



KOZLODUY NPP REVIEW

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conference**

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Kozloduy NPP hosts IAEA's workshop on nuclear safety

On June 18-22, 2007 the Training Center of Kozloduy NPP hosted a workshop on methods for assessment and enhancement of safety culture (SCART). The event was organized and sponsored by the International Atomic Energy Agency at the invitation of the nuclear plant. Experts from several countries took part in the workshop: Frank Hardeman (Belgium), Frank Guldenmund (Netherlands), John B. Taylor (Great Britain) and Marin Ignatov (Germany). On Kozloduy NPP's side, coordinators for this training were Peter Petrov, Head of Quality Department, and Misho Monev, Head of Nuclear Safety and Radiation Protection. Twenty specialists from Kozloduy NPP and the Nuclear Regulatory Agency attended the workshop and acquired new knowledge in the sphere of nuclear safety.

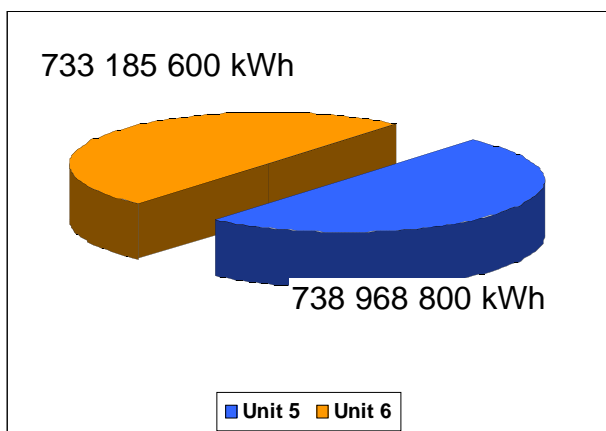
During the workshop, lecturers discussed safety culture in the light of the IAEA's documents. They talked on the key features of safety culture and its attributes. Experts gave examples from Japan, Great Britain, South Africa, etc.

Particular emphasis was put on self-assessment and assessment by invited independent safety culture experts and peers (SCART - Safety Culture Assessment Review Team). Participants were encouraged to take part in discussions which provided for a vivid debate and exchange of ideas.

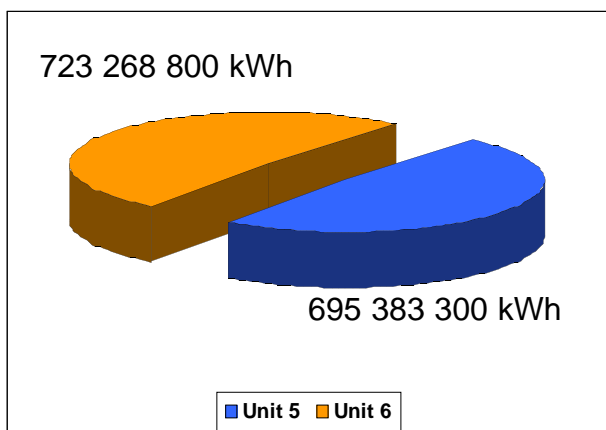
Dr. Marin Ignatov said he expected the cooperation with Kozloduy NPP on improving safety culture to continue.

Generation

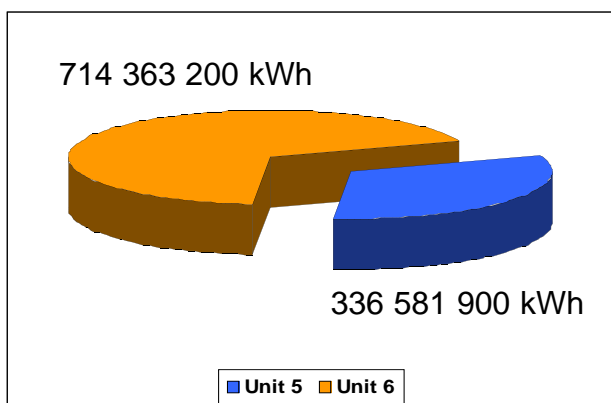
April



May



June



Facts & Figures

In the first half of 2007, Kozloduy NPP generated 8 335 514 200 kWh electrical power. This amount is 4.52 percent above the target which was set at 7 975 184 800 kWh. The target was met on June 15, 2007. During the whole period, the two 1,000 MW Units operated in accordance with the schedule set by the central dispatching office. Unit 5 was shut down for maintenance from June 16 to August 16, 2007.

