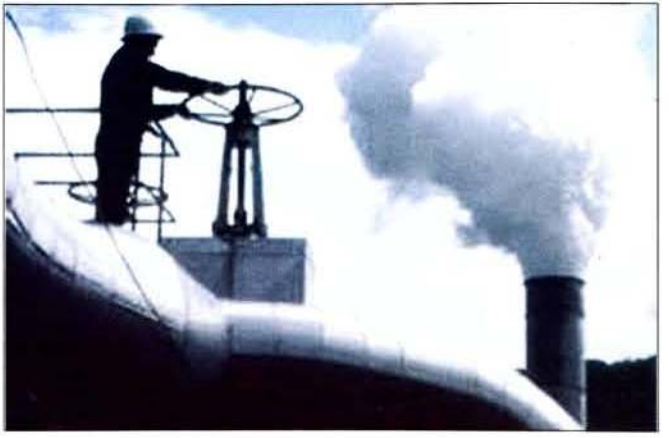

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NEWS FROM THE POWER INDUSTRY

Environmental concerns drive coal-fired power plant modernization

A case study on how Patnow power complex in Konin, Poland deployed a variety of Bentley solutions for major reconstruction of their units. The mission was to produce environmentally friendly electric and heat energy in an effective and safe manner. Managed by BSPiR Energoprojekt-Katowice (EPK), the existing units which had been in operation for over 40 years had to be reconstructed to prolong the life of the plant, while also making it possible to comply with stringent environmental requirements that will be implemented in the near future.

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The Patnow power complex in Konin, Poland, is a cluster of six lignite-burning units that together produce about 1,200 megawatts of power, which is about 12 percent of Poland's total power output. Patnow is Poland's largest lignite-based energy producer, supplying major cities near the plant like Poznan and Wloclawek.

As part of an ongoing maintenance and renovation program, Patnow is in the midst of a major reconstruction of Units 1 through 4 designed and managed by BSPiR Energoprojekt-Katowice (EPK). The reconstruction has three main objectives: add at least 25 years to the units' life span, increase unit efficiency, and reduce the discharge of environmental pollutants. Ultimately, the intent is for Patnow to become Poland's largest, most efficient coal-fired plant.

Stakes are high – a successful reconstruction will have a major beneficial impact on the health, environment, and economic development of Poland's Wielkopolska region. "Our client's mission is to produce environmentally friendly electric and heat energy in an effective and safe manner," said EPK Design Engineer Mieczyslaw Sieradzki. "Because the existing units had been in operation for over 40 years, the owner decided that a major reconstruction was the only way to prolong the life of the plant, while also making it possible to comply with stringent environmental requirements that are being implemented in the near future. This modernization will considerably reduce the emissions of sulfur dioxide and dust."

To accomplish these design goals, the reconstruction has been unusually comprehensive, ultimately including – in all four units – boiler houses, turbine halls, electrostatic precipitators, flue gas fans, compressor stations, transformer stations, process control stations, sorting plants, belt conveyors, water treatment stations, sewage treatment plants, and buildings for oil and hydrogen management. EPK estimates that the cubic capacity of all reconstructed and designed buildings and structures is

1,466,150 cubic meters on footprints totaling 41,500 square meters.

Currently in the design stage, the project has been successfully working through major challenges, including the requirement that existing power units remain functioning as much as possible during the reconstruction. Power output from the Patnow plants is simply too vital to the regional economy to suffer major disruption. "The main challenge was to keep the units functioning during the disassembly of existing piping, mechanical equipment, and structure while also finding ways to adapt existing structure to work with new piping, equipment, electrical lines, process control, HVAC, and plumbing," Sieradzki explained.

The project size and complexity of existing structures also created serious clash detection issues that needed to be resolved, which mandated the use of model-based design. EPK is using a variety of Bentley products, including MicroStation and Bentley Structural. Of course, managing a multiplicity of models emerged early on as a workflow issue.

"During the design process, we created more than 500 major models of structure, piping, mechanical equipment, HVAC, and cable traces," said Sieradzki. "All these models and other documents are managed by ProjectWise so that our entire team can share, synchronize, and secure information. The number of facilities under design is generating a huge volume of information. So far, in fact, we have more than 19,000 files exceeding 41 gigabytes."

To help manage the work, the project was divided into separate areas, such as boiler houses for all units, turbine sets for units 1 to 3, turbine set modernization for unit 4, new power system control station, and other functional areas that made sense in the context of the project. In each area, architects used a consistent set of appropriate Bentley tools to design multidisciplinary buildings. At contact lines, and within areas, collisions were checked and resolved with Bentley Interference Manager.

EPK estimates that the model-based workflow reduced engineering time by as much as 50 percent and cut overall project costs by 15 percent. Sieradzki attributed the savings to improved design quality, accuracy, productivity, and the associated reduction in rework costs.

Energy-efficient substations to power Qatar

Dubai, U.A.E. : ABB, the leading power and automation technology group, has won a USD $25.4-million turnkey contract from Al Jaber & Partners - Construction & Energy Projects W.L.L to build and install two state-of-the-art 66/11kV substations in the new city of Lusail – the country's biggest domestic real estate development. Launched by the Qatari Diar Real Estate Investment Company, Lusail city is being built to serve the demand for residential space in the country. The well-planned development, located north of Doha, will be used for commercial and residential purposes.

Within the second phase of the Lusail Development project, ABB will supply and install two Kahramaa-approved 66/11kV indoor gas-insulated switchgear substations, which will provide energy efficiency, increased safety and space-saving benefits. Both substations will be built underground.