



KOZLODUY NPP REVIEW

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Golden Diploma for Kozloduy NPP

On March 2, 2006 Kozloduy NPP received a Golden Diploma in the Central Military Club, Sofia, where a special ceremony took place. The National Convent of Experts gave the award to the major electricity producer in Bulgaria.

The nuclear plant was distinguished for contribution to the development of the national economy and received the official status of a company with a high prestige in this sphere. The award is unique: it is a 'golden diploma' with a seal of real gold made by the Mint of the Bulgarian National Bank, a golden card of 24-carats gold and a golden pin representing an open book.

The other categories of awards were for contribution to science, contribution to the Bulgarian culture, and contribution to the positive image of Bulgaria. Distinguished artists, experts, scientists and sportsmen were among the other laureates.

The National Convent of Experts is a

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NGO which carries out public opinion surveys in two ways. One, it is a mass online poll and two – questionnaires to poll employer organizations, creative and scientific unions. The Convent nominates prestigious companies, professional unions, chambers, associations as well as experts who have proven their competence in various spheres.

High waters didn't shut Kozloduy NPP down

A record-high level of the Danube was registered on April 23, 2006 in the region of Kozloduy NPP's Bank Pumping Station. The water reached 9.17 meters or 30.17 meters according to the Baltic System which is standard for Europe. All the water levels in the Hydro-Technical Facilities (HTF) of Kozloduy NPP with significance to safety and operation , including river water's

level, are registered, analyzed and archived through the "Aqua" automated level-measuring system and the Geographical Information System at the HTF.

The most important indicators are shown in real time in the control room of the Bank Pumping Station. Moreover, according to technological requirements for the Bank Pumping Station's operation, the level of

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High waters didn't shut Kozloduy NPP down



Record-low level in June 2003



Record-high level in April 2006

the Danube is measured once per hour by a fixed measurement spar mounted in front of the Station.

The Bank Pumping Station ensures water supply for the Kozloduy NPP's technological needs. The Station's design envisages problem-free operation up to a level of 32.5 meters. This means that even with the record-high level reached in April, a reserve of 2.3 meters was still left. According to specialists, such a high level is practically impossible because the river overflows its banks at the much lower terrains alongside. For comparison purposes it is worth saying that the soil-made dike across from Kozloduy NPP has an elevation of 31.75 meters above sea level in its lowest part. This means that the Bank Pumping Station of the nuclear plant was designed according to most conservative assumptions and is reliable enough so as to withstand the highest levels of the Danube.

The Bank Pumping Station is among the first facilities built on the plant site. Through electrically driven pumps mounted at the Station, a great volume of water is taken from the river and directed to the so-called inlet canal. Then it goes to the central pumping stations at the separate units. The water goes back to the Danube through an outlet canal after it is used in the technological cycle.

Accents

Kozloduy NPP experts attend international

"Energy in Central and Eastern Europe" was the topic of an international conference which took place on March 13-14, 2006 in Prague, Czech Republic. Two Kozloduy NPP experts took part in this forum: Mrs Snezhana Yankova, Market Coordinator, and Mr Vladimir Dichev, Senior Expert on Energy Markets.

The conference was organized for a third year. Presidents and managers of leading energy-related companies were lecturers at the meeting. They presented the current status and the prospects for development of the energy sector in Europe. The specialists outlined the major areas of concern: security of electricity supply as well as facilitating the process of establishing an European integrated energy market.

In the course of the forum, the participants emphasized the serious ecological consequences related to electricity generation. They also stressed the importance of measures to increase the share of renewables in the energy mix as well as the share of nuclear energy so as to face the environmental problems of the present day.

International cooperation

World Energy Council sends representatives to Kozloduy



Experts from the World Energy Council visit Unit 5's control room

On March 21, 2006 the participants in the third meeting of the World Energy Council gathered in Kozloduy at a working meeting. The theme of the forum was the role of nuclear energy in Europe. The project aimed at presenting the current status and the prospects for development of the nuclear industry, as well as to gain public support for nuclear plants' operation.