Annual conference of BULATOM

This year's conference of the Bulgarian Atomic Forum BULATOM was entitled "Bulgarian nuclear industry - national, regional and international security of energy supply." The conference took place in Riviera, a Black Sea resort, from June 6 to 8, 2007. The event was co-sponsored by the Ministry of Economy and Energy and the Nuclear Regulatory Agency.

In this sixth edition of the conference experts and politicians had the opportunity to exchange ideas on various topics related to the nuclear industry. They discussed the prospects for new nuclear builds in Bulgaria and abroad, modernization of existing nuclear facilities, technologies and practices in decommissioning, reprocessing and storage of radioactive waste and spent fuel, ecological aspects of using nuclear power, etc. Special emphasis was put on the preparation of nuclear engineers in the future. More than 300 participants from 8 countries took part in this event.

IAEA's experts consult Kozloduy NPP on decommissioning



Kozloduy NPP hosted on June 11-15 an IAEA's expert mission on questions related to decommissioning of nuclear facilities. The mission was organized at the invitation of Kozloduy NPP. The event

was under the IAEA's program "Support in planning the decommissioning of NPPs and research reactors."

Two experts, Luc A.V. Noynaert (Belgium) and Fausto Zambardi (Italy) reviewed the updated strategy for decommissioning of Units 1-4. They discussed with Kozloduy NPP specialists various details of the decommissioning plan. As a part of the IAEA's

technical support program the representatives of the agency also worked on the concepts for improvement of radiation protection as well as on terms of reference for justification of safety during decommissioning.

WANO technical support mission takes place in Kozloduy

A technical support mission of the World Association of Nuclear Operators took place at Kozloduy NPP on May 10-11, 2007. The two-day event was entitled "Effective Operational Decision-Making (ODM)." Specialists from various Kozloduy NPP departments took part in the seminar. The program was developed in WANO's Atlanta Center by Tim Martin. Operational Decision-Making training courses have been organized by WANO at different plants since 2003. Many of the plants belonging to the Moscow Center of the organization have already hosted such a technical support mission. Also, the

London Coordinating Center has organized training for chief engineers on the same topic. The Kozloduy event was organized under the leadership of Mr Sergey Florov, an advisor at the Moscow branch of WANO. He has 24 years of experience in the nuclear industry. "The goal of the seminar was to improve the process of medium-term decision making and to ensure higher safety in operation of nuclear facilities. The course enjoys popularity among specialists and, in my opinion, is one of the most effective forms of technical support missions within WANO," Mr Florov said.

Experience

Annual outages in 2007: modernization goes further



On June 16, 2007 Unit 5 was disconnected from the national grid for an annual outage. This marked the beginning of the annual maintenance campaign at Kozloduy NPP. This year it will take place at the two operating 1,000 MW Units of the plant.

Preparatory work for outages

“Preparation for annual outages is of vital importance to the success of the campaign,” says Tsanko Bachiiski, Head of Maintenance Division at Units 5 and 6. According to him, this is a long process of planning which starts in fact one year in advance. While planning, it is important to assess the condition of equipment, to estimate the necessity of spare parts, and to analyze the potential of human resources as well as the need to use specialists from other companies. It has been a goal of the Maintenance Division to ensure long-term planning regarding supply of spare parts so as to guarantee completion of work on time.

In recent years, Kozloduy NPP specialists have made every effort to estimate areas

where potential problems with equipment might occur, so measures could be taken in advance. These estimations are done through modern diagnostic equipment which monitors operating conditions. Also, the previous operating experience is taken into account. Generally, most of the monitoring is done during regular operation; special methodologies are specified and teams work on various tasks.

