



KNPP REVIEW

FOCUS



FIFTEEN YEARS OF SWITCH GEAR DEPARTMENT

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HEAD OF SGD

The Switch gear department has been established as a separate organizational unit and separated from the electrical department of EP-1 since the 1st January 1995. The switchgear is one of the first facilities on the plant site, as its 110kV had been commissioned before the construction and installation works on Unit 1 started. The SG was constructed at three stages – relevantly for the construction of units 1 and 2, units 3 and 4 and 5 and 6. It was built at three levels of high voltage – 110 kV, 220 kV and 400 kV. 8 electric power lines 400 kV, 5 electric power lines 220 kV and 4 of 110 kV come out of the SG. Until 31st December 2002, when units 1 and 2 were closed, the SG of KNPP was the largest SG on the Balkan peninsula in terms of connections.

A lot of reconstructions and modernizations have been implemented since its commissioning more than forty-years ago. The more significant of them are: replacement of circuit breakers 220kV and 400kV, performed within the period 1998-2000; installation and commissioning of second autotransformer 220/110 kV – 1999; installation and commissioning of valve arresters at all power lines 400 and 220 kV – from 1999 to 2000; replacement of breakers of reactors -2002; replacement of disconnectors 400 kV – from 2004 to 2007; replacement of relay protections – completed in 2007; replacement of measurement transformers –in the period 2006-2009.

From the very beginning the team working at the SG has contributed for the civil and installation works, starting-up and adjustment activities of the facilities, for the implementation of functional tests, for the technical service of facilities for the maintenance of the equipment operational status, for the development of operational and maintenance documentation in compliance with the legal requirements. The implementation of all these activities that are highly significant for the normal functioning of the power grid in Bulgaria as well as in the region, require excellent qualification

and high professional level that the SG staff demonstrates every day.

RECONSTRUCTIONS

BANK PUMP STATION POWER SUPPLY

The SG 220 kV supplies power to the BPS by two electric power lines from different fields. Automatic Standby Start-up (ASS) has been implemented at sections 6,3 kV in the pump station. ASS has not been performed for the sections power supplied by Harletz electric power line and the other electric power lines. Harletz electric power line remains switched-off and is switched on in idle mode as a stand-by, when switching off for revision of some of the new electric power lines 220 kV is necessary.



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SWITCHGEAR 110 KV.

Neutron 110 kV electric power line is not used as a connection and can be used to supply power for Oryahovo substation on the Dunav electric power line route. The combined measurement transformers 110kV and relay protection and automation are free and can be used in SG and BPS. One auto transformer is moved to SG site. Thus the transformer site of units 1 and 2 has been cleared.

SWITCHGEAR 220 KV

All fields from SG 220 kV have been redesigned following a diagram "two breakers at a connection", except for the autotransformer fields and one field remains redundant. In this way the diagram SG 220 kV has been facilitated (discharged), the maintenance and support facilities decreased and the number of circuit breakers, measurement transformers, disconnectors and grounding switches reduced. The power for the house needs of EP - 1 is supplied by the start-up and standby transformer as there is a possibility for one such transformer to be redundant. In the fields where replacement of the measurement transformers is envisaged, only the ones included in the reconstructions shall be replaced. Disconnectors 220 kV are being replaced.

Reconstruction of the high voltage electrical circuit in Kozloduy NPP shall enhance the reliable operation of the plant and shall lead to economies of plant resources, namely: The costs for the replacement of disconnectors 220 kV shall be reduced by 40 %.

EFFECTS EXPECTED

The resources envisaged for the civil and installation works for the replacement of the measurement transformers 220 kV that have been left out of this reconstruction, shall be saved.

There is also an economy made due to the financial means for the payment of electrical power losses in the transformers.

The available portals and posts 220 kV are used, and new ones are not bought.

The reliability of the BPS power supply shall be enhanced by the two 220 kV electric power lines on the different fields following the diagram two circuit breakers at a connection and one standby 110 kV power supply.

