



UNITS 5 & 6 REACTOR SAFETY AND CONTROL SYSTEMS MODERNIZATION



**DRAGOMIR DRAGOLOV –
EP-2 CONTROL SYSTEMS
CHIEF POWER ENGINEER**

According to the original design of the 1000 MW Units 5 & 6 of Kozloduy NPP the control of all devices and technological system protection is performed on basis of a Unified complex of technical means, the so called UKTS. Taking into consideration its high importance and impact on nuclear safety, Kozloduy NPP envisages the replacement of the UKTS on a regular basis. The replacement of Units 5 & 6 conventional equipment UKTS has been a part of and within the scope of the Units 5 & 6 Modernization program. In compliance with the ever

more strict international requirements, concerning safety systems, striving to implement leading good practices in nuclear power, the senior management of the Kozloduy NPP arrived at the decision to finalize the complete replacement of the UKTS of the three safety system channels.

The 1000 MW Units 5 & 6 of the KNPP have three independent safety systems, each one of them being capable to set the reactor to a "cold" state. The independence of these safety control systems has been ensured with their location into separate rooms and independent redundant electricity supply.

The main objectives to be achieved with the UKTS modernization of Units 5 & 6 safety control systems are to:

- preserve or improve all operational features and technical characteristics as envisaged in the original design;
- enhance operational reliability, improve control

system conditions of operation, as well as the metrological characteristics of equipment as a result of the up-to-date technologies and digital devices implemented;

- increase coefficient of preparedness of the CS by means of incorporating a reliable diagnostics and control system;

considerably reduce maintenance, tests, setup and repair time by the implementation of a new type of equipment, based on industrial computers, resulting in a reduction of outage periods as a whole, thus yielding a



higher load factor for the installed capacities.

It is important to recognize that the operational life
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KOZLODUY NPP FULFILLS SIX MONTHS PLAN

On June, 2, 2008, Kozloduy NPP fulfilled the plan to generate 7 471 600 MWh for the first six month of the year. This by far ahead of schedule result achieved is due to the reliable and effective operation of the modernized 1000 MW Units 5 & 6 and ensured by the highly qualified professionals.

MODERNIZATION AND COMPLETION OF EQUIPMENT FOR THE AEROSOL SAMPLING OF THE ENVIRONMENT



the 100 km area that is a subject of monitoring.

Aerosol activity of air is the major object of control within the scope of radiation monitoring of the environment. To locate the ecological consequences in case Kozloduy NPP operation impacts the air, the plant has provided for 11 control sites, scattered within

In March - April, 2008 the provision of the pieces to complete the equipment of the aerosol control stations started with a new generation of high technology continuous sampling devices. Six sampling devices of the DH-60810EV.2 type, manufactured by the American company "F&J Specialty Products" were installed at the radioecological monitoring stations in the town of Kozloduy, Kozloduy NPP, the NPP river bank pump station and three more settlements. The equipment is completely computerized, data is recorded electronically, digitally processed and information archived. These devices ensure a reliable metrological control of the technical means that measure the flow rate of the air as it is sucked into the devices. Taking into consideration the meteorological parameters such as temperature and pressure contributes to the greater accuracy of the final results of the sampling. The intro-

duction of the metrologically secured digital sampling and monitoring devices guarantees high accuracy and sensitivity of the analyses, enabling the registration of background concentrations and localization of even negligibly low impacts of Kozloduy NPP operation.

The further quality aerosol monitoring sampling net development will continue throughout 2008 for the remaining five more control stations. The completion of the set of devices will ensure high reliability and accuracy of measurements, performed on aerosol activity in ground air layers in the area of Kozloduy NPP in full compliance with the relevant European normative requirements (Art. 35 of Euratom Treaty) and with good international practices.

**RUSSIAN TSIBRANSKY
HEAD OF RADIOECOLOGICAL
MONITORING DEPARTMENT**



Mr. Popov, the stoppage of Unit 5 on June 7th, marked the beginning of the 2008 outages of Kozloduy NPP 1000 MW units. What are the specific features of the outages this year?

Each outage bears peculiarities of its own. All specialists at Electricity Production - 2 (EP-2) involved in the preparation and performance of the activities necessary for the inspection and preparation of all the equipment for the next operational period are well aware of the fact that outages can never be "identical". Even the so called "routine" activities, ensuing from the design requirements and design basis, bear certain challenges as well. Transportation of spent nuclear fuel and reloading fresh fuel, maintenance works on two of the turbine cylinders, the maintenance works on the generator and generator exciter, the metal control activities and heat exchange tubes of the steam generators planned, the implementation of the program on control of condition of metal and welded joints in the primary and the secondary circuits, the maintenance works on the main power and control equipment together with the relevant metrological tests - everything has been precisely planned and needs to be implemented

with due care and at highest quality.

