



NIAEP-ASE, RUSSIA

Key Facts

Company: JSC Nizhny Novgorod Engineering Company (NIAEP-ASE)

Website: www.niaep.ru

Description: NIAEP-ASE is a leader in the nuclear power engineering sector in Russia. It renders the entire complex of design and engineering survey services in the field of nuclear power engineering – development of design and estimate documentation and technical economical substantiation of heat and nuclear power plants construction in Russia and abroad, as well as making up to 30% of the world power plant design and construction market.

Employees: More than 4,000

Industry: Nuclear Power Engineering

Country: Russia

Products Used:

- Intergraph Smart® 3D
- Intergraph Smart Review
- Intergraph Smart Construction

NIAEP-ASE TO IMPROVE NUCLEAR PLANT CONSTRUCTION WITH SINGLE INFORMATION PLATFORM

Hexagon 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 that 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; Yuzhnouralskaya 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.

Hexagon 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 Hexagon provides engineering software and implementation of plant solutions.



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

The company considers Smart 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 Hexagon solutions 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 bi-directional 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 Smart 3D. Then, Smart Construction was implemented in the construction process scheduling department to improve activity progress charts, time measurement methods, and task descriptions for subcontractors. Finally, Smart Review was used for detailed modeling of specific edits. Smart 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. Smart Construction is well integrated with other software systems used by the customer, in this case, Primavera.

REALIZING RESULTS

- 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
- Easier transfer of knowledge from project to project than to the database

Hexagon solutions demonstrated possible construction time reduction of the energy unit with VVER water-moderated, water-cooled power reactors from 60 to 48 months. Also, Hexagon technologies are currently being used in ongoing construction processes. For example, they made it possible to reduce the weldment period of the main circulation water line at Kalinin NPP 4th energy block to 178 days (compared to 250 days planned). Also, the solution helped to set up steam generation units at Rostov NPP before the installation works of the reactor vessel at energy unit number 3 were performed, which eventually saved time due to the reactor vessel delivery delay.

MOVING FORWARD

Today, JSC NIAEP and Hexagon continue to work on the Multi-D project, utilizing Smart Review and Smart Construction solutions 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 Hexagon.

ABOUT HEXAGON

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Hexagon's PPM division empowers its clients to transform unstructured information into a smart digital asset to visualize, build and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire lifecycle.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at hexagon.com and follow us @HexagonAB.