Representatives from 14 European countries came to join the meeting at Kozloduy NPP. They met with the company management. Mr Ivan Ivanov, Executive Director, made a presentation about Kozloduy NPP as a reliable supplier of electric power.

In his presentation Mr Ivanov emphasized on the importance of Kozloduy NPP for security of electricity supply in the Balkans. In addition, Mr Ivanov said that

Kozloduy NPP guarantees that Bulgaria could meet the Kyoto Protocol targets regarding reduction of greenhouse gasses.

The guests gave a positive assessment of the Kozloduy NPP's achievements in respect to safety standards and modernizations. They said this would be highlighted in their final scientific report.

The experts visited Units 2 and 5 of the nuclear plant.

In the end of the visit, the participants thanked the managers for the excellent meeting organization and for their professionalism.

The study of the World Energy Council will be presented to the European Commission in June 2006.

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The World Energy Council (WEC) is the foremost multi-energy organization in the world today. WEC has Member Committees in over 90 countries, including most of the largest energy-producing and energy consuming countries. Established in 1923, the organization covers all types of energy, including coal, oil, natural gas, nuclear, hydro, and renewables, and is UN-accredited, non-governmental, non-commercial and non-aligned. WEC is a UK-registered charity headquartered in London. WEC is well known on the global energy scene for its authoritative reports, analyses, research, case studies, medium and long-term energy projections, and policy and strategy recommendations.

Annual outages

Outage campaign in 2006

Good planning guarantees excellent results

The outage campaign in 2006 covers maintenance of units' equipment as well as technologies common to all units.

The implementation of all the planned measures in the outage campaign will be done mainly when units are shut down for refueling. According to the schedule, on April 22, 2006 Unit 3 was shut down for maintenance, and Units 4, 5 and 6 will be shut down later in the year. Various measures will be implemented during the outages according to preapproved schedules and procedures.

The main goal this year is to complete maintenance in the shortest possible time. For Units 3 and 4 of 440 MW the outages are estimated to last about a month, and for Units 5 and 6 – 85 days. In these 85 days specialists will continue to implement the modernization measures envisaged for these units.

Units 3 and 4 will undergo the so called “small” refueling when only a part of the fuel will be replaced and core internals will not be taken out. Maintenance activities will be performed on primary equipment including check-ups of facilities, pipework, fittings, pressurized vessels, density of containment, and maintenance of electrical installations. A large number of metal control measures are planned as well.

As far as secondary circuit is considered, current maintenance is planned for all the turbines, as well as maintenance of generators 5, 6 and 7.

The maintenance of Unit 5 provides for a number of modernization measures. The most significant of these measures is the complete replacement of the Automated System for Technological Process Control.



Maintenance of the turbine is scheduled on turbine generator 9 including replacement of turbine blades of the second low pressure turbine. General maintenance will be performed on the second and third low pressure turbines of Unit 6 Turbine Generator 10. Replacement of reactor containment elements will be also completed.

The reactors of both 1000 MW Units will be refueled. A comprehensive program for metal control will be followed.

Repair works will be done by Kozloduy NPP specialists as well as external organizations. Tenders were held to select contactors. Tenders were also organized in a timely manner to ensure supply of spare parts and materials, and deadlines were set so as to meet maintenance schedule dates.

In order to determine the readiness for the maintenance campaign in 2006, an inspection was held by the Nuclear Regulatory Agency which found that Kozloduy NPP departments were ready and well-prepared for the forthcoming general maintenance. This brings more confidence to staff that outages will be finished in time according to the schedule.

Modernization

Modernizations on Units 5&6 go further

In recent years, a major characteristic of the maintenance campaign of the two VVER-1000 units is that three programs are applied during outages: maintenance program, investment program and modernization program.

This trend will continue in 2006 as well for Units 5 and 6.

In the scope of the maintenance program are envisaged current and general repair works, eddy current test of certain turbine generator pipes, inspection and prophylactics of facilities and systems. Reactors will be refueled with fresh fuel, too.

