".

Has CPC reached the ceiling of efficiency? The Process Calculations Service team says no. The main remaining opportunity today lies in smoothing out daily throughput variability. The analogy is a car journey: maintaining a steady cruising speed is far more economical than constant acceleration and braking.

To smooth out pumping modes, Consortium specialists are exploring expanded use of existing tank farm capacity, which currently sits idle most of the time in reserve for unforeseen events such as storms on the Black Sea. Using the tanks more actively in day-to-day pipeline operating mode management would allow alternating between drawing down and filling tank farms, maintaining steady pumping rates and reducing dependence on the regularity of shippers' deliveries. Various estimates suggest this could save up to 5% of energy and DRA consumption.

Achieving this level of efficiency may require developing dedicated software, and potentially introducing artificial intelligence technologies. International experience – which CPC draws on in part through the participation of shareholder companies from other countries – confirms that this is the right direction. Modelling recently carried out by Chevron on a specialised simulation platform showed strong convergence between its calculations of pipeline operating modes and energy and DRA efficiency with the methodologies used at CPC. This demonstrates that the Consortium is at the leading edge of the global industry, turning the imperative to save energy into a high-tech process where every participant in this international project stands to benefit.

AUTHOR

Dmitry Konstantinov

Say “Health”, Mean “Safety”

Kurmangazy PS medical station wins Kazakhstan industry competition

On 17 February 2026, an award ceremony was held in Atyrau for the winner of the competition among medical stations at Kazakhstan’s industrial facilities. The competition was organised by Interteach, a company that has been providing medical services and insurance in the Republic of Kazakhstan since 1989. The competition set out to advance corporate healthcare, share best practices and raise medical care standards.

The competition brought together 85 medical stations from companies including Kazgermunai LLP, Zhambyl Cement Production Company LLP, Schlumberger Logelco Inc., JSC CPC-K, JSC Shymkentcement, Karachaganak Petroleum Operating B.V., CaspiCement LLP, JSC PetroKazakhstan Kumkol Resources and others.

Medical stations at production facilities were judged on criteria including the quality and timeliness of medical care provided; compliance with standards and clinical protocols; the professional competence of medical personnel; adequacy of medical station equipment against established requirements; emergency preparedness; accuracy of medical records and reporting; efficient use of resources and the absence of unwarranted referrals; and coordination with production facility management and HSE services.

Monitoring and supporting the health of personnel is one of the key components of occupational safety

The winner was the medical station at Kurmangazy PS, part of the Caspian Pipeline Consortium. Medical station physicians Baldyrgan Makhashova and Raimbek Shaikhimov were presented with a certificate of honour, diplomas and cash prizes.

“All CPC-K pump stations posted excellent results, and medical staff received cash bonuses as a result”, noted Anar Issayeva, Chairperson of the Board of Interteach Medical Assistance LLP.

Following the competition, the Consortium’s medical stations received new equipment: Smart Scan SK-X60 medical screening systems and WAP-CPR310 training manikins with defibrillators.

The award ceremony was attended by Kairgeldy Kabyldin, CPC-K Deputy General Director for the Republic of Kazakhstan Government Relations; Mellyat Karabalin, General Manager, Public and Authorities Relations, CPC-K. CPC-K; Anar Issayeva, Chairperson of the Board of Interteach Medical Assistance LLP; Natalia Mandrovnaya, Regional Director of Interteach Medical Assistance LLP; and Consortium specialists responsible for personnel healthcare.

“A medical professional at a remote facility is key to maintaining workforce capability and a central element of the occupational safety system”, commented Anar Issayeva, Chairperson of the Board of Interteach Corporation, on the competition results. “Working as a medical specialist at a shift-rotation site demands not only professional expertise but also a high degree of independence, resilience under pressure and the ability to make decisions in real time. The competence of site physicians is a major factor in keeping shift operations stable and production running without interruption”.

“CPC-K has been working with Interteach since 1998”, said Kairgeldy Kabyldin, CPC-K Deputy General Director for the Republic of Kazakhstan Government Relations. “Our partners have extensive experience across remote facility support, voluntary health insurance, scheduled and emergency medical care, air and ground medical evacuation, and comprehensive corporate healthcare. This award recognises the high professional commitment of the medical specialists working at a remote production facility such as Kurmangazy PS”.

AUTHOR

Pavel Kretov

The Red Book of Landscapes

CPC Panorama speaks with Vladimir Dyachenko – Deputy Director for Research at Novorossiysk Polytechnic Institute, Chair of the Landscape Geochemistry and Technosphere Safety Commission of the Krasnodar Regional Branch of the Russian Geographical Society, and Doctor of Geographical Sciences – about landscape geochemistry, nature's self-purification mechanisms and the interaction between the technosphere and the biosphere

Vladimir Viktorovich, how did you become a geographer, and what led you to choose this field?

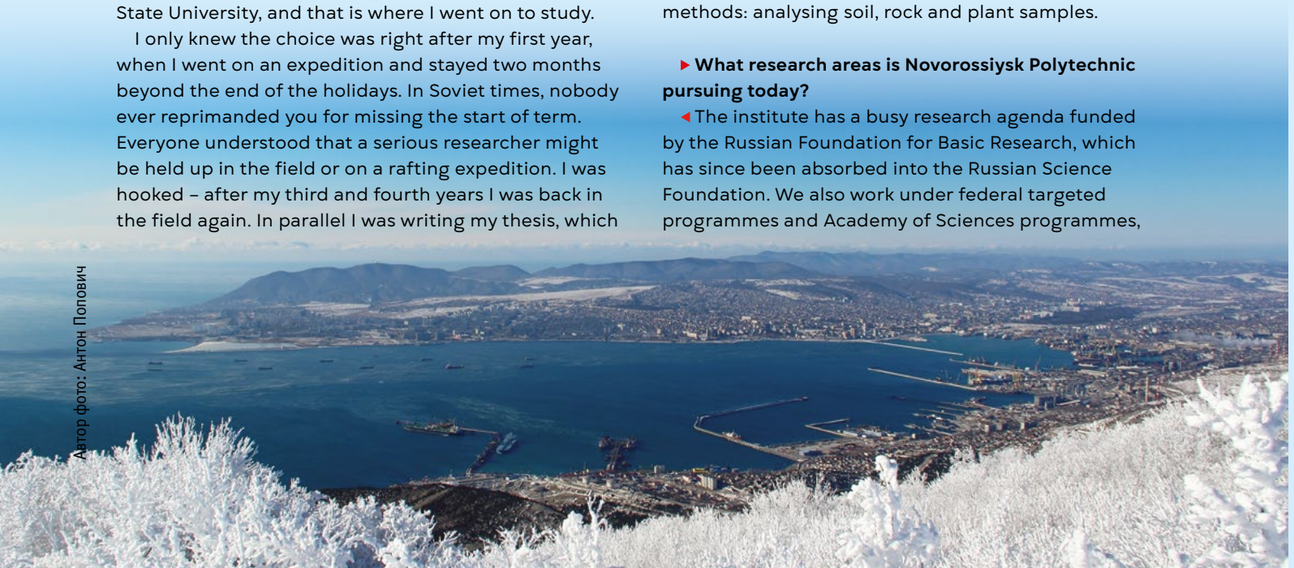
As a schoolboy I had several careers in mind at once – sailor, geologist, athlete, ichthyologist. I ruled out the sea because it doesn't mix with competitive sport. I ruled out ichthyology once I realised that fish interest me far more on the plate than as a subject of scientific study. In my final year at school I joined the Young Geologist School at the Geography Faculty of Rostov State University, and that is where I went on to study.

I only knew the choice was right after my first year, when I went on an expedition and stayed two months beyond the end of the holidays. In Soviet times, nobody ever reprimanded you for missing the start of term. Everyone understood that a serious researcher might be held up in the field or on a rafting expedition. I was hooked – after my third and fourth years I was back in the field again. In parallel I was writing my thesis, which included observations and findings that were new to the discipline.

I have always thrived on open-ended exploration. After graduating, I spent the best part of 25 years doing fieldwork – anything from two months to half a year at a stretch. With geologists I covered the entire Caucasus, from the Black and Azov seas to the Caspian. We then pushed north onto the plains as far as Voronezh, prospecting for mineral deposits using geochemical methods: analysing soil, rock and plant samples.

What research areas is Novorossiysk Polytechnic pursuing today?

The institute has a busy research agenda funded by the Russian Foundation for Basic Research, which has since been absorbed into the Russian Science Foundation. We also work under federal targeted programmes and Academy of Sciences programmes,



Автор фото: Антон Попович

and we also compete for grants from government ministries. We bring students into our research, and they in turn take part in competitions and conferences. Talented students sometimes earn scholarships larger than some lecturers' salaries – that happens when enhanced academic scholarships are topped up with research awards.

Recently a student and I made a discovery that matters for the local environment: it turns out that barely a hundred years ago, the Sudzhukov Lagoon in Novorossiysk was far larger and twice as deep. Dolphins used to swim in; the water teemed with fish. Then the lagoon shrank by 40%. How this happened while the Black Sea has risen 30 cm over the past century remains a puzzle. Other current work includes an investigation into metal contamination of soils – a serious issue across southern Russia – and a study of atmospheric dust pollution.

You specialize in landscape geochemistry. How has the field developed, and where is it heading today?

I came to landscape geochemistry – a discipline originally developed for mineral prospecting – in the 1970s, at the peak of that kind of research, when the state was investing heavily. The transition from a planned to a market economy changed everything: private mining companies focused solely on their own deposits, and large-scale geochemical surveys were no longer needed. Geochemists pivoted to environmental protection. Today we mainly study different environmental media and pollution mechanisms, and we look at the links between these problems and public health.

Masterclass "Treasures of Land and Sea" at the VII Krasnodar Regional Children's Eco-Festival of the Russian Geographical Society

Roundtable "Environmental Challenges of the Black Sea: Current State and Prospects for Solutions", 2024

This work genuinely matters. The factors driving global pollution cannot be ignored. Today contamination is showing up in high-altitude glaciers, in Antarctica, in the most remote parts of the world's oceans. The cause is the aerial transport of pollutants – a process I am studying with a grant from the Russian Foundation for Basic Research.

Back in the 1990s, while studying Novorossiysk's ecology, we noticed a pattern: people's health depends not only on how far they live from industrial facilities, but also on their altitude. My hypothesis about the toxicity of dust was borne out. Compared with soil, dust can contain three to five times more metals. The reason is that fine dust particles carry a negative charge, which attracts positively charged metal ions. Add to this the fact that a city acts as a mechanical geochemical barrier: unlike open rural areas, a large urban settlement prevents wind from dispersing dust into the atmosphere, so pollutants accumulate in the urban environment over years.

Chemical elements in widespread human use – technophilic elements, as scientists call them – disperse into the environment, are carried through the air and are adsorbed by dust. These include potentially toxic heavy metals such as lead, zinc and cadmium, which we use in countless products, paints, road markings and so on. The result is what might be called the metallisation of the biosphere.

You chair the Landscape Geochemistry Commission of the Krasnodar Regional Branch of the Russian Geographical Society. Does the role involve fieldwork, and if so what kind? What did you find?

Our commission is affiliated with Kuban State Technological University.

Just two weeks ago I presented a report there on my own research and that of colleagues. Our main finding: over just 60 years, the area of natural landscapes in the Kuban has shrunk by 30% – a loss of 7,000 km². Across the two federal districts of southern Russia, covering 600,000 km² – a territory larger than any European state – only 59 of 200 landscapes remain natural. When the biosphere gives way to the technosphere, the environment's self-purification processes grind to a halt.

There is a view you sometimes come across: that to restore the planet it is enough to save its 'lungs' – the Amazon rainforest – which will supposedly supply the whole Earth with oxygen…

That is a misconception. The Amazon produces as much oxygen as it consumes. The biological cycle there moves at high speed, driven by vast numbers of voracious bacteria. The northern taiga – in Russia and, to a lesser extent, Canada – is a different matter entirely. Those dense conifer forests are capable of absorbing carbon dioxide for decades.

Science has yet to settle the question of cause and effect: does rising atmospheric CO_2 cause global warming, or does global warming drive up atmospheric CO_2? What is clear is that as the world's oceans warm, their capacity to absorb gases declines, and those gases escape into the atmosphere. Scientists do not yet have the tools to look back through history and determine whether we have already passed the peak of these processes. What can be said with confidence is that human influence on climate change is greatly overstated. Anthropogenic emissions amount to just one billionth of the total output from volcanic activity. The eruption of Krakatoa alone in 1883 exceeded all human emissions over the past 50 years. So even if civilisation's impact were to increase tenfold, it would only become significant in combination with other factors.

By contrast, nature's impact on human living conditions could become far more pronounced if current trends continue. Climate warming has accelerated the rise in sea levels: the rate was once 0.3 mm per decade; it is now ten times faster. Even before land begins to retreat beneath the water, wave action on port infrastructure will intensify. Global warming is a serious issue for us specifically: 70% of Russia's mineral deposits lie in the permafrost zone, those areas will become waterlogged, and industrial and transport infrastructure will be disrupted.

Landscape geochemists compile databases and maps from their research. Who uses this information beyond the academic community?