Specificity of maintenance

The major part of maintenance activities envisaged for Unit 5 include replacement of the automated system for technological processes (YKTC). At Unit 6, this replacement was done last year. This is the last measure under the large-scope Modernization Program for Units 5 and 6 which started back in 2002. The operation has its unique specificity not because of the volume of technical activities but because of the functionality tests and the commissioning of the system. The experience of the implementation of the YKTC at Unit 6 showed that the operability tests of the system are time consuming so other maintenance activities on the secondary circuit need to be planned and implemented in a timely manner at the beginning of the outage.

After completion of this operation, only two measures will remain under the Modernization Program: implementation of a system for control in emergency and post-

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Annual outages in 2007: modernization goes further

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emergency situations, and implementation of a system for functions control of safety systems. During the outage of Unit 5, preparatory work will take place to ensure implementation of these measures. Furthermore, Unit 6 is awaiting a permit by the Nuclear Regulatory Agency to implement these measures during this year's outage.

Unit 5 will be reloaded with fuel, and components of the first circuit will be monitored and serviced by Kozloduy NPP specialists. Eddy current control will be performed on both steam generators. New lighting will be installed in the containments of Units 5 and 6. This will improve the working conditions at the two operating Units.

When talking about maintenance of the secondary circuit at Unit 5, it should be pointed out that many design upgrades will take place there. The most important technological upgrade is related to the regulation pumps of the turbine driven feedwater pumps. They will be moved to a new place which will ensure easier access and maintenance. Other measures aim at achieving better operational characteristics and reliability of equipment.

The maintenance of Unit 6 will be more complex than the one of Unit 5. One of the major tasks would be the modernization of the polar crane. It is a major piece of equipment at both Units and is used for many operations. This modernization presents a serious challenge because it is being done

for the first time at a nuclear plant and needs to be performed in short time to avoid delays in other maintenance activities.

Preparations for this operation started long ago. A special working group was formed and the project was studied in detail.

Another major task at Unit 6 will be the maintenance of the turbine generator. Various design upgrades are also envisaged. The reactor will be also refueled for the next cycle.

Work of high quality

The outages of the two 1,000 MW Units in 2007 are supposed to last 150 days, or 75 days for each Unit.

The high quality of work during outages guarantees that these Units will operate flawlessly and safely over the next fuel cycle.

After Units 3 and 4 shut down at the end of 2006, the generation of Units 5 and 6 has become even more important for the national electric system. However, the Kozloduy NPP management never put pressure for shortening duration of outages as high quality of maintenance has always been a priority.

"The success of an outage could be judged only when a Unit is stopped for the next scheduled maintenance," says Tsanko Bachiiski. "If the period of operation has been trouble-free, then the maintenance was performed well."

Focus

Specialists from closed units get training

In May 2007, fifty-one specialists from the closed Units 1-4 started training at similar departments at Units 5 and 6 (VVER-1000).

The training will last five months.

The group consists of people who wished to get qualified for work at the 1,000 MW Units which differ from 440 MW Units in

terms of construction. These are specialists from departments such as operational unit, turbine equipment, electrical equipment and instrumentation and control systems. Participants were selected among personnel of Units 1, 2, 3 and 4 in a way that doesn't compromise safety at the shut-down Units. The first four Units of Kozloduy NPP were shut down in line with commitments Bulgaria made in the negotiation process preceding EU accession. Now, these Units are in the so-called condition "E", i.e. fuel is removed from the core and stored in the by-reactor water pools.

Individual training programs have

been developed for the specialists who moved to Units 5 and 6. The programs are designed so as to reflect the previous

experience of each employee and the specificity of the new department. In the course of five months, specialists will have to pass specific tests for each position. At the end of the



training they'd have the necessary knowledge and skills to be able to work at Units 5 and 6.