Other than this, a large number of technical specifications will be implemented during the annual planned outages. The necessity of these implementations has arisen in the working process as a result of analysis of the operational experience and the changes during modernization.

Modernization measures are also envisaged in the outage campaign of Units 5 and 6 this year. Major efforts will be focused on the implementation of a new YKTC (Universal Complex of Technical Devices) for Unit 5 primary circuit. The same system

was mounted on Unit 6 last year. A seismic upgrading will be done of all the compartments and turbine halls of Units 5 and 6, including the Radioactive Waste Treatment System. Because of its large scope, the seismic measures require particularly precise planning so as to provide good synchronization of work of various teams.

The number of activities to be realized during the planned outages is enormous. Preparations for maintenance have actually started at the end of last year outages. At this stage of readiness, needs are identified and tender procedures are started to assure supply of spare parts and materials. Instruments are checked up to make sure they are in good working order. A plan is being prepared for better coordination between various company departments.

The goal set by the Maintenance Division is to seek optimal performance of maintenance activities and optimal duration of outages. Therefore, precise diagnostics of facilities is provided by using modern methods and technical devices, and by division of labor according to the amount of required maintenance activities.

Outage campaign for Units 3&4

Some of the maintenance activities on Units 3 and 4 are implemented while units are in operation. Some facilities of the non-radioactive secondary circuit are serviced in advance, before units are shut down. In order to do this, specialists have prepared a specific schedule which is strictly observed. The schedule is done in a way that guarantees normal and safe operation of the 440 MW units. This schedule for maintenance of units while in operation was approved by the Nuclear Regulatory Agency. In order to

certify that annual outages were performed correctly, documents are issued for the facilities that have undergone maintenance.

This approach is applied for a second year in a row for the two VVER-440 units. Experience from 2005 has shown there were two positive effects from this practice:

- duration of outages was reduced
- the planned measures are implemented mainly by KNPP's own staff which has the chance to map out their working time and implement a larger number of measures.

Partnership

KNPP, Westinghouse and European Consortium Kozloduy review progress in Modernization Program

In the first half of March series of meetings took place to review the progress made in the Modernization Program of Units 5 and 6. The meetings gathered specialists from Kozloduy NPP and the main contractors Westinghouse and European Consortium Kozloduy. These reviews are scheduled according to the contracts between the partners. They are done periodically so as to discuss specific questions and take decisions at project managers' level.

The reviews which took place in March were somewhat different in their goals.

In 2006 continued the replacement of the YKTC (Universal Complex of Technical Devices) for both units. Because of the importance and the large scope of measures, the main purpose of the meeting with Westinghouse was to discuss problems related to specific modernization measures: documentation development, factory acceptance tests, installation and commissioning. The goal is to use the good practices based on previous experience and to continue searching new ways for optimization of work.

Another important question addressed by Kozloduy NPP in cooperation with the contractors is configuration management, i.e. assuring relevance between actual units' status after modernizations and its adequate incorporation in documentation.

Different topics were discussed with the European Consortium Kozloduy as their contract with Kozloduy NPP expires in May 2006. The major activities have been suc-

cessfully finalized. Some questions remain regarding warranty service of installed equipment.

Therefore, special attention was paid to analysis of the extensive experience accumulated during the last eight years of cooperation. In general, assessment is the mandatory final stage in the management of each project. Specialists review the accumulated experience from various viewpoints and draw conclusions regarding future operation. This was the idea behind the final meeting with the European Consortium Kozloduy. Partners tried to give an objective assessment of both weaknesses and strengths in the process of cooperation, and analyze these factors that facilitated project's realization.

