

**THE INNOVATIVE USE OF THE RADIO MONITORING SYSTEM OF PIPES DURING
THE BUILDING OF THE GAS PIPELINE
"POWER OF SIBERIA"**

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ОАО Gazprom is a global energy company. The main directions of its activities include exploration, production, transportation, storage, processing and marketing of gas and other hydrocarbons as well as generation and marketing of heat and electric energy.

Gazprom is building a gas pipeline "Power of Siberia", for the supply of gas from Yakutia to the Primorsky Krai and the Asia-Pacific region. The power of Siberia will become a unified gas transmission system for the Irkutsk and Yakutia gas production centers and will transport gas from these centers through Khabarovsk to Vladivostok. The route of the gas transmission system will pass along the route of the existing main oil pipeline "Eastern Siberia — Pacific ocean", which will allow to optimize expenses on infrastructure and energy, including the track will overcome swampy, mountainous and seismically active areas. The implementation of this ambitious project will, in particular, wholly-owned subsidiary of Gazprom, ООО Gazprom dobycha Irkutsk".

The harsh climate of Northern regions of Russia, along the miles of gas and oil mains, increases the degree of wear. The main destructive factors — low temperature, high humidity, strong currents (if near the pipeline railway). Thus the traditional method of diagnostics of the pipeline is expensive and time-consuming, so the company can afford only two or three times a year. Running into the pipe flaw detectors are tens of kilometers on it "write" information on injuries. It takes a few days, meanwhile in the pipe can form new damage. But Gazprom is planning to implement a system of radio monitoring of the pipeline. This system allows to obtain new data about the state of the pipeline hourly and automatically transmits information about the detected defect in the pipe directly on the desktop of the computer of the laboratory.

In place dry pipe sensor elektrosnabgeniya, which holds the "laboratory analysis". To the sensor connected system of radio monitoring. With the help of radio signals, it transmits the

information obtained by the sensor in the measuring point. Are test points at a distance of one kilometer from each other. One measuring point transmits information to another, the second one adds to it the data received using your site, and so, the chain, the data arrives at the station, and from there to the lab. Such transfer of information on the status of the pipeline at short distances reduces the energy consumption. In addition, the majority of the time radiomonitoring systems are dormant, actively working only a few minutes to an hour to gather information. Thus, replacement power supplies radio systems — conventional lithium batteries — can be made not more frequently than every two years.

The development of such a radio has no analogues not only in Russia but throughout the world. A similar system is only in the US but it is based on a more costly method of use of a solution of copper-sulphate electrode. This solution tends to flow from the sensors. Therefore, they need to be replaced. At the time, as the dry electrode has a much greater shelf life.

The dry electrode is a plate made of porous stainless steel is electrically connected by a resistor to the anode is made of steel having a more negative potential in the soil than the electrode. When installed in the ground electrode and the anode is closed by the resistance of the soil and under the influence of a potential difference between the electrode and the anode, a constant current whose magnitude is determined by the resistor. Under the action of the current results in the release of hydrogen from the moisture of the soil. As the hydrogen saturation of moisture adjacent to the electrode, which is located in its pores, the electrode is positioned stationary value of the potential. As has been set out above, in comparison with copper-sulfate electrodes, the dry electrode has a longer service life commensurate with the service life of pipes, small size and weight, is installed to a depth of pipeline installation manually without the involvement of heavy equipment. It is resistant to the contents in the soil chloride ions, low soil moisture and low temperatures. The advantages of dry electrode allow, in General, significantly reduce operating costs for electro-chemical protection of trunk pipelines in especially harsh conditions of Siberia.

The company Gazprom took a decision to prohibit the application of the method of sulphate electrodes. Now in the construction of new gas pipelines company, including the gas pipeline "Power of Siberia" will be used innovative technology of radio monitoring, which provides

constant monitoring of the pipeline, predicts the corrosion rate at a particular section and provides information about the causes corrosion. That allows you to immediately investigate what factors influence rapid wear of the pipe to know and to ensure more effective protection of the pipeline.