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DIGITAL TECHNOLOGIES FOR PROJECT DEVELOPMENT ODEC AND PEC AND DIGITAL TWINS

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In the conditions of the modern international market, not only the safety of nuclear facilities, but also their economic performance is critically important. When developing its facilities, the project direction "Proryv" tries to solve these problems comprehensively on the basis of new reactor technologies and closing the nuclear fuel cycle. Given the high degree of novelty of projects, the following key difficulties arise:
• the need for a large number of participating organizations to participate in the project, which use in their work heterogeneous information, calculation and modeling tools that require integration;
• significant uncertainty with the way of achieving the final results, a large amount of R&D performed, the results of which constantly cause changes in the projects of objects.
In addition to the standard set of modern CAD and engineering software used in the industry for the development of NPP projects, a comprehensive digital solution has been developed and applied to ensure that the specified economic indicators are achieved in compliance with all safety requirements for the development of ODEC and PEC projects. This solution includes:
• unified information space - a set of databases, data transmission channels, hardware and software and methodologies that ensure the joint work of project participants, common information services for private projects and integration of IT systems of participating organizations;
• information models of objects-a continuously updated structured set of electronic data and documents about objects and technologies of project direction, necessary and sufficient at each stage of the life cycle;
• integrating projects and consolidated 3D models of objects that provide visual navigation of objects, link documentation with the requirements management system of projects, as well as 4D models for handling equipment of ODEC and PEC objects;
• calculation complexes based on integrated mathematical models that allow for advanced construction and simulation modeling of objects in various modes of operation –normal operation, violations of normal operation and emergency, which is necessary for the development and testing of automated control systems, search and elimination of collisions on technological parameters.
In fact, integrating projects with calculation complexes based on integral computational mathematical models are digital twins of ODEK and PEC objects, accompanying real objects at all stages of the life cycle.

Country/Int. organization

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