Our current work contributes to fundamental science. We are building up a substantial body of factual data that needs to span at least 30 years before meaningful patterns can be identified. We

The eruption of Krakatoa alone in 1883 exceeded all human emissions over the past 50 years

report these patterns at conferences and through academic publications.

Do policymakers take scientists' views into account when making decisions about urban expansion, new industrial facilities, infrastructure projects or the extension of agricultural land?

They do, but the response is rarely quick. For several years now, for example, I have been trying to get traction on the metallisation-through-dust issue. I have proposals on urban greening – vegetation traps dust. Another proposal is to water streets using fine-spray misting systems.

With students we dug up historical data. In 2008, dust concentrations along roads in Novorossiysk dropped threefold. It turned out that year saw exceedances of maximum permissible concentrations (MPC) of harmful substances, and the city, together with one of the local enterprises, funded watering and sweeping vehicles to work the Sukhumi Highway twice a day.

The effect was obvious – and when I describe it to officials, they nod along – yet somehow our streets are not being watered regularly. The other side of this coin, as I mentioned, is the slow, insidious harm that dust does to human health. The damage builds up over many years, and long-term research is needed before decisions can be made and funding secured.

What is happening today with the landscape geochemistry of the Kuban, particularly in the coastal zone bordering the Black Sea? How significant is anthropogenic pollution?

In my area of research, heavy metal concentrations are rising sharply across the entire south. Over 40 years they have increased two- to fourfold. And the scale is enormous – both geographically and in depth: we have sampled down to 20 cm. Across 600,000 km² that adds up to hundreds of thousands of tonnes of metals – a staggering figure. All of this, carried in fine particles, enters our lungs; through food it reaches our liver and kidneys. But the respiratory pathway is particularly significant: uptake via the lungs reaches 80%.

With students I looked into dust levels at the Shchelba municipal landfill on the outskirts of Novorossiysk. Even under normal conditions, MPC levels for toxic chemicals drifting towards the city are exceeded. During fires the figures are catastrophic – 20 to 40 times the MPC. The accumulation of waste – brought there not only from Novorossiysk but from Gelendzhik and Kabardinka as

Photo credit: Anton Popovich

The technosphere of Tsemesskaya Bay

70% of all harmful emissions today come from freight and passenger vehicles, especially during the tourist season

well – must stop. Recycling needs to scale up. The recycling rate is said to have reached 5%, but is that really a figure worth celebrating?

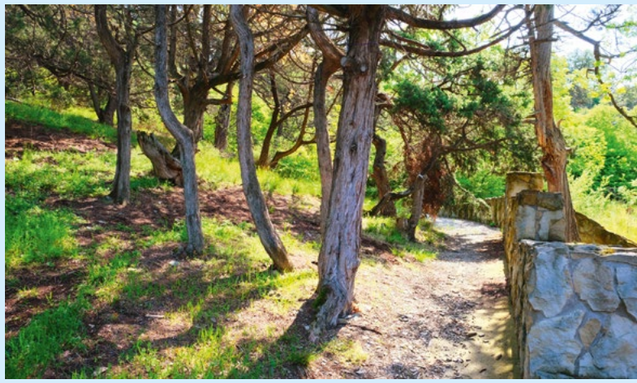
High levels of atmospheric dust pose threats beyond biosphere contamination with heavy metals. In the mountainous areas of the Kuban, sudden cloudbursts are a serious hazard to people and infrastructure. Alongside global warming, dust is one of the contributing factors: water vapour in the air condenses around airborne solid particles.

I have put forward a proposal to create a specialised atlas – a "Red Book" of the natural landscapes of Krasnodar Krai that occupy important ecological niches. We need to document their functions, measure their extent and create a photographic and video record while there is still time. There are places where the plants have nothing left to pollinate them; losing these habitats risks collapsing entire ecological chains within the biocenosis. One day soon, where a biologically productive landscape once stood, there will be a stony desert – and everyone will wonder why the soil is being swept away by floods and mudslides.

As moderator of the Black Sea Ecology round-table at the 2024 RGS Eco-Festival, you noted that despite a manifold increase in oil and petroleum product transshipment volumes, the city's beaches have become cleaner. What lies behind that? And what share of total emissions in Novorossiysk today comes from companies involved in hydrocarbon exports?

70% of all harmful emissions today come from freight and passenger vehicles, especially during the tourist season. Cement plants account for 17–25% of stationary-source emissions across Krasnodar Krai. The situation there has improved: one plant has been shut down and mothballed, others have had sensors installed and are now recording only elevated background levels without serious MPC exceedances. It is encouraging that the cement producers have learned to cut their emissions – after all, any emission is also lost raw material.

As for the oil sector, the situation really has changed dramatically. In the 1960s through to the 1990s you had to choose your spot on the beach carefully to avoid getting covered in oil. Today, thanks to the responsible approach of oil transportation company management and a higher standard of operational culture, beach cleaning is no longer necessary. The smell from oil transshipment, however, remains an unresolved problem. The only relief at present is distance from residential areas and a strong wind.



The biosphere of the Utrish Nature Reserve

In light southerly winds, the smell of mercaptans becomes noticeable along the shore. Meteorologists cannot predict these unfavourable weather conditions in advance: they have just three stations, and not one of them is located beyond the Markhotsky Ridge. Today, when complaints come in from residents, CPC responds quickly and reduces loading speeds. It is encouraging that the company acknowledges the problem, is transparent about it, and engages with the public and the scientific community. I hope that further effective measures to reduce unpleasant odours near the Marine Terminal at Yuzhnya Ozereevka will also be found.

AUTHOR

Pavel Kretov

Quality mark

On 20 March 2026, Alexei Dmitryukov, Operations Division Head, celebrated his 50th birthday. Some people's careers add a whole new chapter to the Russian energy industry's story – and make it a more vivid one. Alexei Alexeyevich is one of them

Alexei Alexeyevich, congratulations on your anniversary! In the Year of the Unity of the Peoples of Russia, our experience of interviewing CPC's leadership and specialists suggests that most of our colleagues' life stories are vivid examples of that unity...

◂Thank you for the congratulations. My own story probably won't be the exception. My parents met in the Altai region – where my mother was born and raised – when my father, who had served in the Baltic Fleet, came to help with the potato harvest. I was born in Alma-Ata, but the family soon moved to Karachay-Cherkessia, where I grew up and finished secondary school No. 1 in the village of Zelenchukskaya. I was called up for military service, completed my conscription and was demobilised in 1996. My father spent his whole working life as a driver; my mother worked at a factory making electronic components.

▸When and how did you find your way into the oil industry?

◂In Karachay-Cherkessia, my father worked on the construction of the Zelenchuk cascade of hydroelectric power stations, with the Hydrospetsstroy trust. We lived near the RATAN-600, the world's largest radio telescope. As children, my friends and I had climbed all over the site, and later, when the BTA-6 observatory opened, we spent many evenings looking at the stars – so it was only natural that I dreamed of becoming a cosmonaut and conquering the vast expanses of space.

There was probably another reason I fell in love with mechanics from an early age. My paternal grandfather – a former marine who had fought at the Malaya Zemlya bridgehead near Novorossiysk – was always making something, for as long as I can remember. A born tinkerer. With no internet in those days, he came up with his own devices for repairing cars, worked with wood, taught himself to play musical instruments. He was endlessly fascinating, and that may well be where I got my love of working with my hands. When my career eventually brought me to Novorossiysk, I felt a deep connection to him.

In the mid-1990s, finding work was hard not only in Karachay-Cherkessia but across Russia, so I had to rethink my ambitions and enrolled at the Taganrog State Radio Engineering University (TSRTU). As the economic situation worsened, I had to take whatever odd jobs I could find. In my final year I switched to part-time study; my wife's parents suggested I try for a position at the Rodionovskaya PS of Chernomortransneft. The company was going through a

reorganisation at the time and had vacancies. I started as a Grade 4 line pipeliner, then became a linear operations section foreman, and later a tank farm maintenance and repair foreman.

▸Was that in the area where the pipeline bypassing Ukraine was being built in the early 2000s?

◂Exactly – and I was part of the team that built and commissioned that Sukhodolnaya–Rodionovskaya pipeline. As a Grade 1 engineer, I was responsible for connecting the PS to the new main line. Virtually the whole of Chernomortransneft was involved in that tie-in outage; there was a great deal of work, and we delivered on time.

After Rodionovskaya, I moved to Deputy Head of Operations at the Krasnodar MPDA, then transferred to Tikhoretsk as Chief Engineer and later Head of the MPDA, before becoming Deputy Director General of JSC Chernomortransneft for Operations.

▸After your expert adjustment in crane operations during the replacement of the buoyancy tanks in 2022, a story spread around CPC that you had once worked as a crane operator and even an excavator operator. Did you really receive that kind of training?

◂That's all down to the ESPO school. Chernomortransneft sent us there – the Deputy Head of Construction at the Krasnodar MPDA and me – as the youngest ones. A lot of equipment had been brought onto the site, and in winter, in severe frosts, even we as managers had to get behind the controls to warm the hydraulic oil so the machines wouldn't freeze up and would be ready to work when needed. In the end, most people who worked on the construction of the Eastern Siberia–Pacific Ocean pipeline could drive a nail with an excavator bucket, close a matchbox with it, and weld a fence if the occasion called for it.

▸How long did you work on ESPO in total?

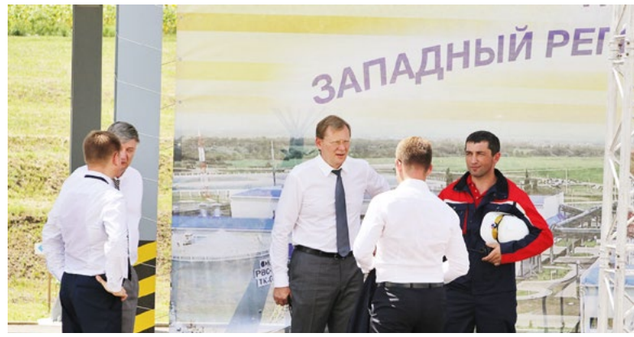
◂Three years of rotational assignments – two months on site and one and a half months back at my home facilities in the department, because no one stood down the main job. Our crews moved along the route behind the construction teams, starting from Zheleznogorsk. They laid the pipe; we made the tie-in welds, installed valves, commissioned pump stations, rectified defects, assisted with inline inspection and built access roads along the right of way – there was no end to it.

▸Were you working alongside Mikhail Sayapin? He was responsible for the linear section, wasn't he?

◂Him and others. Probably the toughest stretch was the FAB/Vostok section. We had to get to grips quickly with large-diameter pipe – wall thickness often up to 25 mm. But every specialist who came back from ESPO to the «mainland» worked to an exceptionally high standard.

▸And I imagine it was tough not just technically, but also in terms of the conditions?

◂Not everyone handled the unusual routine well – the extreme cold and the relentless midges. But, to the credit



Commissioning of PS-8. 2017

of the Chernomorka team, we met every challenge put to us. After the pipeline was commissioned and the inspection pigs had made their runs, we worked our way along fixing the defects that had been found – Mutina, Olekminsk, Bolshoi Nimir, Aldan.

Expeditions like that put a team to the test and give you a real sense of who everyone is – which proved invaluable when planning future work. You learn that this isn't simply «Pipeliner No. 1» – it's Ivan Ivanovich, a man you can send to a remote site and leave to get on with it. Whereas Pyotr Petrovich – «Pipeliner No. 2» – would benefit from a bit more oversight, just to be safe.

▸ESPO as a professional school?

◂Yes – and not just in your own discipline. An excavator operator from ESPO, for instance, could handle virtually any construction equipment afterwards; a pipeliner could install tie-in spools not just on «spaghetti» – small-bore pipe of 150–500 mm diameter – but on full metre-diameter pipe.

▸How did your career develop after that?

◂I served as Chief Engineer of the Tikhoretsk MPDA, then headed the department. I was soon transferred to Novorossiysk as Deputy Director General of JSC Chernomortransneft for Operations. After the Grushevaya and Sheskharis oil depots were merged, I took charge of both.

▸Was the tunnel between the depots, cut through the rock, built on your watch?

◂It was started on my watch. I was involved in drawing up the terms of reference, the design work and the selection of technical solutions. The 3.6-kilometre tunnel was ultimately completed, but the commissioning happened after I had moved on – by then I was already building PS-7 for CPC.

▸Did you join the Consortium for the Expansion Project?

◂Yes, in 2014 – as head of the group coordinating the construction of the new stations: PS-7 and PS-8.

▸What were your first impressions of CPC?

◂I was pleasantly struck by the care the organisation took of both its people and its processes. Even earlier, when I was working at the Tikhoretsk MPDA, we had travelled out to the Komsomolskaya PS and Kropotkinskaya PS to provide backup

to the STARSTROY company's personnel during tie-in work. The work permit system and risk assessment procedures were in a class of their own. At Kropotkinskaya I noticed that excavation slopes were being reinforced with netting and access to the work zone was strictly controlled – it left a lasting impression, and when the offer to join CPC came, I didn't hesitate.

In the Krasnodar Krai, the CPC and Transneft main lines run almost in parallel, and their pump stations have their counterparts: PS-7's neighbour is Novovelichkovskaya, and PS-8's is Krymskaya. We all know each other well and have a great deal in common – we share advice and tips.