The reliability of the redundant power supply of units 5 and 6 shall be enhanced - power supply from the different fields following the diagram two circuit breakers at a connection.

The transformer site of units 1 and 2 shall be cleared from autotransformers and iron-framework structures. The reliability of the 220 kV diagram shall be enhanced by replacing the disconnectors and increasing the number of circuit breakers per connection from 1,5 to 2 pcs.

There won't be any need to maintain the main lines for compressed air in SG 220 kV. The overall reconstruction of the high voltage electric circuit in Kozloduy NPP is expected to be completed by the end of 2011.

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ONE -DAY MANAGER



For a second year in a row KNPP has participated in the One-day Manager National Initiative organized by The Junior Achievement Bulgaria Foundation under the auspices of the Ministry of Finances of the Republic of Bulgaria. This is an initiative in which well-known businessmen, politicians, leaders and managers offer their seats to young people to introduce them to their everyday work and challenges and make them try walking in their shoes for one day. The students were from the 11th and 12th grade of St.St. Cyril and Methodius School , majoring in Entrepreneurship and Business.

Their working day started with the morning meeting of the management, then they

were delivered a presentation on the plant history and current status by the Head of Administration and Control Division – Ms. Julieta Tosheva. They students took interest in the information about the internship programmes for university students from Bulgaria and abroad.

These future managers participated actively in the real management of the relevant structures and later visited the turbine halls and the main control rooms of units 2, 3 and 5. They said that their day at the plant will motivate them and for sure will have an impact on their choice of future profession.

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CONFERENCE ON INDIVIDUAL DOSIMETRY MONITORING - IM2010



March 8 to 12 the Greek capital – Athens, hosted the International conference on Individual dosimetry monitoring - IM2010. The Conference was organized by the European Commission, the International Atomic Energy Agency (IAEA) and the Greek Atomic Energy Commission, (GAEC) The Conference was attended by regulatory authorities representatives and highly qualified experts in the area of radiation protection and dosimetry monitoring from Austria, Belgium, Brazil, Bulgaria, Great Britain, Canada, Iran, the Czech Republic, France, Germany, Greece, Spain, China, the Republic of South Africa and other countries.

Kozloduy NPP was represented by Emil Kamburov, physicist, Spectrometric body counting, in charge of quality with Inspection body of the C type – Inspection centre “Personal dosimetry”, Safety and Quality Directorate.

The Conference was opened with presentations and reports by IAEA and EC representatives regarding the development of the IAEA normative requirements in the area of radiation protection and individual dosimetry control - Basic Safety Standards

(BSS), Radiation Protection 160 (RP160).

The Conference program ranged over a number of topics related to the development, structure and activities of the individual dosimetry inspection offices and occupational dose monitoring and the theoretical calculations on uncertainty of results in measuring and calibration of measuring instrumentation

In his presentation Emil Kamburov described the ap-

proach applied to set up the Management system and authorization of the Inspection body of the C type – Inspection centre “Personal dosimetry” in compliance with the requirements of BAC EN ISO/IEC 17020:2005 as a Management system already applied at Kozloduy NPP Plc. The preference to ISO 17020+AC:2006 chosen as a standard was substantiated on basis of the national legislation (Basic Norms for Radiation Protection – 2004) and its advantages in the part related to control and assessment the compliance of the individual effective doses of the professional irradiation, in accordance with the normative requirements in this area pointed out. The activities performed by the Inspection body regarding the metrological validation of the technical means for measurements, in-house calibration and how is metrological traceability provided, according to BAC EN ISO 10012:2003 were dwelled on. The presentations made and lectures given by IAEA representatives and experts from the participating countries gave rise to numerous discussions on individual dosimetry control during the working meetings.

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KNPP WWER-1000 FULL SCOPE SIMULATOR 10 YEARS IN OPERATION NOW

In the calendar of significant for the Kozloduy NPP events this 25th of February marked the tenth anniversary of the official putting into operation the WWER-1000 reactor type full scope simulator. All these years throughout the continuous improvement and development of

its main functions proved the full scope simulator to be a contemporary nuclear operators training facility as well as a means to perform various engineering analyses.