In parallel to all these activities during the stoppage of the units, which are exclusively extensive in their scope, preparatory activities, concerning the international expert missions to EP-2 have to be initiated. Large scale construction and installation works in rooms, cable trays and equipment that shall enable improving the operational status of Units 5 & 6 have been envisaged. Those activities, though not directly related to the maintenance campaign require a lot of organizational efforts to coordinate contracts and their implementation.

In the last few years during the outages of the 1000 MW units, the majority of measures of the Units 5 & 6 Modernization Program were implemented. Now that the Program has been successfully finalized, are there any plans to continue this process of modernization?

Regardless of the fact the MP has been completed, Units 5 & 6 will undergo further improvements. This stems from the requirement that the units need to be continuously kept in full compliance with the ever more strict criteria and safety requirements of the present day. For this purpose a series of modernization activities and replacement of equipment has been planned even for this very outage. Funding has been ensured within the resources of KNPP

HEAD 2 HEAD

EACH OUTAGE BEARS PECULIARITIES OF ITS OWN

Investment program.

Among the major activities taking place are the replacement of coolant water condenser turbine generator №9 pipework filters, replacement of 0.4 kV breakers of safety systems I and III, replacement of control and protection systems electric power supply panels, replacement of secondary circuit control valves, etc.

What is the duration of the planned outages ?

The duration of the outage for each of the two units as scheduled is about 52 days.

As is the case with the outages in the last years we shall again do our best to reduce the duration of the outage taking care and preventing this from having any negative impact on quality of the works, of course.

The reasons are more than clear - despite the shutdown of the four 440 MW units Kozloduy NPP is still a major factor on the electricity market and the only possible way to maintain this position is by increasing the quantities of energy produced by the two units in operation. On the other side, the ever growing consumption in the country and the deficiency of electric power in the region require that all possibilities available should be utilized to meet the demand. In this respect each and every day gained with a shorter outage contributes immensely for the achievement of these objectives.

Are the persons involved with the outage activities prepared to face the challenges

of the new circumstances that have arisen?

I can say that the teams of EP - 2 are clearly aware of the enormous responsibilities in hand and are able to cope with all the tasks. I mean not only to perform the works in full scope and within the schedule but also to achieve the quality of performance required to ensure safe and reliable operation of the 1000 MW units during the next operational period.

The successful implementation of the entirety of tasks depends on the degree of preparedness and motivation of EP - 2 staff as well as on the level of internal organization. This is why all efforts of the managers have been directed to further development of safety culture, the quality of performance and the personal involvement of each individual in order to ensure the successful accomplishment of the goals as stated.

I would like to take advantage of the occasion to emphasize the contribution of all our colleagues from EP-1 that are playing a significant role in performing the activities together with the staff from the Diagnosis and Control Test centre, Hydro Technical equipment and Safety and Quality departments. There is no doubt, as it has always been in our practice so far, we can count on their full cooperation.

TSVETKO POPOV, CHIEF MECHANICAL ENGINEER "MAINTENANCE", EP - 2:

DELEGATION OF NATO PARLIAMENTARY ASSEMBLY VISIT KNPP

A delegation of the Sub-committee on Energy and Environmental Security and the Science and Technology Committee at The NATO Parliamentary Assembly visited Kozloduy NPP on 15th May 2008. NATO representatives were led by the Christian Buzea- Chairman of the sub-committee and member of the Romanian Parliament and Michael Mates - chairman of the Science and technology committee. A meeting with KNPP management was organized where the Executive Director Ivan Genov presented the current status and the operation of nuclear facilities emphasizing the significant efforts and resources invested in the enhancement of KNPP safety.





OPEN TO THE WORLD

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cycle of the newly installed modernized safety control systems is 40 years.

The contract with the Ukrainian enterprise "Radii" is scheduled to be implemented as follows:

- Within the 2008 outage – preparation activities on safety system two and three of Unit 5.
- For Unit 6 the complete replacement of the second safety system is envisaged during the 2008 outage as well as preparation works for systems one and three.
- Outage 2009 – the complete replacement of systems two and three and preparation of system one of Unit 5.
- In 2009, systems one and three of Unit 6 shall be entirely replaced, this bringing the modernization of the safety systems of this Unit to completion.

The Project shall be finalized in 2010 with the replacement of system one of Unit 5.

Some preliminary works are imposed by the limited time for their implementation – dismantling the obsolete systems, preparations in the room to meet the requirements of the new equipment, installation and start-up activities, single and functional tests to prove operability of devices, etc.