▸ Could you help clear up a common misconception – that "the main thing in a pipeline is building it, and maintaining it afterwards is straightforward: just like a water pipe, it only needs routine servicing and a few spare parts replaced by a plumber"?

◂ In everyday life we don't think about plumbers or electricians until something breaks. And that is precisely to the credit of the operating organisation – keeping everything running smoothly and invisibly. When people talk about a water pipe, they only think about what's in their flat: the pipes and taps. But behind it all there's a pump raising the water to each floor, and that pump needs servicing, spare parts, a replacement plan when the time comes, and a host of regulatory requirements to keep in mind.

Maintaining and repairing a pipeline is no simpler than building it – and on top of that, the Operations Department carries responsibility for the reliability of the entire pumping process. The better we operate the equipment and the better the quality of our repairs, the further ahead we can plan.

Our planning horizon used to be one year; then it became three years, then five, and today it is ten. That reflects how seriously and competently the whole company – not just my department – approaches these questions. A growing planning horizon is a mark of quality in our work.

▸ How technically demanding and knowledge-intensive is the work of the Operations Department's specialists?

◂ Technology evolves and grows more complex at pace – you can see it clearly in electrical machinery and equipment.

Replacement of the MLBs' buoyancy tanks at the Marine Terminal. 2022

Where once there were wires, a transformer and fuse boxes, today the switchgear cells are packed with dozens of controllers. In instrumentation and control, it is even more complex. Where a pump unit used to generate a handful of signals, today it generates around a hundred.

As equipment grows more sophisticated, so do the skills and competencies required. Where an electrician once needed to know which wire was live and which was the neutral, today he must be able to programme, read signals and interpret data. The same applies across every trade.

As for the knowledge-intensive nature of our work – there is genuine room for analysis and research. A good example: we are currently refining the ventilation systems for the mainline pump units, because improvements to the units themselves have increased not only their output but also their heat generation, which needs to be managed.

Just as any large problem starts with small ones, equipment failures are triggered by minor faults in ancillary systems, circuits and components. Our automated systems let us see all of this and respond in time. It is satisfying when our fixes and improvements translate into greater reliability.

▸ You mentioned the growing number of controllers in the switchgear and signals in the instrumentation and control systems. What other changes are you seeing in systems and equipment?

◂ The most significant is the new mainline pump unit developed to our terms of reference at Transneft-system plants. Prototype testing is under way now – the pump is being tested at our PS-7, and the electric motor at Transneft-Siberia's Torgili-2 PS. The unit's efficiency is higher than its predecessors – rated at over 85% – and Transneft has already ordered these MPUs for its own pipeline upgrade.

Another joint development, with our partner Diaprom LLC, is a self-propelled diagnostic system for the inspection of subsea pipelines. Two years of hard, painstaking, highly complex work. We built it, tested it – and for the past two years it has been carrying out inspections, meeting the requirements of the Maritime Register.

Russia's engineering capability – both within CPC and across the country – is substantial, which says something about just how knowledge-intensive this field is. For example, Kazakhstan speaks highly of Russian radio communication systems, saying they are as reliable as a Kalashnikov.

▸ In CPC's 30th anniversary year, we are putting together a chart of the 30 most significant production milestones in the company's history. Which would you say is the most important?

◂ The creation of the CPC pipeline system itself – large-scale, cross-border, with a substantial number of shareholders and a highly professional team. Russia's largest tanks, SPM and other innovations, the best

Completion of the Oil Metering Station construction at the Marine Terminal. 2023

domestic and international practices, and 25 years of confident, reliable, uninterrupted operation.

▸ What would you say is the single greatest strength of the CPC team – the quality that allows the company to meet every challenge?

◂ Accountability. In Tengiz, in Novorossiysk, in Moscow and in every region, there are a great many responsible, committed people, and the entire system rests on their shoulders. They are all very different, but one thing unites them: nobody walks out the door when a problem comes up, no matter what time it is. They stay until the issue is resolved.

▸ In your view, how do the competency requirements for CPC specialists and managers in 2026 differ from those in 2014?

◂ The mindset around accountability has shifted – doing things properly now takes precedence over doing them quickly. Today the priority is quality, reliability and safety. Safety seems to be hardwired into our people at a DNA level. For example, when you get into a taxi in Novorossiysk and buckle up in the back seat, the driver says: «Ah – CPC, I got it».

▸ Which of the leadership practices in the Safe Work Culture do you consider most effective?

◂ The best practice is the leadership visit. For a front-line supervisor or an ordinary worker, it shows how engaged a manager is with the realities of a particular department. For the people working at a PS, a visit from the Head of Operations or the Director General is a sign of openness, a mark of respect and a chance to raise whatever has been on their minds – directly, without going through layers of management in between. A manager who clearly understands the local specifics earns authority and trust and gets better feedback.

When you walk into a pressure surge protection system room at a station, look at the gauges and ask why certain readings differ from the norm, people sometimes start telling tall tales, hoping management won't know the details. But when it becomes clear that management does know the details, that is when an honest conversation begins.

▸ Coming back to the Year of the Unity of the Peoples of Russia – can you give examples of that unity in the workplace?

◂ Think of our annual Safety Days, where dozens of teams come together from very different regions. What struck me most was watching teams that had just competed against each other walk over to help and coach the others once their own event was done. Another example: when staff from the Central and Western Regions drove their equipment across the border to help fight flooding on the Ural River in the Eastern Region – and it was their own idea. Over the years, CPC's multinational team has grown closer and closer – a kind of symbiosis takes hold: ties deepen, experience is shared more freely.

▸ Do you see the results of CPC's social and charitable programmes in your own life and your family's?

◂ When I first moved to Novorossiysk, I kept noticing the «A Gift from CPC» logo on buses, ambulances and medical facilities. My daughter's school had one of those buses – very handy. I once had a sports injury, and thanks to a tomograph that CPC had purchased, I was diagnosed quickly and made a full recovery. The Consortium's social and charitable initiatives make life more comfortable, and that gives you a sense of pride in the company – regardless of whether you happen to be using those services yourself.

▸ Do you have time for hobbies or sport? Any personal strategies for switching off at weekends or on holiday? How does the Head of Operations avoid burning out and avoid an early "overhaul"?

◂ For a long time, sport was my hobby – football and volleyball. A reliable way to unwind is family walks, taking the children to a football match or a game of table tennis.

▸ Do you see a continuation of the family professional tradition in your children?

◂ My thirteen-year-old daughter is a creative soul – she loves music and theatre, and plays the guitar. It seems unlikely she will choose energy as her career. My son recently graduated from the Moscow Power Engineering Institute and went straight into work in his field. So in the broad sense, there is one heir to the dynasty in the fuel and energy sector.

CPC Safety Day in Elista. 2025

AUTHOR

Pavel Kretov

Фото: РИА "Новости"

Stars Over Berlin

Eighty-five years ago, the Great Patriotic War began. The first six months of fighting after the unprovoked German invasion were the hardest the Soviet people had ever faced – yet even while holding the line, the Red Army managed to land telling blows against the enemy

Exactly one month after the war began, on 22 July 1941, the Luftwaffe carried out its first air raid on Moscow. For five hours, four waves of German bombers swept over the capital, destroying around 40 buildings and killing more than 100 people. The Luftwaffe was flying from airfields near the front line – around Minsk, Vitebsk and Smolensk. The Soviet Air Force could not respond in kind: the thousand kilometres between its forward airfields and Berlin exceeded the range of its bombers.

It was the Baltic Fleet command that put forward the bold proposal to strike Berlin using naval aviation. And bold it was – not least because the aircraft would have to take off from the Estonian island of Saaremaa (Ösel), still under Soviet control but effectively already behind German lines. The 900-km distance allowed only a direct course and a bomb load of no more than 750 kg. The bombers had to carry enough fuel for the return journey as well, with no possibility of refuelling en route.

On 26 July, Stalin's Headquarter authorised the naval airmen to proceed with Operation Berlin. The strike was to be carried out by two Baltic Fleet squadrons equipped with twin-engine long-range DB-3 and Il-4 bombers. The operation called for meticulous preparation – crews, equipment, fuel and the airfield itself.

On 2 August, a convoy of self-propelled barges slipped out of Kronstadt under conditions of strict secrecy and heavy guard, loaded with ammunition, aviation fuel, rolled metal, construction machinery and supplies for the accommodation and feeding of the aircrew and ground personnel. Navigating the mined waters of the Gulf of Finland, the convoy reached the piers of Saaremaa Island on the morning of 3 August and began unloading.

Fifteen crews were selected for the Special Air Group tasked with bombing Berlin. The pilots were told: the only way through the German anti-aircraft batteries was at the maximum altitude of seven kilometres. That meant

flying in an unpressurised cockpit in winter gear at temperatures down to –45°C, breathing through oxygen masks and using only navigation lights to communicate during the radio-silent flight. Equally unfamiliar to bomber crews was the absence of fighter escort: the fighters, with their shorter range, could accompany them only at the very start of the hours-long mission.

The navigators received even more intensive preparation. They were expected to know the entire route in detail – the geography of Berlin, the alternate targets of Königsberg and Danzig – and to be proficient in reading the marine lighthouses along the eastern coast of Sweden. Particular attention was paid to the area around their home airfield on Saaremaa: even if a navigator was 150 km off course at the final waypoint on the return leg, he had to be able to correct his route without consulting the map.

Yevgeny Preobrazhensky

The runways were extended with steel planking and additional taxiways were laid. The airfield's air defences were reinforced with two anti-aircraft batteries, and 14 I-153 Chaika fighters arrived on the island to provide cover for the bombers. Everything was accomplished in a single day: a test flight took place on the evening of 3 August. The first Berlin raid was flown on the night of 7–8 August, led personally by Colonel Yevgeny Nikolayevich Preobrazhensky, commander of the Special Air Group.

The fifteen DB-3 bombers, loaded with FAB-100 general-purpose bombs and propaganda leaflets, flew the route Saaremaa Island – Swinemünde – Stettin – Berlin. For the first hour they flew at 200–500 metres, then climbed to 4,000 metres. A hundred kilometres from the coast, they ascended to 5,000 metres.

Over German territory the aircraft climbed to 7,000 metres. After three hours of flight the bombers crossed the coastline, passed over the brightly lit Stettin airfield below and, using the Stettin–Berlin highway as a landmark, closed on the German capital. The Reich's principal city, with its three rings of anti-aircraft defences, was not expecting an attack.

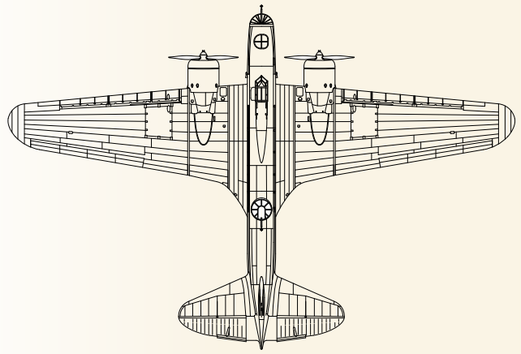
Buildings had their windows blacked out, yet all the main streets and squares were bathed in lamplight.

Calmly fixing their positions over the city, the Soviet bombers struck military installations on the shore of Lake Tegel, government buildings in the Tiergarten, and warehouses, factories and oil storage facilities on the outskirts.

Only after the first bombs fell did the Germans switch off the street lighting and open fire with their anti-aircraft guns. There was no longer any point in concealing their presence, and the group's radio operator, Vasily Krotenko, transmitted: "My position – Berlin! Mission accomplished. Returning to base". On 8 August, after a seven-hour flight, all crews landed safely back on Saaremaa.

The following day, the unexpected air raid on Berlin became the subject of an odd war of words between the German and British media. German radio initially reported a night attack by the British air force. From across the Channel, the BBC could only express puzzlement: "The German report of a bombing of Berlin is interesting and puzzling, as British aviation was not over Berlin on the night of 7–8 August".

In total, Soviet airmen carried out nine raids on Berlin before the beginning of September. The operation had to be called off after the evacuation of Tallinn and the Moonsund Archipelago. For their part in the Berlin bombings, ten airmen were awarded the title of Hero of the Soviet Union and thirteen received the Order of



DB-3 Long-Range Bomber

Designed by: EDB-39, Sergei Ilyushin
First flight: 1935
Crew: 3
Engines: 2 × M-85 (14-cylinder air-cooled radial piston engines)
Power output: 1,520 hp
Length: 14.2 m
Wingspan: 21.4 m
Armament: 3 × ShKAS 7.62 mm machine guns
Maximum bomb load: 2,500 kg
Range: 3,100 km with 1,000 kg of bombs
Speed: 400 km/h
Service ceiling: 8,400 m
Fuel tank capacity: 810 litres
Fuel: leaded aviation petrol 3B-70
Units produced: 1,528

Lenin. On top of that, each such sortie earned the crews an enhanced financial bonus. Stalin's Order of 19 August 1941 "On the procedure for decorating air force flight personnel for good combat performance" stipulated: "For operations against the enemy's political centre (capital), each crew member shall receive a cash award of 2,000 roubles per bombing mission". By comparison, a standard successful bombing mission paid 500 roubles.

Raids on the Reich capital resumed in July 1942. Soviet Long-Range Aviation, flying Il-4 aircraft, also struck Danzig, Königsberg, the Ploiești oilfields, Budapest and Bucharest.