In November 1994 between the National Electricity Company and the American company S3 Technologies (the now GSE Systems Company) a Contract was concluded for the construction of a full scope simulator for KNPP Units 5 & 6. The Contract made provisions not only for the construction and supply of the WWER-1000 full scope simulator, the prototype being KNPP Unit 6, but also for the transfer of the construction technology and simulator maintenance by a team of KNPP experts.

The Project saw its start in the beginning of 1995 with the preparation of the complete set of input data. In the middle of 1995 a team on the technology transfer was assigned to training on site of S3 Technologies in the USA. In addition to the theory, by taking active part in all stages of the Project, KNPP experts gained valuable practical skills as well. The preparation work proved to be an important stage within the entire process of construction, operation, maintenance and improvement of the simulator. Experts of this same team, as a part of KNPP staff, are still being involved even to



this present day in the activities, related to the operation and maintenance of the FSS-1000.

The main purpose of the FSS-1000 is training of KNPP 1000 MW Units' operational personnel, subject to licensing. More than 350 teams of nearly 2000 reactor operators have passed continuous training

in the period 2000 – 2009. Simulator training of a week's duration for reactor operator teams is conducted twice a year.

In addition to continuous training initial training for specific job positions is also provided. So far 7 teams and 29 operators have been thus trained. This kind of training is the so called combined training – demonstrative and practical. In case it appears necessary or after instructions given by the national regulatory authority or KNPP management, special training may also be conducted on the simulator.

Simulator training is always performed after scenarios developed by licensed instructors in compliance with the topic relevant standards as specified within the corresponding training program.

Due to the high authenticity of the mathematical model and the physical replication of Unit 6 Main Control Room the simulator is now a powerful engineering tool to validate symptom-oriented emergency instructions or other operations documentation, to test complicated technical decisions, related to changes in protections or locks, to review the measures included in the Modernization program, to perform and analyze operational events or programmed in advance emergency situations, etc.

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WORKING MEETING ON THE VERLIFE PROCEDURE



From March 8 to 12 in the town of Pieshtani, Slovakia a working meeting was held, organized by the International Atomic Energy Agency (IAEA) on the Unified procedure for lifetime assessment of components and piping in WWER NPPs "VERLIFE". The event was attended by experts, representing 8 countries – Finland Germany, the Czech Republic, Hungary, Slovakia, Russia, Ukraine, Bulgaria as well as experts from the IAEA.

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VIETNAMESE ELECTRICITY COMPANY MANAGERS ON A VISIT TO KNPP



On April 7th, 2010 representatives of the Vietnamese National Electricity Company paid a visit to Kozloduy NPP Plc. The group of guests, led by Duong Kuang Than, Deputy General Director of the Company, got familiarized in details with the activities of the Training centre, the planning and organization of the work there and visited the workshops and the Full scope simulator of the WWER-1000 MW Unit.

IAEA INTERNATIONAL CONFERENCE

In March 14th-18th, 2010, the International Atomic Energy Agency organized in Abu Dhabi, United Arab Emirates (UAE) an International Conference on Human Resource Development for Introducing and Expanding Nuclear Power Programmes. The UAE is one of the great number of countries having declared their intentions to join the nuclear community and was selected to be the host of the event as a model country applying clearly defined policy that complies with the international agreements and having undertaken transparent and consistent activities to implement it.

The Conference was planned to be a large-scale event, supported by almost all international organizations in the nuclear industry. The Head of the Training centre at the Kozloduy NPP was personally invited to take part in the Conference and present a paper on the interrelations between the specialized training organizations and nuclear equipment suppliers in their effort to train staff operate nuclear facilities.