Currently the design of preliminary installation works on safety systems two and three of Unit 5 is being implemented and the design of the entire replacement of safety system two of Unit 6 is being developed.

In addition to enhancing safety, a major result of this modernization is expected to be the possibility that Kozloduy NPP shall be in the position to initiate a fully substantiated and well-grounded preparation of the documents needed to apply for extension of Units 5 & 6 operational life to 60 years, this being in line with worldwide trends in the operation of contemporary nuclear facilities.

FRENCH AMBASSADOR TO KNPP

On June 11, 2008 a delegation, lead by His Excellency **ETIENNE DE PONCINS** -



Ambassador of France to Bulgaria paid a visit to the Kozloduy NPP. The Ambassador was accompanied by **MICHELLE SCHUA** - the official representative of Radiation protection and nuclear safety Institute for Eastern and Central Europe and the deputy head of the Economic mission to the Embassy - **PHILLIP BRAVAR**.

At the meeting with the managerial team of Kozloduy NPP Ivan Genov, the Executive Director, acquainted the guests with the present-day status of the NPP. The visit included a EP-1 and EP-2 walkdown.

PARTICIPATION IN AN OSART MISSION

Lyubomir Pironkov, Head of the Personnel and Training Center Division at KNPP, took part in the IAEA OSART mission to Balakovo NPP, Russia. The Mission was performed from May 19 to June 2, 2008 and was requested by the Government of the Russian Federation. The Bulgarian representative was in the team to assess Training and qualification of NPP per-

sonnel. This OSART mission involved experts from Austria, Slovakia, Hungary, the USA, France, the Czech Republic, China, Germany, Italy and Japan. The scope of the mission included operational safety in the areas of management, training and qualification of personnel, maintenance, engineering support, operational experience, radiation protection and chemistry.



LYUBOMIR PIRONKOV (on the right) and **EVGENY MATVEEV**, Head of the Training Centre at the Full-scale simulator - the IAEA OSART mission to Balakovo NPP, Russia.

KOZLODUY NPP OPEN DAY—RECORD BREAKING VISITORS

The first for 2008 Kozloduy NPP OPEN DAY on the 31st of May witnessed a record breaking the last eight years' number of visitors. Almost six hundred visited the plant to take advantage of the opportunity to see the turbine halls and main control rooms of the 440 MW Unit 2 and the 1000 MW Unit 5 where experts and professionals made them acquainted with the operation of the nuclear fa-

cility. Real time gamma background measurements at the mobile lab and experts' explanations on the contribution of the nuclear plant for the reduction of carbon dioxide emissions into the atmosphere and preservation of the environment aroused the greatest of interest. It is curious to know the youngest visitor was only a bit more than 17 months old while the oldest one was 81.





CELEBRATIONS



KNPP EXECUTIVE DIRECTOR IVAN GENOV congratulates the “Power Engineer of the Year” - ALEXANDER NIKOLOV, HEAD OF KNPP OPERATIONAL DIVISION awarded by the Bulgarian Chamber of Power Engineers for his overall contribution and results achieved.

THE DAY OF THE POWER ENGINEER, 21 of June, was traditionally celebrated to mark the final starts of a number of sport competitions and disciplines, to enjoy the pleasure to attend the series of cultural events, Kozloduy was the host of these days and to reveal the surprise as to who amongst all the deservedly nominated would merit the reward of the honorary title: “Power engineer of the year”. One of the world famous magnificent fairy-like gracefully majestic dance and light productions of Neshka Robeva, enchanted the audience in the eve of the festivities.

SPORT EVENTS

KOZLODUY NPP SPORT TEAMS WIN CHAMPION TITLES AGAIN

“The Balkans invitation for peace, 2008” was the sixth traditional workers’ sports festival, held in the Black sea resort, Albena , June 11 – 15, with more than 2300 participants from 19 countries, including Russia, Belarus, Romania, Belgium, France, Israel, etc. Kozloduy NPP Plc teams, lead by the Production director Kiril Nikolov won the all-round championship title for the sixth year in a row with 6 gold, 6 silver and 6 bronze medals of all the 18 sport events.



INTERNATIONAL CYCLING EVENT ON EUROPE’S DAY

Cyclists from Kozloduy NPP joined the international cycling event to mark Europe’s day - May, 9th. His Excellency, the Belgium Ambassador to

Bulgaria – Phillip Becket took the lead of the column of cyclists along the route across Bulgaria, Greece and Turkey.