Schwarzer Tod

The closer Soviet forces drew to the enemy's lair, the more aircraft bearing red stars appeared in the skies over Berlin. By 1945, these were predominantly Il-2 ground-attack aircraft – tank-killers – which the Germans had nicknamed the "Black Death", after the plague epidemic of the 14th century. The Il-2's standard weapons load was 300 kg of bombs in various configurations; the airframe could take twice that load when needed.

Accounts of these operations survive in the memoirs of the Kazakh pilot Talgat Begeldinov, twice Hero of the Soviet Union. A graduate of the Chkalov Military Aviation School in Orenburg, he entered the war in January 1943. In May, his Il-2 was shot down in combat with German fighters. Having bailed out, he spent several days working his way back through enemy territory to friendly lines.

By May 1945, Talgat Begeldinov had risen from ordinary pilot to squadron commander in a Guards ground-attack regiment. He flew 305 combat sorties and personally destroyed seven enemy aircraft.

In the final months of the war, unable to halt the Soviet advance or the air strikes by military means, the Germans resorted to various ruses. In his book The Ils Attack, the pilot recalled:

"We crossed the front line. I reported by radio that everything was in order and we were approaching the

Operation Berlin

7 August – 5 September 1941

Aircraft types
Long-range bombers DB-3, DB-3F, TB-7 and Yer-2

Sorties flown
9 group raids:
94 individual aircraft sorties (total for the operation)

Bombs dropped
Over 36 tonnes of high-explosive and incendiary bombs (FAB-100 and ZAB-50) + 34 leaflet bombs

Bombing altitude
5,000–7,000 m

Soviet aviation losses
17 aircraft, 7 crews

Awards:

10 Heroes of the Soviet Union

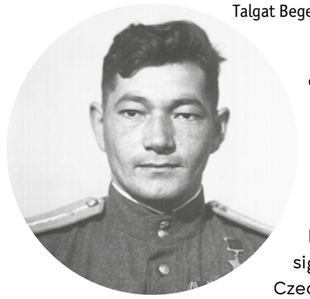
13 Orders of Lenin

21 Orders of the Red Banner

20 Orders of the Red Star

14 Medals "For Combat Merit"

Talgat Begeldinov



target. The command post acknowledged and gave the order to attack. Then, suddenly, a voice came through the intercom: 'Begeldinov, cancel the attack. Return to base with the whole group.' I was honestly thrown for a moment. Easy enough to say – 'return to base.' There were thirty aircraft in the group, every one of them loaded to capacity with bombs. I asked for the order to be repeated and gave the password. Procedure required whoever was speaking to give their own password in return. The order was repeated – silence where the password should have been. I had no idea what was going on, and the voice sounded wrong. Meanwhile the group kept flying towards the target. Then a familiar voice came through from our command post: 'Don't listen to them, Begeldinov, carry out your mission.' And the familiar voice gave the password".

In April 1945, south of Berlin near Teupitz, a large German force from General Busse's 9th Army managed to break out of encirclement. The area was heavily wooded and the enemy's armour had taken cover in the forests. Begeldinov flew a reconnaissance sortie, located the Germans and returned to strike with eighteen more aircraft. A second group followed. The ground-attack aircraft worked through the entire day – the Nazis were destroyed.

In the course of this aerial reconnaissance, Talgat Begeldinov became the first pilot – not only in the Red Army but among the Allies – to make a daytime flight over Berlin. He surveyed enemy airfield activity, troop dispositions and the state of the bridges, passing over the central streets of the city at an altitude of 50–80 metres.

Then came the assault on the German capital. Begeldinov's squadron provided air support to the advancing tank crews. The Germans fought back ferociously, and at one point in the battle they even managed to surround the tank of the division commander. Without hesitation, the general called in all available air power on his own position.

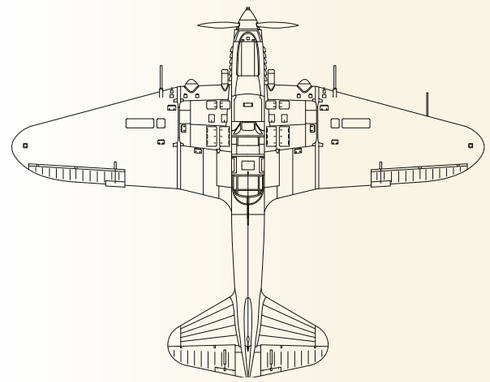
"I could not believe such an order and asked again... We quickly formed a circle and one after another began diving to hit the tanks. From the air you could see vehicles with crosses on their turrets surrounding several T-34s. Every pilot was trying to be perfectly accurate... We made twelve attack runs..."

DETAILS

On 16 April 1945, ground-attack pilots dropped four keys and pennants over the formations of the 8th Guards Army bearing the inscription: "Guards, friends! Forward to victory! We send you the key to the gates of Berlin". These were replicas of the keys to the Brandenburg Gate, captured by Russian forces when they took Berlin in October 1760.

The Germans fell back. That same evening, the general he had saved drove to the airfield in person to thank the crews.

After the fall of Berlin, Soviet tanks turned towards Prague. Begeldinov became the first pilot to land – on his own initiative, responding to white signal flares – at the central airfield of the Czech capital. It turned out that the forces of the national resistance had already cleared it of the occupiers. A few weeks later, a fitting end to his combat career came with his participation in the Victory Parade on Red Square. In addition to The Ils Attack, he wrote several more books in which he described in detail his wartime youth, the fates of his comrades-in-arms and the tactics of aerial combat.



Il-2 Ground-Attack Aircraft

Designed by: EDB-240, Sergei Ilyushin
First flight: 1939
Crew: 1–2
Engine: AM-38F (12-cylinder supercharged liquid-cooled V-type piston engine)
Power output: 1,700 hp
Length: 11.7 m
Wingspan: 14.6 m
Armament: 2 × VYa 20 mm cannon, 2 × ShKAS 7.62 mm machine guns, 1 × UBT 12.7 mm machine gun
Maximum bomb load: 600 kg
Range: 685 km with 300 kg of bombs
Speed: 414 km/h
Service ceiling: 5,500 m
Fuel tank capacity: 1,300 litres
Fuel: leaded aviation petrol 4B-78 or B-95
Units produced: 36,000

AUTHOR

Dmitry Konstantinov

Dragon Strait

Today, the world's busiest and most strategically vital strait for oil tankers is not the much-cited Strait of Hormuz but the Strait of Malacca, linking the Pacific and Indian Oceans. Among seafarers, this corridor – 937 km long and up to 40 km wide – has long been known as the pirate strait, and the name fits

The Panama Canal sees roughly 300,000 tonnes of oil pass through it each day; the Suez Canal handles twice that amount. The Strait of Hormuz typically carries over 2.9 million tonnes daily. But the Strait of Malacca moves 3.2 million tonnes a day – around a third of the world's oil exports. In the early 2000s that figure stood at roughly a quarter, and the upward trend reflects the unmistakable rise of various "dragons" and "tigers" in the global economy.

The legend of Sinbad the Sailor's seven voyages is 1,200 years old, collected in One Thousand and One Nights, and it was precisely in those centuries – the 9th to the 13th – that Arab seafarers mastered long-distance navigation, reaching the shores of India and China. Every September they set out from the port of Basra in lateen-rigged dhows, passing through the Strait of Malacca on their way to China. The strait, separating the Malay Peninsula from the island of Sumatra, was held from approximately 200 to the 1400s by the ancient Malay kingdom of Srivijaya – a classic thalassocracy, a state that lived and prospered through maritime trade.

By the early 15th century, the Muslim Sultanate of Malacca had seized control of the strait. The fishing village of Malacca grew into the leading port city of Southeast Asia, complete with a customs house, a court of law and all the infrastructure a seafarer could need. Duties were low, corruption modest, and safe passage through the strait was guaranteed. The Lanun – also known as Orang Laut, or sea nomads – had plied piracy here since time immemorial, and whenever state authority weakened, they wasted no time getting back to their trade.

The Sinbad legend borrows freely from other traditions – Homer's Cyclops from the Odyssey, for one. There is even a theory that Sinbad had a Chinese prototype: Admiral Zheng He, known as Sanbao. In 1407, this commander sailed through the Strait of Malacca with an entire armada of around 100 junks; by 1415 he had landed at Hormuz, and by 1419 he had reached the African port of Mogadishu.

Game of Thrones

The European demand for spices – worth more than gold in the Middle Ages – drove much of the Age of Discovery. In the 15th century, the overland Silk Road had lost its viability to plague, Tamerlane and a host of other factors. The Genoese Christopher Columbus and the Portuguese Vasco da Gama were both searching for a sea route to India, the home of pepper. Columbus, as history records, took a wrong turn and officially discovered America in 1492. Da Gama, six years later, rounded Africa – guided by the Arab navigator Ahmad ibn Majid – and landed in India.

In 1511, the Portuguese general Afonso de Albuquerque landed artillery at the port of Malacca, beating the Venetians who had already been eyeing the prize, and wresting control of the strait from the Muslims. Tariffs rose, but so did piracy. Raiding the ships of pale-faced foreigners became not merely profitable but ideologically justified. The faithful also lodged a complaint with the Ottoman Empire, and in 1566 Selim II – son of Suleiman the Magnificent – dispatched a fleet to Sumatra carrying cannon and military instructors, who established local arms and ammunition production and trained the islanders in the art of war.

Karl Marx held that the Kingdom of the Netherlands reached the peak of its maritime power in 1648, at the end of the Eighty Years' War with Spain. In 1602, the world's first joint-stock company was listed on the Amsterdam Exchange: the Dutch East India Company (VOC). Its trade catalogue ran from silver, silk and spices to opium, tea and much else besides. VOC personnel wielded sweeping powers: founding colonies, waging wars, imprisoning and executing criminals, minting coins. The company's headquarters were in Batavia (modern Jakarta), with trading posts at the Cape of Good Hope, in Persia, Bengal, Malacca, China, Siam (modern Thailand) and Formosa (Taiwan).

The Dutch-Portuguese struggle for control of the Strait of Malacca lasted from 1606 to 1641. During this period the VOC developed an alternative route through the Sunda Strait, described in the book Three Voyages by the sailing master Jan Janszoon Struys. As for the Strait of Malacca itself – once the Dutch had it firmly in hand, they chose to mothball the route until better times came along.

Gentlemen of Fortune

The British East India Company (EIC) was founded in 1600 and, like its Dutch rival, was invested with sweeping strategic powers. One of its divisions, for instance, was responsible for guarding Napoleon on the island of Saint Helena from 1815 to 1821.

When Britain lost its thirteen American colonies during the War of Independence (1775–1783), Britain set about making up for the loss by extending her reach across the Indian and Pacific Oceans and the Strait of Malacca connecting them. In 1786, Captain Francis Light, acting on behalf of the EIC, leased the island of Penang along this route for 6,000 Spanish dollars a year from the local Sultan Abdullah Mukarram Shah. Penang was renamed the Prince of Wales Island, with its capital Georgetown (named after King George III). The first order of business was to build Fort Cornwallis – a four-bastion star fort named after Lord Charles Cornwallis, Governor-General of India – armed with Dutch bronze cannon, including a gift from the Sultan: the most powerful cannon in Malaysia, the three-metre, six-inch Sri Rambai of 1603.

As for the Napoleonic Wars: Bonaparte first occupied the Netherlands – which had backed the French Revolution – installing his brother Louis as its ruler, then annexed the country outright in 1810. The moment the Netherlands ceased to exist as a sovereign state, the British occupied VOC colonies and trading posts around the world, a situation that lasted until Napoleon's defeat in 1815. Having grown accustomed to their role as masters of the Strait of Malacca, the British realised it was more convenient to control the strait not from Georgetown but from the island of Singapore, where the channel narrowed to a bottleneck just 2.5 km wide. In Malay, Singapura means "lion city"; the settlement that preceded it, before the 13th century, was known as Temasek.

On 6 February 1819, Stamford Raffles – Governor-General of the British province of Bencoolen in Sumatra – signed a contract with Hussein Shah, elder brother of the Sultan of Johor, granting the latter administrative control of the port of Singapore for a salary of £5,000 a year. In practice, this meant establishing British control over the

most strategically valuable point in the strait, where construction of the necessary infrastructure began without delay.

The Anglo-Dutch Treaty of 1824 left the Strait of Malacca in British hands, while Britain withdrew from Java and Sumatra. In 1867, Singapore became a British crown colony. From 15 February 1942 until September 1945, the island was occupied by Japan.

From 1951, Singapore became a self-governing state within the British Empire. In 1963, following a referendum, it joined the Federation of Malaysia; two years later it left, and on 9 August 1965 declared independence. Thalassocracy, transparent duties, corruption minimal (a hanging offence), the world's second-most competitive economy (according to the World Economic Forum in 2018), and safe passage through the strait – guaranteed.

The Passage Problem

In his 1999 book The Scents of Eden: A History of the Spice Trade (New York), historian Charles Corn of George Washington University wrote: "Spices shook the world economy in those days the way oil does today". In 2001, the People's Republic of China joined the WTO, and in the twenty years of its membership, traffic through the Strait of Malacca grew from 59,000 to 80,000 vessels a year. Eighty per cent of China's oil imports pass through the Strait of Malacca. Today traffic stands at 90,000 vessels annually.

