OPENING UP THE VANKOR DEPOSIT GROUP

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The Corporation began in mid-2006 to design the installations for handling crude oil at the Vankor deposit. The project at once became one of the most important for the Institute, which is not surprising: the deposit is one of the most promising ones of all those surveyed in West Siberia, and its size constitutes 22.5 million tons of crude oil a year. The Vankor oil will be one of the basic sources for supplying the Trans-Siberian major pipeline in regions of the Russian Far East and subsequently export to China.

The building and commissioning of this pipeline represent a major economic task for the oil industry, as is evident from the direct participation in selecting the line in the region of Lake Baikal from the country’s then President V. V. Putin.

The significance of exploiting the Vankor deposit is difficult to overestimate. The Rosneft’ Corporation, which owns this deposit, has involved one of the largest Western firms in the oil industry in the design and partially other engineering operations: the Canadian company SNS LAVALIN, or rather its British division, which is located in the Croydon suburb of London. However, it was evident that a foreign engineering company not involved with the participation of a Russian design organization would find it very difficult to perform the designing on the basis of the requirements of Russian standards and specific climatic conditions. Therefore, the company at once undertook to choose a Russian partner, with whom it could begin and successfully perform the work. The present Corporation was chosen after an audit of various Russian design organizations.

The Corporation is the head and patriarch of project organizations in the industry, and it vigorously participates in drafting the standard basis for the design, since it has enormous experience in joint design with large Western engineering companies, and, a particularly valuable point, at the start of work on Vankor it had successfully completed work on a similar project: the coastal structures for handling crude oil and gas for the Sakhalin-1 project (Chaibo deposit), which was the subject of excellent reports from the operator of the project: Exxon Mobil.

The control group was set up for the project containing British and Russian managers, whose tasks were to organize the designing, set up the basic standards, check on the performance of the operations and the obedience to a fairly rigid time schedule established by the customer.

A single team was set up of specialists from the Russian and British sides for all sections of the project, who had participated in the Sakhalin-1 project and on it had acquired invaluable experience in joint operation with a consortium of Western companies.

Of course, there were difficulties. For example, there was the need for fundamental observation of Russian standards on safety and environmental protection, which sometimes are more stringent than analogous Western
standards, so the Russian engineers needed to have care and avoid compromises in considering the design decisions proposed by their British colleagues.

The climatic conditions in the building area are harsh, as it is a permafrost zone, so engineering designs were needed to protect the permafrost soil, which should eliminate any possible warming up and the loss of load-bearing capacity. Other climate features were also considered, particularly a minimal temperature of -60°C.

The area is remote from building industry organizations, and there is a lack of infrastructure, so building under these harsh climatic conditions was handled with minimization of the installation operations in the area by the use of the block building method. In it, blocks made under factory conditions are brought to the area in assembled form. Their sizes and maximum weights need to be adopted in accordance with the supply conditions. The lack of constant transport connections with large areas meant that shipping the blocks from canals and railroad installations to the building area was possible only in the winter.

All of this required nonstandard design decisions.

A further difficulty was that the strict building schedule required some primary operations in the area, although the final choice had not been made for the suppliers of the main equipment, and there was a lack of complete input data for making drawings of this equipment, whose design had not been finally determined. It required all the experience of our British colleagues and our own engineers to define the best decisions without delaying the start of the building.

Much assistance was received from the three-dimensional PDMS model. This enabled us to perform designing in parallel in all the sections and link up designs taken in adjacent sections, which minimized errors and discrepancies between sections.

Also, the three-dimensional model allowed us to take the best engineering decisions, since it made clear which of the possibilities is preferable. Of course, the three-dimensional model not only improved the quality of the design documentation but also provided reduction in the design times. For example, the formulation of the isometric drawings of the pipelines, which in traditional methods takes many months, was performed almost automatically with the three-dimensional model.