According to Kozloduy NPP's specialists, the factors that played crucial role and contributed to the success of the project are:

- **Clearly defined and understandable goals**
- **Well-prepared motivated specialists**
- **Professional project management**
- **Involvement of all Kozloduy NPP departments and EKC**
- **Support on behalf of the top management**
- **Clearly defined scope of activities**
- **Precise contract agreements**
- **Elaborate project procedures**
- **Active communication between teams**
- **Retaining key participants in the projects as a warranty for success.**

Professional project management brings success



Students and journalists visit Kozloduy NPP



Students from the National High School of Mathematics “Acad. Lyubomir Chakalov” at KNPP

“The young generation has to know about the operation of Kozloduy NPP,” said Ms Miglena Chavdarova, a physics teacher at the vocational school of architecture and geodesy “Hristo Botev”, Sofia. A group of students from this school came to see Kozloduy NPP on March 28, 2006.

Mr Yavor Panev, a student in the 10th grade, said, “My two-hour stay at Kozloduy NPP was long enough for me to realize that it’s a place where everything is in perfect order. I must say that I am very nicely surprised by the staff and by what I saw.”

Students from “St. St. Cyril and Methodius” Junior High School, Sofia, visited Kozloduy NPP on March 24. The director of the school, Ms Nadia Nikolova, also came with the students.

Three groups of students and professors from the Electro-Technical Department of the Sofia Technical University came to Kozloduy NPP on March 16, 23 and 31. They had a tour around the control rooms of

Units 2, 3 and 5. The students got familiarized with the operation of the Switch Yard as well. Mr Adrian Ivanov, assistant professor, said, “What makes the greatest impression are the modern instruments at the plant, the kindness of personnel and the unique facilities which couldn’t be seen elsewhere. We got convinced that the level of safety and security at Kozloduy NPP is really high.” The dean of the department, associate professor Vassil Gospodinov, expressed his thanks to the management for the excellent organization of the visits.

In March and April the nuclear plant was a point of interest for international students too. We had visitors from *Universita di Corsica – Pasquale Paoli*, and from *Ecole des Mines de Paris*. Prof. Philippe Poggi from the Corsican University said after the visit, “For me and my students this tour was a real pleasure. It was interesting to see such a huge nuclear plant – with great dimensions, large territory, friendly people and a large number of professions on the site.”

A group of 12 journalists from major Russian media visited Kozloduy NPP on April 17. These were reporters from ITAR TASS, RIA Novosty, Rosiyskaya Gazeta, etc. They had a tour at Units 2, 3 and 5 of the plant, and met with the company managers afterwards. Mr Ivan Ivanov, Executive Director, made a presentation about the nuclear plant and pointed out its importance for security of electricity supply in the region. Mr Ivanov and other managers answered numerous questions about the operation of the plant and the prospects for future development.



Traditional spring exhibition gathers large public

On April 17, 2006 the House of Culture in Kozloduy hosted the traditional spring exhibition of the Art Studio in town. Each year about 70 children prepare their drawings for this cultural event. This year the exhibition gathered 300 art works made in tempera and in oil pastel. The young artists have created them in class and during the drawing days held at the Ledenika Recreational Complex. A selection of excellent drawings will be sent to international contests in various countries - Japan, Portugal, Serbia, Poland, etc.

The young artists will also take part in two national contests in Lovech ("Oh, my real and magic childhood") and in Blagoevgrad ("Coca-Cola Vacation").

A great number of parents and friends attended the opening of the exhibition and applauded the artists for their talent and hard work. Ms Galya Yanakieva, Art Studio teacher, said, "I am so proud to stand in front of you with my students!"

There is a good reason for this pride. Early in the year the young artists from the Art Studio received prestigious awards from contests in Japan and China.

Recreational complex turns 5 years

The Sports and Recreation Complex of the nuclear plant turned 5 years in March. The anniversary was marked by two special events. The Club for physical culture, sports and tourism "Parva Atomna" organized swimming competitions on March 28 and 30 for Kozloduy NPP employees and citizens of Kozloduy. Women competed in different styles: freestyle, breaststroke, and backstroke. Men competed in these three styles plus butterfly.

On April 11 and 13 "Parva Atomna" organized a table-tennis competition in which 19 sportsmen took part. All the winners received diplomas and souvenirs from Kozloduy NPP.

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