Another industry of the Asia-Pacific region for which the strait is critical is steelmaking. Each year, the largest Capesize bulk carriers – with deadweight tonnage of up to 200,000 tonnes – transport 1.5 billion tonnes of ore and coal through the Strait of Malacca to China, Japan and South Korea, which together account for 65% of global steel production.

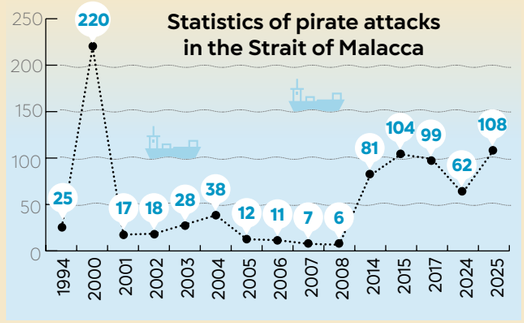
"There are only a handful of places in the world where a natural strait functions in practice as an industrial canal", wrote the official Russian Railways newspaper Gudok in a 2026 issue. "The Strait of Malacca is one of the few such straits to have been developed into a managed maritime corridor comparable in significance to the world's largest man-made canals. Over decades it has been transformed into an engineered navigation machine, designed for the mass and controlled movement of ultra-large vessels. It operates one of the world's most advanced traffic management systems, with compulsory pilotage, regular dredging and fairway monitoring. Navigation is tightly structured: separated lanes, marked channels and well-established passage rules reduce uncertainty to a minimum".

To an unprejudiced observer studying a map, the apparent lack of alternatives to the Strait of Malacca seems puzzling – after all, there is the Sunda Strait, chosen by the Dutch 400 years ago. And the Lombok and Makassar Straits? In practice, however, any such detour adds two to three days to the voyage and increases freight costs by 15–20%. The sums involved are enormous.

Nevertheless, the Strait of Malacca ranks among the Chinese Communist Party's foremost security concerns. The "Belt and Road" strategy proclaimed in 2010 by General Secretary Xi Jinping includes optimising sea routes – among them the Strait of Malacca – where piracy flares up not only when state authority weakens but also when traffic volumes rise.

The pattern of crime here follows a strange arc. By eyewitness accounts, pirates attack tankers and cargo vessels under cover of darkness – between 20:00 and 06:00 – approaching in light craft, climbing aboard and seizing anything not lashed down, at gunpoint.

The most popular Soviet film of its era, Pirates of the 20th Century (1979), was based on real events – the disappearance of an Italian vessel carrying 200



tonnes of uranium ore in 1968 – and anticipated a string of similar incidents in the Strait of Malacca. Soviet merchant vessels attacked there during the Soviet period included the Vysokogorsk (1986), the Slutsk (1987), the Boris Andreyev, the Pridneprovsk and the Nikolay Pogódin (all in 1988), and the Nikolay Podvoisky (1989).

On 11 June 2015, eight Indonesian pirates armed with pistols and machetes seized the Malaysian tanker Orkim Harmony, carrying 50,000 tonnes of petrol from Malacca to Kuantan. The pirates herded the crew into the interior quarters at gunpoint, and one crew member was shot. With the transponder and radio switched off and part of the vessel's name painted over, the pirates steered it towards the coast of Cambodia – until the ship was spotted from an Australian Air Force Orion-3 aircraft taking part in the search. Six days later, a Malaysian Navy patrol vessel freed the crew of the Kim Harmon. The pirates fled in one of the lifeboats but were arrested shortly afterwards in Vietnam.

Since 2004, the strait has been patrolled by naval vessels from Singapore, Indonesia and Malaysia. In 2005, given their "limited numbers and insufficient effectiveness", the US Navy joined the patrols; a year later, the Indian Navy followed. The Chinese Communist Party rightly notes that these corvettes and frigates would be quick to close the strait should things take an unwelcome turn over Taiwan.

The CCP envisions two ways to ease the pressure on the Malacca shipping corridor. The first is a road and rail freight artery linking Kashgar – China's westernmost city – to the Pakistani port of Gwadar. An international agreement to that effect was signed in 2015, and part of the route is already in operation.

The other alternative project that has caught China's attention is a 50-kilometre canal across the Kra Isthmus in Thailand. In 2005, the Communist Party announced it was prepared to invest 25 billion dollars in the project – by no means the first potential investors to come forward. In 1677, King Narai of Siam asked the French engineer De Lamar to study the feasibility of building a canal. De Lamar concluded it was impossible: a mountain ridge 75 metres high lay in the path, beyond the reach of the explosive technology of the day. The idea was revisited many times over the centuries, each time with a different proposed route. The most ambitious scheme was a 1985 project by the Japanese state company Mitsubishi, which proposed using 20 nuclear bombs – each twice as powerful as the one dropped on Hiroshima – to blast the canal through.

In 2020, the Thai government officially declared that "construction of the canal is not feasible".

The Strait of Malacca overtook the Strait of Hormuz in 2024 and has held its lead ever since – driven not only by the growing weight of Asia's "dragons" and "tigers", but by the pressure of recent developments. Looking down from space at that irreplaceable blue ribbon with its sabre-like curve, one is reminded once more: "The mystery East is a delicate matter".

Full text – available at website

AUTHOR

Pavel Kretov

Targeted Support

In spring 2026, a new day-care unit for Oncology Dispensary No. 3 opened its doors in Novorossiysk. The building was constructed and fully equipped as a part of CPC's corporate charity programme

The two-floor oncology centre, with a total floor area of 285 m², was built in just three months using rapid-assembly modular construction technology. The ground floor houses a physician's office, a head nurse's office, two patient wards with nine beds in total, a treatment room, and utility areas. The upper floor contains a minor operating theatre, rooms for blood transfusion and blood component storage, three patient wards with seven beds in total, a physicians' workroom, and additional service rooms.

"We provide specialised medical care to the population of Novorossiysk, Gelendzhik, and the Abinsky, Anapsky, Krymsky, Slavyansky and Temryuksky districts – roughly one million people in total", says Mikhail Leonov, Chief Physician of Oncology Dispensary No. 3, Doctor of Medical Sciences, Professor. "Thanks to our partnership with the Caspian Pipeline Consortium, we can now treat patients and work in far more comfortable conditions".

Modern antitumour drug therapy – commonly known as chemotherapy – draws on advances in genetics, biochemistry, molecular biology, pathological anatomy, surgery and radiology, and frequently requires blood correction through transfusion. Previously, Oncology Dispensary No. 3 had to carry out these procedures

in a building dating back to 1907. The new unit has increased the facility's working space roughly fourfold and opened the way to adopting new treatment methods.

"Cancer treatment has entered the era of targeted therapy", Mikhail Leonov continues. "Rather than attacking all rapidly dividing cells, targeted therapy acts selectively – it blocks the specific molecules driving the growth of a particular tumour. Treatment begins with an analysis of the tumour's molecular-genetic profile, after which tumour cells are treated with drugs that have minimal side effects. Targeted therapy has significantly improved survival rates among cancer patients".

The first targeted therapy drug was imatinib, developed in the late 1990s. Its results were remarkable: it transformed chronic myeloid leukaemia – previously an almost invariably fatal disease – into a well-managed condition.

FIGURES & FACTS

On 26 April 2023, at the roundtable discussion "Ecology in a Port City", cancer statistics in Novorossiysk were reviewed in a positive light. Yuri Karpenko, Director General of the Research Institute of Human Ecology and Environmental Hygiene, Doctor of Biological Sciences, noted that "cancer incidence in Novorossiysk is lower than in other localities of Krasnodar Krai". Head Physician of Primary Care Clinic No. 1 in Novorossiysk, Alexander Kanakin, echoed his colleague: "Over the past three years, the rate of growth in cancer cases has declined".

"Working with 2025 data for our cluster – 40,000 cancer patients per million people – I have two pieces of news: one bad, one good", says Mikhail Leonov. "First, as quality of life improves, life expectancy rises. That is broadly positive, but it also means cancer risk increases with age. The good news is that half of the growth in cancer statistics is attributable to better diagnostic methods – which means earlier detection and better chances of a positive outcome".

Older Than Civilisation

Many diseases once thought incurable have been conquered over the course of human history, yet malignant tumours still account for 12% of all deaths worldwide. Scientists have found cancerous metastases in fossilised dinosaur remains. The disease is referenced in the ancient Egyptian Ebers Papyrus, dated to the 16th century BC. The ancient Greek physician Hippocrates (5th–4th centuries BC) coined the term carcinoma – owing to the resemblance of cancer metastases to crustaceans.

Aulus Cornelius Celsus, a Roman physician of the 1st century AD who laid the foundations of medical terminology, translated the name of the disease into Latin as cancer – the form that has survived to this day. The word "oncology" we owe to the Greek physician Galen of the 2nd century AD: in Greek, onkos means "tumour". Cancer was known in Russia as well, where attempts were made to treat it with poultices, arsenic and surgery. The Ipatiev Chronicle, for instance, describes the illness of Prince Vladimir of Galicia, who lived in the 12th century.

In the 17th century, German physician Wilhelm Fabry performed the first successful surgical removal of a cancerous tumour. His patient recovered, but the procedure did not become widespread – undergoing surgery without anaesthesia required exceptional courage.

Russian input

In 1705, Peter the Great – who closely followed the world's scientific advances – ordered the establishment of a hospital for the treatment of "ailing people", to be run by his personal physician Nicolaes Bidloo, who among other procedures performed operations to remove cancerous tumours. In 1855, German pathologist Rudolf Virchow, in his seminal work Cellular Pathology, convincingly

demonstrated that tumours were caused not by fluid accumulation but by uncontrolled cell division. In 1890, Virchow was elected a member of the Russian Surgical Society of Pirogov. His standing in Russia was underscored by a telling detail: in 1897, he and N. V. Sklifosovsky were jointly elected co-chairs of the 12th International Medical Congress, held in Moscow.

In 1903, funded by donations from prominent Moscow industrialists, the Morozov Institute of Imperial Moscow University was founded – the first specialised cancer treatment centre in Europe, now known as the P. A. Hertsen Moscow Oncology Research Institute.

At the turn of the 19th and 20th centuries, breakthroughs in physics transformed the fight against cancer. X-rays and radioactive substances were discovered in this period. Scientists working with them initially observed that radiation damages cell DNA, thereby triggering tumour development – but they also found that higher doses could destroy not just chromosomes but the diseased cells themselves. The patients who volunteered for the risky experiment had no cause for regret – both made a full recovery.

"In the 20th century, medical and research oncology institutions began concentrating along the Black Sea coast of the Caucasus", says Mikhail Leonov. "The founder of Russian oncology as a scientific discipline was Nikolay Petrov. In 1910, he published the first monograph dedicated to malignant tumours. His name is inseparably linked to the National Medical Research Centre for Oncology in St. Petersburg and to Kuban State Medical University. At the latter, Petrov established the Department of Hospital Surgery in 1920 and set up a cancer research laboratory in Sukhumi in 1938. The Caucasus location was no coincidence: disease mechanisms were studied using monkeys from a local primate facility. Under Petrov's direction, researchers tested new drugs and treatment methods and proved the carcinogenic effect of sunlight on the development of malignant tumours in mammals".

The 1940s marked a new chapter in radiation therapy. Cyclic electron accelerators and gamma knives came into use. Physicians continue to apply high-energy, high-penetration particle radiation against malignant cells to this day.

"Russia's pioneer of radiation treatment was Vladimir Tobilevich", Mikhail Leonov continues. "Notably, he began his medical career in 1927 in the gynaecology ward of Novorossiysk City Workers' Hospital. Tobilevich personally designed and drafted applicators for radiation treatment. These methods were registered with the Committee for Inventions and Discoveries under the USSR Council of Ministers and were recognised with four USSR Author's Certificates".

Science and Technology

The history of Russia's state oncology service began on 30 April 1945, when the Council of People's Commissars of the USSR issued a Decree "On Measures to Improve Cancer Care for the Population". A nationwide network of oncology institutions began to take shape. In late 1946, an oncology unit opened in Novorossiysk at City Polyclinic No. 1. Within a few years, it was reorganised into an oncology dispensary department within City Hospital No. 1, which by then already had 15 oncology beds.

"The workload of oncologists at the time speaks for itself: a physician held consultations six days a week and on the seventh made home visits to severely ill patients", says Mikhail Leonov.

Novorossiysk City Oncology Dispensary No. 3 was established in 1963; Mikhail Leonov took charge of the institution in 2004. Professor Leonov is the author of 250 scientific publications, five monographs, 25 manuals for practising physicians and medical students, and holds seven patents for inventions.

Today, under his leadership, the dispensary employs 40 physicians, including one Doctor of Medical Sciences and five Candidates of Medical Sciences. The institution hosts a research school specialising in improving existing and developing new methods of morphological diagnosis and screening for malignant tumours.

"I started here as an orderly – watching cutting-edge medical equipment arrive in the Soviet years with pride, and witnessing the consequences of the transition to a market economy with sadness", says the Chief Physician of Oncology Dispensary No. 3.

