CASE STUDY: NIAEP-ASE, RUSSIA

SINGLE INFORMATION PLATFORM TO IMPROVE NIAEP-ASE NUCLEAR PLANT CONSTRUCTION

Intergraph® and Russian nuclear state company are on track to complete the one-source-of-truth project

IDENTIFYING GOALS

Historically, nuclear power in Russia has been a strong industry supported by scientific and technological developments in the area of reactor design, nuclear fuel, nuclear power plant operation, and high NPP personnel qualification. Russia possesses one of the world’s most advanced enrichment technologies and nuclear power plants with VVER water-moderated, water-cooled power reactors which are increasing their reliability every year thanks to technology advancements.

NIAEP-ASE, the company resulting from the merger of JSC NIAEP and JSC Atomstroyexport (ASE) had undertaken a large amount of projects, including: Rostov NPP blocks 3&4; Baltic NPP 1&2; Kursk NPP-2; Nizhny Novgorod NPP 1&2; Yuzhno-ural’skaya GRES-2 Units 1&2; Tianwan NPP 3&4 (China); Bushehr NPP -1 (Iran); Akkuyu NPP 1,2,3,4 (Turkey); Belarus NPP 1&2; Kudankulam NPP 1&2 (India); and Ninh Thuan 1&2 (Vietnam). Bushehr NPP-1 (Iran) is already being operated. More than 20 NPP projects are currently taking place. Due to this, the company made a decision to develop and launch a system to improve construction processes – Multi-D system. This integrates all tools and all disciplines in a single centralized platform (therefore, the name Multi-D system, as opposed to 2D or 3D). The system aims to optimize the management of three major project conditions – time, quality, and cost. Effectively, the Multi-D system will eventually help the company to develop new business lines and improve performance in main business segments by managing the cost of generating 1KW/H.

Intergraph and NIAEP-ASE have enjoyed a long-term collaboration in designing, building, and managing complex and demanding nuclear facilities. JSC NIAEP defines the project goals, according to its standards, while Intergraph provides engineering software and implementation of plant solutions.

NIAEP-ASE had used SmartPlant® 3D before for creating 3D models of energy blocks 3-4 of the Rostov NPP and VVER water-moderated, water-cooled power reactors project. Such successful collaboration and Intergraph’s competencies were the main reasons for choosing SmartPlant Review and SmartPlant Construction technologies for the Multi-D project.

The company considers SmartPlant Construction to be the key project solution thanks to its ability to solve planning tasks within construction and installation work decision areas.
The solution is integrated into SmartPlant Enterprise and provides access to the latest engineering and technical data. Weekly and daily tasks for the construction crew are based on the 3D model, not only on project documentation. This approach is more illustrative, better for reporting, and more effective. A bidirectional binder with activity progress charts enables easy updates to the main construction chart. An automated labor cost and work duration calculation system provides the opportunity to reduce labor efforts of the task-setter and accelerate cost calculation.

**OVERCOMING CHALLENGES**

The project execution followed a well-planned scheme. First, information models were created in SmartPlant 3D. Then, SmartPlant Construction was implemented in the construction process scheduling department to improve activity progress charts, time measurement methods, and task descriptions for subcontractors. Finally, SmartPlant Review was used for detailed modeling of specific edits. SmartPlant Construction enables NIAEP-ASE to work with both activity progress charts and 3D models within a single application, automate the process of task distribution to the construction crew weekly, and automate labor cost evaluation. SmartPlant Construction is well integrated with other software systems used by the customer, in this case, Primavera.

**REALIZING RESULTS**

Creating the Multi-D system – a complex, single information platform for industrial construction management – lead to:

- Reduced project time and decreased construction and installation work.
- Optimized construction and installation work execution sequence.
- Personnel capacity optimization during construction.
- Modeling of the assembling processes before work execution.
- Better decision-making and better design decisions due to effective communication between the site and engineers.
- Activity progress chart generation.
- Simplified construction processes control and management.

**MOVING FORWARD**

Today, JSC NIAEP and Intergraph continue to work on the Multi-D project, expanding SmartPlant Review and SmartPlant Construction technologies and improving their application. Real-time data integrated into a single application offers the possibility to design dynamic processes of construction and to create progress charts before construction and installation works. Access to a scheduling module, labor cost, equipment, cost sheet management, along with construction processes control software all provide a beneficial approach to power plant construction. These are the core principles of the Multi-D technology philosophy, which will be the essence of all future collaboration efforts between NIAEP-ASE and Intergraph.

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