"The Kozloduy NPP management undertook this step to preserve motivation and commitment to work of personnel employed at Units 1-4," said Mr. Alexander Nikolov, Production Director of Kozloduy NPP. He pointed out that another important goal is to preserve and develop qualification of nuclear specialists. According to him, qualified personnel from Kozloduy NPP will be needed at the nuclear plant in Belene as the new units there would be similar to Units 5 and 6 in Kozloduy.

Kozloduy NPP gets recognition again

Kozloduy NPP was ranked 9th among the largest 100 Bulgarian companies by the *Capital*, a weekly newspaper published in Sofia. The rating is based on financial data from 2006. First place was awarded to

Lukoil Bulgaria. In the power generation sector only two companies took higher positions than Kozloduy NPP: the National Electrical Company (3rd place) and Bulgargas (4th place).

Summer internships at Kozloduy NPP

Professional hands-on training is among the priorities of Kozloduy NPP when it comes to young specialists and recent graduates. This has always been part of the company's social policy.

The summer internships program was established three years ago. This year, it gathered dozens of students again. It is open for Bulgarian students who have finished their third year in college and got an average score of 4.50 as a minimum. In addition, they need to be fluent in English and have computer literacy.

Approved students sign contracts with Kozloduy NPP and work for four weeks at various plant departments. The trainees work on specific projects according to their university majors.

Practical training proved to be of great benefit for students in the last three years. They get skills in team work and establish contacts with leading specialists in their fields.

From June 25 to August 1, Kozloduy NPP had twenty-two students from several universities in Sofia, Russe, Gabrovo, etc. The company also accepted two Bulgarian students from universities in Germany and

France.

Interns get trained in several fields: nuclear technology and nuclear generation, electrical engineering, electrical equipment, electronics, civil engineering, economics, etc.

Emergency preparedness

This year, the training of the Kozloduy NPP's paramedical team was organized by the Emergency Preparedness Department and the Health Service. The focus of the training was mainly on giving first aid, human anatomy, activities in case of chemical or radiological contamination, etc. Classes took place for two months at the Kozloduy NPP's Training Center.

The practical part of the training took place in June at Pomorie, a Black Sea resort. The paramedical teams had the chance to practice various scenarios and demonstrated excellent skills in giving first aid.

The paramedical team is a crucial part of the emergency response plan of the plant. It is part of the Health Service at Kozloduy NPP and has existed for over 30 years. More than 200 employees have undergone training over the years. At present, there are 26 volunteers on the team.

In brief

Open doors day brings over 400 visitors

On May 12, 2007 Kozloduy NPP held an open doors day which is usually organized twice each year. 432 people visited the plant from 27 towns of Bulgaria – Plovdiv, Stara Zagora, Russe, Sofia, Gabrovo,



The youngest visitor:
Konstantin Dimitrov

Blagoevgrad, Vratsa, Pleven, etc. The youngest guest was 1-year-old Konstantin Dimitrov from Vidin.

The visitors had the chance to see control rooms at Units 2, 3 and 5, turbine halls, and even glimpsed at the whole plant from 52 meters after climbing a giant ladder of the fire brigade. Fire fighters made special demonstrations for the public and specialists from Kozloduy NPP measured gamma background radiation at the specialized laboratory truck.



Kozloduy NPP's team wins again

In June, the Kozloduy NPP's team became the all-round champion at the Second World Workers' Games in Albena. The games were organized by the International Labour Sports Confederation



A team of champions...

and the Bulgarian Workers Sport Federation under the aegis of President Georgy Parvanov and Vesela Lecheva, President of the State Agency for Youth and Sports.

2,500 athletes from Brazil, Mexico, India, Poland, Russia, France, Romania and other countries took part in this event. The Kozloduy NPP's team got 12 first places, 6 silver medals and 4 bronze medals. Our athletes got best achievements in shooting (men and women), darts (men), tug-of-war (men), arm-wrestling (men and women), and karate (men and women).

KOZLODUY NPP REVIEW

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