"Once I became chief physician, I started making visits not only to patients, but also to major organisations. In the 2000s, Chernomortransneft helped us with ultrasound, endoscopic and laboratory equipment, and now CPC has come to our support at exactly the right time. In recent years, changes in legislation meant we were no longer able to perform blood transfusions – a separate dedicated space was required, and we did not have one. Now we do".

The new building also houses a minor operating theatre – a practical measure, though not a complete solution. Professor Leonov's vision for the long-term development of the regional oncology centre is a large inpatient facility with multi-disciplinary surgical departments.

The future of oncology is equally of interest to CPC Panorama's correspondents, whose phones are full of news about new anti-cancer vaccines. The Chief Physician of Oncology Dispensary No. 3 declines to comment: as a scientist, he cannot evaluate new vaccines without robust, randomised trial data to draw on.

"The Ministry of Health and the Administration of Krasnodar Krai pay close attention to developing the oncology service in our region. We have the support of the Novorossiysk city administration and the Public Chamber, and CPC's assistance has been both significant and timely", says Mikhail Leonov. "The new day-care unit already has its first patients – and they share our feeling: things have got better, things have become much more comfortable".

AUTHOR

Angelica Kim

Children First

2026 has been officially designated the Year of Digitalisation and Artificial Intelligence in the Republic of Kazakhstan. As one of the most technologically advanced enterprises in Atyrau Region, CPC-K JSC is opening the year with a digital transformation of its charitable projects in education

Ahead of the Nauryz spring festival, state-of-the-art chemistry classrooms opened at schools in the villages of Makhambet and Makat. Interactive displays, measuring instruments, laboratory-style workstations, display cabinets and safety equipment – all of this was provided under CPC-K JSC's charity programme, which covers the creation of five such classrooms across three schools in Atyrau Region.

Makhambet village, Yessenbay Ageleuov Secondary School (named after the prominent scientist, Professor, Doctor of Biological Sciences), 18 March 2026. In the first chemistry lesson in the bright new classroom, students conduct a hands-on experiment on the interaction of metals with oxygen and water under their teacher's guidance. Glassware lines the shelves, reagents are fully stocked, and an interactive periodic table on the classroom board allows each of the 30 students to scan a QR code and access comprehensive information on any chemical element.

Eager eyes of the students, smiles on the teachers' faces.

"Before, we only read about chemical reactions in textbooks – now we run the experiments ourselves. The difference is obvious", says seventh-grader Akku Kanatkyzy. "Learning has become so much more interesting. I've even started thinking – maybe I should build my future around the natural sciences?"

"For many years we worked with minimal resources", says Gulzhazira Khasanova, a chemistry teacher with 30 years of experience. "Today we have everything we need to genuinely spark children's interest. This is tremendous support and a whole new level of teaching. But most importantly – the students are engaged".

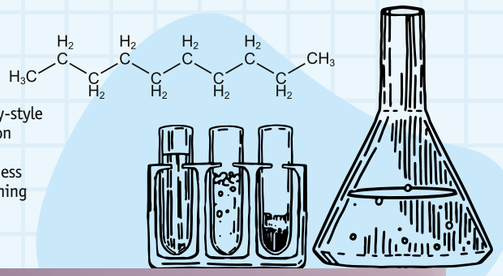
Chemistry and Life

What does it mean to build a career in the natural sciences in Atyrau Region? Kazakhstan's leading oil-producing region is developing rapidly. It is home to a specialised university – Safi Utebayev Atyrau University of Oil and Gas (non-profit JSC), which in 1999 incorporated the Institute of Petroleum Chemistry and Natural Salts of the Academy of Sciences of the Republic of Kazakhstan. Across the region's oil extraction, transportation and processing enterprises, laboratory technicians, process engineers and chemical engineers are highly sought after.

"By steering our fellow countrymen towards careers in the oil and gas sector from an early age, we are working not just for ourselves", says Kairgeldy Kabyldyn, Deputy Director General of CPC-K JSC for Government Relations with the Republic of Kazakhstan. "In the broader sense, we are building a long-term talent pool for every enterprise operating in the region".

"Our students now have a real chance to reach their potential – this may well be where future specialists of the petrochemical industry are shaped", says Talshyn Idrkenova, Principal of Yessenbay Ageleuov School, sharing the view of the Deputy Director General – a name well known across Kazakhstan's pipeline industry. "We extend our deepest gratitude to CPC-K for its attention to district schools – people are the most important and valuable resource a country has".

Among the guests at the chemistry classroom opening ceremony were



Laboratory-style workstation raises the effectiveness of thelearning process

Gulzhazira Khasanova, chemistry teacher with 30 years of experience

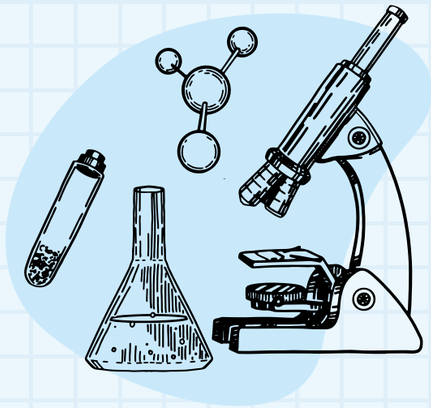
Parukh Kabiyev, Principal of Gibatolla Masalimov Secondary School (named after the prominent scientist) in Isatay village, and Akzhanar Zhalgasbayeva, Principal of Khamza Sanbayev Secondary School (named after the distinguished teacher and Honoured Worker of Education of the Republic of Kazakhstan) in Makat village. These schools have also been equipped with modern chemistry classrooms under the CPC-K charity programme.

"In the future I want to go into petroleum engineering, and for that you need a solid grounding in chemistry", says Kassymkhan Seres, a ninth-grader at Yessenbay Ageleuov School. "Our new classroom has up-to-date equipment and all the necessary reagents, which lets us explore the subject in real depth".

Parukh Kabiyev, Principal of Gibatolla Masalimov School, recalls that chemistry has long been a proud tradition at his institution. Even in Soviet times the school had a Young Chemists' Club. Zinedolla Karabalin, school principal from 1956 to 1986, was among the first in the region to establish and equip a school chemistry laboratory. In those years, the chemistry classroom was considered one of the best in the area.

"With CPC's support, our school has received a modern chemistry classroom", says Parukh Kabiyev. "We are confident this will deepen students' interest in the subject and raise the quality of their knowledge. The students will be able to put theory into practice through laboratory work – all the more so because our outstanding teacher-researcher Venera Amirova, a former student of Karabalin, is carrying on her mentor's legacy".

"Atyrau is oil region, and I want my future to be part of that industry – I dream of becoming a chemical process engineer", says Nargiz Saikhan, a tenth-grader at Gibatolla Masalimov School. "This year, our school received a new chemistry classroom with modern equipment. It has opened up so many more opportunities for studying the subject. We run experiments and produce various hydroxides, alkalis and salts".



A Better Life for the Region

Supporting education in Atyrau Region has long been a proud tradition for the Caspian Pipeline Consortium, alongside its initiatives in healthcare, culture, sport and environmental protection. Under its charity projects, schools and kindergartens are not only renovated, furnished and equipped with computers – entirely new school and pre-school facilities have been built and continue to be built in the settlements of Alga, Birlik, Kulsary, Ganyushkino, Akkol, Akkistau, Zhastalap, Kurylys and Aktogay.

First aid kit and fire safety equipment ensure safe handling of open flames and reagents

Seventh-grader Akku Kanatkyzy is considering a career in the natural sciences

The most ambitious education project to date is the school built in the Talgayran district of Atyrau city, which opened in 2025. In addition, schoolchildren across the region receive New Year gifts every year, and every first-grader steps through the school gates with a full set of supplies from CPC.

The new programme to equip district secondary schools with chemistry classrooms is a natural extension of the Consortium's strategy for improving quality of life in the region – a strategy it has pursued consistently for over a quarter of a century. The total cost of creating and fitting out five fully certified chemistry classrooms came to 78.6 million tenge, with the programme reaching more than 2,800 students.

"This project is fully aligned with the objectives of the national education development programme and brings high-quality learning within reach of children in rural districts", says Doszhan Bolatbekuly, Director of the Methodological Centre of the Atyrau Region Education Department. "Chemistry is no longer an abstract theory – it has become a living, engaging science. On behalf of the Akim of the region, we express our gratitude to CPC-K for its contribution to developing new formats for teaching natural sciences in state schools".

"We aim to give children access to quality knowledge and help them make an informed career choice", says Kairgeldy Kabyldyn, Deputy Director General of CPC-K JSC for Government Relations with the Republic of Kazakhstan. "Supporting education is one of our company's core priorities".

AUTHOR

Dmitry Konstantinov

Creative Unity

We continue our series on theatres and cultural centres in the regions where CPC operates. We spoke with Anna Ochkayeva – People's Artist of the Republic of Kalmykia and Director General of the A. N. Mandzhiyev Kalmyk State Philharmonic – about the Philharmonic's musicians, productions and plans

Anna Borisovna, the editorial team of CPC Panorama considers this interview a real treat. A world-class lyric-dramatic soprano – may we call you an opera diva? – a teacher who has trained a remarkable number of talented vocalists, and the Director General of the Arkady Naminovich Mandzhiyev Kalmyk State Philharmonic: your perspective – spanning vocal mastery, pedagogy and institutional leadership – is genuinely one of a kind. How did you reach such heights in your career?

◂ As for "opera diva" – it is, without question, a wonderfully flattering title. It speaks not only to vocal mastery but to a particular standing in the world of art. Yet as a teacher and administrator, I have always thought of music as a calling and an act of devotion. What matters to me is not the label itself, but the genuine response our Philharmonic's projects find in the hearts of our audiences – and the achievements of my students.

The role of Director General of the A. N. Mandzhiyev Kalmyk State Philharmonic is, for me, not simply an administrative post – it is the chance to protect and develop a legacy. My mission is to make serious music accessible to every resident of Kalmykia, and to ensure our artists feel supported.

The secret of my professional growth is straightforward: I have never separated the roles of performer, teacher and administrator. On stage, in the classroom, and in the director's office, I try above all to be honest – with the music and with people.

▸ **How would you outline the key stages in the history of the A. N. Mandzhiyev Kalmyk State Philharmonic? Who, in your view, played the leading roles in shaping this principal professional platform for the republic's musicians?**

◂ The history of our Philharmonic began in 1960, when the Kalmyk Concert and Entertainment Bureau of the Ministry of Culture of the Kalmyk ASSR was established by resolution of the Council of Ministers of the Kalmyk ASSR. By order of the Minister of Culture of the RSFSR dated 24 September 1971, the Bureau was reorganised into the Kalmyk State Philharmonic. In 1987, the Philharmonic opened branches in the district centres of the republic: Priyutnoye, Sovetskoye and Yashkul.

These were the years when professional national art found its footing. Rosa Sarmutkina, Vladimir Saldusov and Anatoly Tsebekov all played pivotal roles during this period.

By Decree No. 136 of the Head of the Republic of Kalmykia, dated 29 August 1996, the Kalmyk State Philharmonic was reorganised into the State Concert and Touring Institution "Kalmkoncert". Kalmkoncert comprised the Theatre of Costume, the State Choir of Kalmykia, the Allegro soloists' ensemble and the Lotos state ensemble.

In January 2012, by order of the Government of the Republic of Kalmykia, the budget institution "Kalmyk State Philharmonic" was established on the basis of Kalmkoncert. From 2011 to May 2022, the Philharmonic was led by Arkady Mandzhiyev, Honoured Arts Worker of the Republic of Kalmykia. Mergen Nastinov was appointed Artistic Director.

By Decree No. 148 of the Head of the Republic of Kalmykia, dated 15 August 2022, the Kalmyk State Philharmonic was named after Arkady Naminovich Mandzhiyev. Since 2022, Olga Dednikova has served as Artistic Director, and I became Director General in August 2023.

Speaking of those who shaped the Philharmonic, one must mention outstanding artists such as Anatoly Ochir-Goryayevich Tsebekov, Honoured Arts Worker of Russia; Lidia Kuleshova, Honoured Artist of Russia; Nadezhda Bargayeva, Honoured Artist of Russia; Abai Sikumbayev, People's Artist of Kalmykia; Elena Kadzhiyeva, People's Artist of Kalmykia; and Valentina Batashova, Honoured Artist of Kalmykia. These gifted individuals laid the foundations of academic performance in the region.

No chapter in the Philharmonic's story is more defining than the one written by Arkady Mandzhiyev. As a composer and Minister of Culture, he thought on a grand scale. It was his energy that turned the Philharmonic into a magnet for talent. Arkady Naminovich did not simply lead – he created meaning, weaving folk traditions into a contemporary sound.

Today the Philharmonic brings together the State Symphony Orchestra of the Republic of Kalmykia, the Anatoly Tsebekov State Choir of the Republic of Kalmykia, the Theatre of Costume and Plastic Arts, and the Gerel Children's Choreographic Ensemble named after E. E. Mandzhiyev. We have become a stage where the world's classical heritage meets the unique traditions of Kalmyk folklore.

Mergen Nastinov, Honoured Arts Worker of Kalmykia and Artistic Director and Chief Conductor of the State Symphony Orchestra, truly achieves the impossible. Despite the severe shortage of personnel that the academic sector faces, he not only inspires the ensemble but continuously expands its creative horizons.