INTERNATIONAL NUCLEAR FORUM - BULATOM

The traditional International Nuclear Forum was held in May in Varna under the heading of "Bulgarian Nuclear Energy – National, Regional and World Energy Security". It is organized by the Bulgarian Atomic Forum (BULATOM) and under the patronage of the Ministry of Economy and Energy and the Bulgarian Nuclear Regulatory Agency and with the cooperation of Kozloduy NPP Plc., Worley Parsons, ENPRO Consult, Risk Engineering LTD, Atomstroyeksport and Energy Insurance Company. Politicians, experts and scientists from a number of countries participated in the forum - **Petar Dimitrov**- Minister of Economy and Energy, **Sergey Tzotchev** – BNRA Chairman, **John Ritch**- Director general of World Nuclear Association, **Vladimir Urutchev** – Member of European Parliament etc. The following subjects were presented and discussed: Construction of New NPPs, Perspectives in the development of nuclear technology in Bulgaria and worldwide, Technologies and practices during decommissioning of nuclear equipment, Treatment and storage of RAW and SNF; Operation and Modernization of existing nuclear facilities; Ecological aspects of nuclear energy. Preparation of personnel for

nuclear industry. The following open letter was read and signed by the participants:



nuclear industry.

The following open letter was read and signed by the participants:

SOUTH-EAST EUROPE ENERGY CRISIS

OPEN LETTER TO:

- THE EUROPEAN COUNCIL,**
- THE EUROPEAN PARLIAMENT,**
- THE EUROPEAN COMMISSION, AND**
- THE PRESIDENT OF THE REPUBLIC OF BULGARIA**
- THE PRIME MINISTER OF THE REPUBLIC BULGARIA,**

Dear Sirs,

We, the undersigned, wish to draw your attention to the energy situation in South East Europe. Since the beginning of 2007, there have been widespread power cuts, spiralling price rises, more use of lignite and increased dependence on Russian gas. These factors are having grave effects on the South East European countries' environment, economies and threaten unemployment, economic decline and even civil unrest. The Balkan Region has been particularly hard hit by this situation. One major reason for this is the unnecessary and premature closure of Units 3 and 4 of Bulgaria's Kozloduy Nuclear Power Plant. The shutdown of four of Kozloduy's six units by the end of 2006, was a condition for Bulgarian Accession to the EU, and was placed before the Bulgarian Government in 1999. All independent experts, including those of The European Council, agree that, after the completed upgrading of units 3 and 4, there was no technical justification for the demanded closure. We have to emphasize here that every relevant criteria since 1999 when the decision for the closure was made has now changed.

Without underrating the significance of that decision for the Bulgarian accession to the EU and the real situation when it was made, we can not agree with it. Besides we also understand that this closure obligation is now a part of Bulgaria's Accession Treaty. However, the consequences of that agreement are only now seen in our everyday life.

That is why consider that now there are absolutely all reasons necessary and adequate to review this decision- the conditions in which it was taken in 1999 have been changed completely. The possible agreeing to review it, we see as an act of political will on behalf of all the institutions participating in this process. We most respectfully and sincerely ask you, as the leaders in Europe, to find the courage and strength to address this issue. Our professional advice says that these plants could be running again within a matter of months. Their reopening would be a clean, safe and reliable solution to South East Europe's energy crisis in the immediate term whilst new plants are completed and the regional high voltage transmission network reinforced.

We underline that this is a serious problem in our region but it has a ready-made serious solution that we implore you to consider. We ask you in public and you may be sure that your positive response will also be most publicly and warmly accepted.

On behalf of the participants in the traditional nuclear conference "Bulgarian Nuclear Energy – national, regional and world nuclear security" of the Bulgarian Nuclear Forum.

28-30 May 2008



KOZLODUY NPP REVIEW

CONTACT US

We look forward to hearing your views.
Please feel free to contact us.

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**WE ARE ON THE
WEB!**

www.kznpp.org

CHILDREN IN ARTS

7TH NATIONAL COMPETITION “KOZLODUY NPP – ENERGY – NATURE”



Nearly 700 children, aged 6 to 15, divided into three groups, took part in this 7th National competition, organized by KNPP. More than 100 children's paintings and works of plastic arts were exhibited in the House of culture. KNPP Executive Director Ivan Genov, Kozloduy Mayor Roumen Manoef and other officials attended the opening ceremony to appreciate all children's efforts and creativity and to award the winners.



CHILDREN'S DRAMA SCHOOL

Into pure rapture went the audience at the first night performance of “School for Clowns”, the fourth production of the “Gold Fin” drama school. Twelve promising young actors and actresses were enthusiastically applauded on the stage of the House of Culture on May, 27th, 2008.

NEW IN JULY AND AUGUST:

1. KNPP Unit 5 2008 outage completed, Unit 6 outage started
2. Graduates choose to be trained at Kozloduy NPP
3. West Cumbria Copeland officials visit KNPP
4. KNPP sport teams at the World Workers' Sport Games in Italy