Olga Serdyukova – Artistic Director of the State Choir and Honoured Arts

Worker of Kalmykia – took the baton from the legendary Anatoly Tsebekov and preserved the distinctive warmth, airiness and timbral richness that its founder instilled. Under her direction the choir displays remarkable versatility: a single programme may move from complex liturgical chant to masterpieces of world classical music, Kalmyk folk songs and contemporary avant-garde scores.

Tatyana Milovanova, Honoured Arts Worker of Kalmykia and Artistic Director of the Theatre of Costume and Plastic Arts, is a master whose name is inseparably linked to the art of dance and ballet. Her work shows how tradition can speak directly to the present – not merely a fashion show, but a synthesis of the arts.

Alexandra Mandzhiyeva, Honoured Artist of Kalmykia and Artistic Director of the Gerel Children's Choreographic Ensemble, leads not simply a performing group but a true breeding ground for talent, keeper of the "genetic code" of Kalmyk folk dance. Alexandra Bovayevna has a rare gift: she feels music and movement as one, and – with a mother's care and a professional's rigour – carries forward the traditions laid down by the ensemble's founder, Emba Mandzhiyev.

Olga Dednikova, Artistic Director of the Philharmonic and Honoured Worker of Culture of Kalmykia, is the linchpin of our organisation's present structure. Her role is many-faceted: motivator and strategist in one, Olga Alekseyevna has the rare ability to see potential where others see only obstacles. She makes the company believe that no summit is beyond reach – from Baroque classicism to the avant-garde.

▸ You have performed in concert halls in Paris, Moscow and St. Petersburg. Which do you consider ideal for vocal performance? What have you taken from your experience of international venues that could be applied at home in Elista, in modernising the State Philharmonic?

◂ Choosing the ideal hall is always a search for the right balance between acoustics and atmosphere. Each city has shaped me in its own way. For vocal performance, the ideal is unquestionably a hall with a "live", enveloping acoustic – one where the voice simply soars without effort. The Grand Hall of the Moscow Conservatory is the world standard: its unique "wooden" acoustic wraps the sound, giving it a noble depth. In Spain, I was captivated by the intimate halls of historic theatres, where every whisper from the stage reaches the back row, thanks to architecture refined over centuries.

When it comes to Elista and modernising our Philharmonic, my experience points to several key directions. First, acoustic engineering: modern technology makes it possible to shape sound even in halls not originally designed for the purpose. We need to install sound-reflecting panels and materials that gather and focus the sound rather than letting it disperse.

The second area is flexible, multi-use space. In Europe, halls are frequently multi-functional. In time, we want our venue to adapt effortlessly – from an intimate vocal recital to a full symphony concert or a large-scale show.

The third direction is lighting design. Lighting accounts for 50% of any production's success. I have seen light conjure entire stage sets from nothing. This is something we have already begun to develop, to make our programmes truly spectacular.

The fourth direction is audience and performer comfort – nothing here is trivial. Everything must be considered: from a modern ventilation system that generates no noise (critical for recording) to the acoustic treatment of backstage areas.

▸ Who are your favourite composers and works? What from this repertoire do you plan to bring to the Philharmonic?

◂ Among my favourite composers I would name Giuseppe Verdi – for me, the pinnacle of operatic art. His Aida is not merely music but the human soul laid bare; it demands extraordinary vocal discipline and passion.

Another favourite is Giacomo Puccini. The aria Vissi d'arte from Tosca is a perfect example of his extraordinary gift for melody. And of course, Pyotr Ilyich Tchaikovsky – his romances and the opera The Queen of Spades are music that speaks to audiences anywhere in the world, without a word of translation.

Among Kalmyk composers, the foremost is Pyotr Chonkushov – author of the opera Dzhangar and the ballet Lotos. He was the first to bring Kalmyk music to a truly academic, symphonic level without sacrificing its national character.

As a vocalist, I can say that performing Pyotr Ochirovich's works is a genuine challenge for any professional. They are encoded with extraordinary beauty and deep philosophy – a unique synthesis of European tradition and Eastern melody. Chonkushov did not simply write in a folk idiom; he integrated the most intricate Kalmyk ornamental figures – those characteristic steppe "shimmerings" and microintervals – into the rigorous structure of a classical aria or romance. A performer needs flawless Italian bel canto technique while at the same time feeling the specific "steppe" quality of sound projection. Music of the finest filigree – played, as it were, on the very tips of the fingers.

I must also mention the legacy of Arkady Mandzhiyev. His melodicism is a unique phenomenon – I would call it the soul of modern Kalmykia. It is a refined art of stylisation in which every interval, every turn of a phrase, resonates at a subconscious level. Arkady Naminovich had a rare gift: he wrote works of great inner complexity in a remarkably accessible language. In his songs and musicals, melody is always primary – it leads the performer, dictating the emotion.

Preserving this melodic richness is a priority for our Philharmonic. We are working to ensure that the works of our professional composers continue to be performed with the original purity their creators invested in them. Our goal is for the music heard in Elista to be worthy of the world's greatest stages – while remaining close to our own audience.

▸ How significant is the role of the stage director in a philharmonic, and how does it compare to a theatre?

◂ This is genuinely one of the most pressing issues in contemporary philharmonic life. The absence of a full-time stage director is a challenge we face every day.

As the Philharmonic has in practice become a theatre of sound and a complex production venue, the director's functions fall to the artistic leadership and the heads of each ensemble.

Today those functions are largely taken on by the Philharmonic's Artistic Director, Olga Dednikova. She must be both strategist and director – building mise-en-scènes and shaping the dramaturgy of concerts. For major productions we bring in outside specialists, but that is no substitute for a permanent in-house director who lives and breathes the ensemble, knows every artist's capabilities and understands the acoustic specifics of our hall.

A director in a philharmonic is the person who stitches music, lighting, video content and movement into a seamless whole. Without that, even brilliant playing can lose some of its impact on today's audience – an audience accustomed to strong visual storytelling.

We are well aware that to take the Philharmonic to the next level, we urgently need a professional dedicated solely to directing the academic concert. That would free our artistic directors to focus entirely on the score, sound quality and performance precision.

▸ Which new technologies do you consider most important for philharmonic concerts today? Arkady Naminovich Mandzhiyev once staged a rock opera on this very stage – so contemporary music clearly calls for lighting, fog machines, sparklers and the like. What else from the latest in stage technology do you see as essential?

◂ Indeed, thanks to the support of the Head of the Republic of Kalmykia, Batu Sergeyevich Khasikov, the Republican Government, and our long-standing partnership with CPC, the Philharmonic's technical capabilities have begun to transform. A comfortable touring bus that allows our ensembles to reach even the most remote districts of the republic and beyond – that is the backbone of our touring and production work.

The installation of high-resolution LED screens and a full upgrade of the lighting rig have been a tremendous leap forward. This has not only improved our visuals but significantly expanded the range of expressive tools available to our ensembles. We can now instantly transport an audience from the boundless Kalmyk steppe to the Paris Opera or into the cosmic world of Arkady Mandzhiyev's musicals. Our concerts have become dynamic, and the visual experience has risen to a new level. For young audiences who expect high-quality visuals on every screen they own, this is essential – they see a contemporary product.

In a philharmonic, lighting is the second conductor. The new equipment lets us build depth, direct focus to the soloists and quite literally "draw" the music. Combined with the screens, light creates the immersive experience today's audiences expect.

Upgrading our visual technology also requires a corresponding upgrade to our sound system. We want the sound in our hall to be as crisp as the image on the screens – and that is especially critical for delicate vocal lines and complex symphonic scores. Our dream is a fully integrated digital system in which lighting, sound and video are controlled as one. That would allow our ensembles to perform within pre-programmed lighting scores to a world-class standard.

To be frank, we are in the middle of a transformation. The hardest part – that first step – is already behind us; now our task is to complete the system to a point where the technical capabilities of our venue place no limits on the creative imagination of our artists.

▸ How does the A. N. Mandzhiyev Kalmyk State Philharmonic participate in the events of the Year of the Unity of the Peoples of Russia? Can you give examples of that unity – in your concerts, among your students, within the Philharmonic company, in life, work and artistic practice?

◂ For our Philharmonic, the Year of the Unity of the Peoples of Russia is not a calendar event – it is the very essence of what we do every day. Music is a universal language that needs no translation and brings people together across every boundary.

In practice, our contribution takes several forms: creative dialogue between cultures, the passing-on of artistic heritage through teaching, the synthesis of the arts as a symbol of cohesion, and the support of our partners. Our programmes place masterpieces of European classicism side by side with the epic heritage of the republic's finest composers. When the State Choir under Olga Serdyukova performs a Kalmyk folk song in the academic tradition, and the Symphony Orchestra under Mergen Nastinov plays Russian classical music – that is unity in art, alive and present.

Our Philharmonic is a large, multi-ethnic family. Artists of many nationalities work here, united by their love for Kalmykia and its culture. That unity is felt most strongly backstage, where shared responsibility for the outcome erases every other difference.

Among my students are young people of many backgrounds, but all of them absorb the Kalmyk vocal school. We teach them to treat their native language with care – whether it is a Russian romance or a Kalmyk song. This is the education of a new generation of citizens through culture.

In this same spirit, our partnership with CPC is an example of the constructive unity of business and culture in the service of regional flourishing. For us, unity means co-creation: every voice adds its unique sound to the shared "choir" of our republic, making it powerful and harmonious.

▸ In your interview with the newspaper Khalmg Unn, you said that "immersion in management demanded stepping back from an active solo career". But did that mean the end of your artistic life? How possible is creativity alongside running the State Philharmonic – especially given that you are also a delegate?

◂ Creativity is not only about stepping into the spotlight. For an artist it is a state of being – one that cannot be switched off by an order or a job description. Moving into the management of the Philharmonic and taking on duties as a delegate has not interrupted my creative life; it has given it new meaning.

Serving as a delegate of the Elista City Assembly means, first and foremost, serving my city directly. The municipal level is the closest to people's lives, and that brings a particular sense of responsibility.

The Philharmonic stands at the very heart of Elista, and its character is inseparable from the character of the city. My status as a delegate helps me advance projects to improve the surrounding area – a prime example being the creation of Arkady Mandzhiyev Square: a new gathering place for citizens, where music will be performed in the open air.

To make classical music concerts more accessible to veterans, large families and young people in our city, we initiate social programmes. Our aim is for the Philharmonic to be not a closed, elite club but an open public space. Our artists are residents of Elista. As a delegate, I can raise questions about their social support, housing conditions and participation in city programmes at the municipal level.

When an artist has no worries off stage, they give so much more on it.

▸ In 2024, the A. N. Mandzhiyev Kalmyk State Philharmonic hosted the regional gala concert of the CPC for Talented Children festival and competition. How do you assess the project overall, and what would you recommend for its development in Kalmykia – as a master vocalist, as a teacher, as a director? What are the particular strengths of Kalmykia's young talents and its music and vocal schools?

◂ This project is a tremendous stimulus for the republic. The 2024 gala concert held in our Philharmonic showed that CPC for Talented Children is not merely a competition – it is a real springboard. It gives children from the most remote corners of Kalmykia the chance to perform on a professional stage with quality lighting and sound.

Its strength lies in a holistic approach. CPC does not simply search for talent – it runs masterclasses and provides teacher training, creating a continuous learning environment. For us at the Philharmonic, it is also a talent-spotting exercise: we watch the prize-winners closely. Importantly, when a child grows accustomed to high technical standards at home, any stage in the capital feels familiar.

▸ In your view, is the sound quality at the Philharmonic currently adequate, or is that the next challenge? And you also mentioned a shortage of instruments...

◂ On acoustics and audio equipment – we are genuinely standing on the threshold of a new and critical stage. As both a vocalist and a director, I assess the current situation this way: our audio capabilities are operating at their limit. For popular music numbers that may be sufficient, but for the most demanding scores or large-scale audiovisual productions, we need a fundamentally different level of volume and resolution.

The Philharmonic's concert halls require modern acoustic tuning – not simply speakers, but a sophisticated system of sound-absorbing panels and digital processors that carry a voice or the sound of strings to the back row without distortion.

Musical instruments are the voices of our orchestra. Time and intensive use take their toll, and renewing the instrument inventory – from grand piano to wind instruments – is a matter of survival for academic music in the republic.

Our goal is to develop, together with specialists, a comprehensive acoustic design for the hall that unites sound, light and video into a single digital ecosystem. We are exploring "smart sound" systems that adapt the hall's acoustics to different needs – from an intimate evening of romances to a full-scale rock opera. If visually we already look like a modern European venue, the next priority is to ensure we sound every bit as good as we look.

▸ What would you say to young talents who dream of the big stage and a career as a professional artist? What is your recipe for success?

◂ My recipe for success is simple in form but demands enormous inner resources. If you dream of the big stage, be prepared: it is not only the glow of the footlights – it means showing up every day and giving everything you have.

Safe Work Culture News

CPC Panorama presents the Safe Work Culture Leaders — Consortium and contractor employees — based on Q1 2026 performance

Ibrahim Osmanov
PPS Operator, Tank Farm, Marine Terminal
Completed the highest number of leadership practice observations at the Marine Terminal in Q1 2026.

Ruslan Suleymanov
Shift Supervisor, PS-5
Completed the highest number of inspection checklists in CPC's Western Region.

Victoria Melikhova
Senior Administrative Support Specialist, CPC Central Region office (Astrakhan)
While carrying out routine duties at her worksite, she noticed a contractor's employees violating HSE requirements during façade work on the building. She promptly intervened to halt the unsafe activity at second-floor level, eliminating the risk of injury and preventing a potential incident.

Kashkinbai Tapanov
Operator, Tengiz PS
During loading and unloading operations on PS grounds, he noted that contractor employees were not using tag lines.

Oleg Klimov
Senior Mooring Specialist, Transneft-Service LLC
Discovered a disassembled 220V socket in a tanker's cabin with no warning notice indicating work in progress. He called the maintenance team, who promptly rectified the violation.

Andrei Volkov
Driver, YuTP LLC, Central Region office (Astrakhan)
Over 14,000 km of safe driving logged in the Central Region over the quarter.

CPC-R, MOSCOW OFF ICE
Bldg. 1, 7 Pavlovskaya Str.,
Moscow, 115093, Russian Federation
tel.: +7 (495) 966-50-00
fax: +7 (495) 966-52-22
e-mail: Moscow.reception@cpcpipe.ru

CPC-R, WESTERN REGION
Budennogo Str., 117/2, Krasnodar,
350000, Russian Federation
tel.: +7 (861) 216-60-00
fax: +7 (861) 216-60-90
e-mail: Krasnodar.reception@cpcpipe.ru

CPC-R, REPUB LIC OF KALMYKIYA
Suite 608, V.I. Lenina Str., 255a,
Elista, 358000, Russian Federation
tel.: +7 (8512) 27-13-89
e-mail: Elista.reception@cpcpipe.ru

CPC-R, NOVOROSSIYSK
Isaeva Str., 1a, Novorossiysk,
Krasnodar Krai, 353900, Russian Federation
tel.: +7 (8617) 29-43-00
fax: +7 (8617) 29-40-09
e-mail: Novorossiysk.reception@cpcpipe.ru

CPC-R, STAVROPOL KRAI
Suite 208, Ryleeva Str., 7, Stavropol,
355000, Russian Federation
tel.: +7 (861) 216-60-00
e-mail: Krasnodar.reception@cpcpipe.ru

CPC-K, EASTERN REGION
Business center "Grand Asia",
Abilkhair Khan Ave., 92b, Atyrau, 060097,
Kazakhstan
tel.:+7 (7122) 76-15-00, 76-15-99
e-mail: Atyrau.reception@cpcpipe.ru

CPC-R MARINE TERMINAL
Marine Terminal Primorsky District Territory,
Novorossiysk, Krasnodar Krai, 353900,
Russian Federation
tel.: +7 (8617) 29-40-00
fax: +7 (8617) 29-40-09
e-mail: MarineTerminal.reception@cpcpipe.ru

CPC-R, CENTRAL REGION
Kuibyshev Str., 62, Astrakhan,
414040, Russian Federation
tel: +7 (8512) 31-14-00, 31-14-99
fax: + 7 (8512) 31-14-91
e-mail: Astrakhan.reception@cpcpipe.ru

CPC-K, ASTANA
10th floor, Kunayev Str., 2, Astana,
010000, Kazakhstan
tel.: +7 (7172) 79-17-00
fax: +7 (7122) 76-15-91
e-mail: Astana.reception@cpcpipe.ru

PANORAMA

коммуникационная группа MEDIALINE

CPC PANORAMA Corporate Magazine. № 2 (53) May 2026
The issue is prepared by the CPC Press Service
Editor: Dmitry Konstantinov. E-mail: Dmitriy.Konstantinov@cpcpipe.ru; Pavel.Kretov@cpcpipe.ru
Tel.: +7 (495) 966 50 00 (ext. 5323 and 5220); www.cpc-online.ru
Publisher: FuturaMedia LLC. 105082, Moscow, Rubtsovskaya Embankment, 3, Bldg. 1, 9th floor. www.mlgr.ru
Tel.: +7 (495) 640-08-38 E-mail: info@mlgr.ru General Director: Larisa Rudakova Managing Editor: Ekaterina Anokhina
Editor: Olga Vasilyeva Art Director: Konstantin Yushin
Designers: Ilya Malov, Galina Grunyushkina, Svetlana Lyakhova, Elizaveta Grishina, Sofya Alexeyeva
Photos: CPC Press Service
Printed by Viva-Star LLC Printing House: 107023, Moscow, Elektrozavodskaya St., 20, Bild 30

CASPIAN PIPELINE CONSORTIUM:

A TIME-TESTED INTERNATIONAL PROJECT

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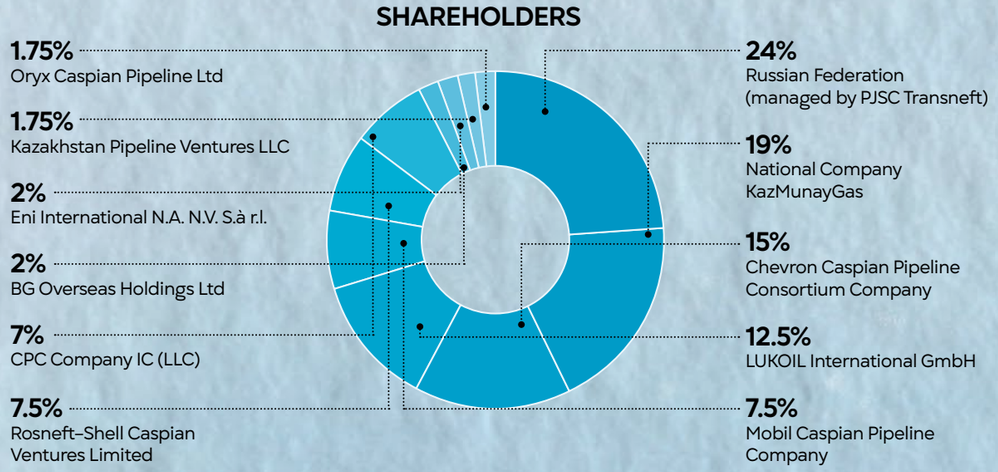

CPC: MILESTONES

A TIME-TESTED INTERNATIONAL PROJECT

ON 6 DECEMBER 2026, THE CASPIAN PIPELINE CONSORTIUM MARKS 30 YEARS SINCE ITS ESTABLISHMENT. OPERATIONAL RELIABILITY, STABLE DELIVERIES, ADVANCED TECHNOLOGY, AND A CONSISTENT PROGRAMME OF SOCIAL, CHARITABLE AND ENVIRONMENTAL ACTIVITY – THESE QUALITIES FORM THE COMPANY'S DNA

30 YEARS MILESTONES

CPC Establishment Day

On 6 December 1996, the Caspian Pipeline Consortium was formed in its current structure. The incorporation of joint-stock companies CPC-R and CPC-K paved the way for the project's further development, includinglegal protection for the capital invested in construction.

Feasibility Study Approved

On 12 November 1998, the feasibility study for the construction of the Tengiz – Novorossiysk pipeline was approved by Russia's expert review bodies: the State Environmental Review, Gosstroy, Gosgortekhnadzor and the Ministry of Emergency Situations.

Foundation Stone

On 12 May 1999, the foundation stone of the CPC pipeline system waslaid near Yuzhnaya Ozereevka. Eleven trees were planted beside the commemorative marker – one for each of the Consortium's shareholders.

First Tanker

On 13 October 2001, the first trialloading of a tanker – the Minerva Alexandra – took place at the CPC Marine Terminal at Yuzhnaya Ozereevka.

Golden Weld

On 22 November 2000, the construction of the CPC pipelinelinear part was completed in a ceremony marking the golden weld. The Russian Government had closely monitored the project's progress throughout.

Oil Quality Bank

In December 2002, the Oil Quality Bank was launched. It manages quality differential settlements between shippers based on the quality of crude batches entering the CPC pipeline and loaded at the Marine Terminal.

Karachaganak Connection

On 16 May 2004, crude from the Karachaganak field in western Kazakhstan began flowing into the CPC pipeline system. Karachaganak is one of Kazakhstan's three world-class oil and gas fields.

Phase One Capacity Reached

In mid-2004, CPC reached the full throughput capacity of its first development phase – 28.2 million tonnes per year – with five pump stations ensuring oil transport across the system.

Record Year 2010

In 2010, CPC transported a then-record 35 million tonnes of oil for export. The designed capacity of 28 million tonnes per year was exceeded through the use of drag-reducing additives.

Russian Crude for CPC

In November 2004, CPC began transporting Russian crude oil. Crude began entering the Tengiz – Novorossiysk system through metering stations at the Kropotkinskaya PS in the Krasnodar Krai. At the Kavkazskaya junction, crude arriving by rail was transferred and forwarded onward to the Kropotkinskaya PS.

SPM-3

On 4 February 2014, the third Single Point Mooring (SPM-3) was commissioned in the waters of the CPC Marine Terminal near Novorossiysk. SPM-3 gave the Marine Terminal the capacity to handle oil throughput of up to 70 million tonnes per year.

Expansion Project Launch

On 1 July 2011, a ceremony marking the launch of the Expansion Project was held at the Atyrau PS. The project was designed to raise the throughput capacity of the CPC pipeline system to 67 million tonnes per year. Contractors began work simultaneously across 22 sites.

Kashagan Crude

On 14 October 2016, crude from the Kashagan field – an offshore oil and gas field with proven reserves of up to 10.5 billion tonnes – began entering the CPC system via the Atyrau PS.

The Million-Tonne Tank Farm

In December 2016, the storage capacity of the CPC Marine Terminal Tank Farm reached one million tonnes. Six SVFRT-100000 tanks, in addition to the existing four, were built as part of the Expansion Project.

The 500-Millionth Tonne

On 12 August 2017, the 500-millionth tonne of oil was loaded at the CPC Marine Terminal since the pipeline system began operations. The milestone consignment went aboard the tanker Ohio.

First International Safety Day

In August 2017, CPC's first international Safety Day was held in Stavropol. The in-house competition event – launched in 2012 as part of the Expansion Project, bringing together teams from the Consortium's divisions and contractor organisations – gained the status of an official international event following the participation of teams from Kazakhstan.

Vision Zero

On 23 April 2019, CPC joined the Vision Zero concept. Partners of this programme demonstrate aleading approach to occupational injury prevention, built around three pillars: safety, occupational health and employee wellbeing at everylevel of production.

Expansion Project Completed in Russia

On 18 April 2018, the commissioning of PS-2 in the Republic of Kalmykia marked the completion of the Expansion Project on Russian territory. The project,launched in 2011, saw eight new pump stations built across Russia.

Expansion Project Completed in Kazakhstan

On 12 October 2017, all Expansion Project facilities on the territory of the Republic of Kazakhstan were commissioned. The project included the construction of two new pump stations – A-PS-4 (now Kurmangazy PS) and A-PS-3A (now Isatay PS).

DBN Programme: Launch

On 21 May 2019, CPC's annual shareholders' meeting adopted the Debottlenecking Programme (DBNP), designed to increase the throughput capacity of the Tengiz–Novorossiysk pipeline to 82 million tonnes per year.

Tanker No. 5,000

On 27 February 2018, the 5,000th tanker wasloaded at the CPC Marine Terminal at Yuzhnaya Ozereevka since the Consortium began operations. The milestone vessel was the tanker Nautilus.

SPM Buoyancy Tank Replacement

On 29 November 2022, an underwater engineering operation to replace the buoyancy tanks on SPM-1 and SPM-2 was completed in the waters of the CPC Marine Terminal. A multi-purpose vessel equipped with state-of-the-art equipment was deployed for the operation.

First Dividends

On 10 June 2021, CPC paid dividends to its shareholders for the first time. The initial tranche covered Q4 2020 and Q1 2021, totalling USD 665 million.

DBN Programme: Mechanical Completion

On 31 December 2022, CPC's shareholders were notified that all facilities required to raise the throughput capacity of the CPC pipeline system – to 72.5 million tonnes per year from Kazakhstan and to 82 million tonnes per year through the Russian Federation – had been constructed and commissioned under the Debottlenecking Programme.

Three Metering Stations at the Marine Terminal

On 25 July 2023, construction of a new Lease Automatic Custody Transfer (LACT) system at the CPC Marine Terminal was completed under the Debottlenecking Programme.

CPC Joins IAOT

On 3 April 2024, CPC became a full member of the International Association of Oil Transporters (IAOT). The Consortium had previously held observer status within the organisation.

The Billionth Tonne

On 1 September 2025, the billionth tonne of oil was loaded at the CPC Marine Terminal since the company began operations.

EPS Project

On 16 October 2025, JSC CPC-R signed an agreement with UDM LLC – a subsidiary of PJSC Transneft – for the manufacture, supply, supervision of installation and commissioning of 11 mainline pump units with shared oil systems.

New SPM-1 and SPM-2

In December 2025, the manufacture of two new SPMs was completed at the Drydocks World Dubai shipyard. In 2026, they will replace the units that have been in service since 2001.

Annual Loading Record

On 31 December 2025, CPC loaded more than 70.5 million tonnes of oil in a single year for the first time in its history – a milestone achievement by the entire Consortium team in CPC's 30th anniversary year.