The Conference was attended by nearly 300 representatives of 65 countries, falling into four main groups. (1) countries with developed nuclear program, technology and equipment suppliers for all or

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The purpose of the meeting was to adopt the latest edition of the main text of the Unified procedure for lifetime assessment of components and piping in WWER. The participants discussed the comments and notes to the text each country had provided in advance. After detailed discussions certain proposals put forward by the Bulgarian group of experts, led by Dimitar Popov were

accepted.

A couple of more working meetings are scheduled by the end of 2010 – in Kiev (Ukraine) in June, Rez (the Czech Republic) in October and November to finalize the work and prepare Appendix II to the document, related to neutron fluence and dosimetry. The forthcoming discussions will be also attended by experts from India and China – countries in which WWER type of reactors are being currently built.

PRE-COMMISSIONING REVIEW AT ROSTOV NPP

From March 13 to 27 at Rostov NPP, located in the surroundings of Volgogradsk – Russia a pre-commissioning review was conducted by the Moscow centre of the World Association of Nuclear Operators (WANO). Twelve experts from Bulgaria, India, Iran, Russia, the USA, Ukraine, France and the Czech Republic took part in the review. The group of experts, led by Yaroslav Vokurek (the Czech Republic) reviewed various areas of activities at the NPP - organization and administrative management, operation, maintenance, en-

gineering support, radiation protection, training of personnel, fire protection. In the area of radiation protection the reviewer expert was Plamen Mishev - Radiation and dosimetry control technologist at Kozloduy NPP. The construction of the Rostov NPP began as early as 1979, but in 1986 it was frozen and restarted again in 2000. The NPP is envisaged to operate four WWER-1000 reactors. In 2001 the first unit of the Plant became commercial and currently the second Unit is in trial operation. Units 3 and 4 are under construction and they are scheduled to become operational in 2014 and 2017, respectively.

KNPP EXPERTS ON A PEER REVIEW TO THE SOUTH UKRAINE NPP

The World Association of Nuclear Operators (WANO) conducted a peer review at the South Ukraine NPP within the period April 10 – 23, 2010. Highly qualified experts from nuclear power plants coming from Russia, Ukraine, China, Bulgaria, Finland, Hungary, the Czech Republic and Slovakia took part in

the peer review, accompanied by Moscow, Paris, London and Atlanta WANO centres



experience, engineering support, radiation safety, personnel training.

representatives.

The WANO expert team included Mrs. Katya Minkova – KNPP Chief Technologist Engineering Support, EP-2 to review the area, related to chemistry. The rest of the areas reviewed were as follows: operation, management and administration, maintenance, operational

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US TEACHER VISITED THE PLANT

Mr Bret Breitenkamp – a teacher from the Van Vleck High School – Texas USA visited the plant on 17th March 2010. The visit was organized following a proposal made by the USA for exchange of teachers in the nuclear area within the General Nuclear Energy Partnership – GNEP. Mr Breitenkamp visited the Turbine Hall and the MCR of Unit Five and then the programme continued with a meeting in the Information Center of the plant with members of Women in Nuclear Bulgaria and students from Christo Botev Comprehensive School – members of the youth section of WiN Bulgaria.

Ms. Katya Minkova – president of WiN Bulgaria and Chief Technologist Engineering Support of EP2 presented the current status of nuclear power engineering in the country as well as the WiN Bulgaria activities and initiatives. Ms Rositsa Minakova, head of Department “Planning and Organization” at the training center of KNPP focused on the training of KNPP personnel and the role of the TC. The student Stilian Kostov impressed the guests with the presentation on the WiN activities popularizing nuclear power engineering among young people and making it an attractive perspective for the young generation. Mr Breitenkamp talked about the initiatives undertaken by the Nuclear Power Institute – NPI in order to meet the growing demands of highly-qualified specialists in the nuclear power field of Texas. In order to solve the task in an adequate way there has been a close co-operation between the industry, universities, high schools, US Government, federal agencies and public leaders. He also focused on the fact that the idea of using high school teachers to convince their students in the advantages of nuclear power engineering both from the environmental aspect as well as a field for their future professional development, has turned out to be extremely successful. He also underlined the role of women who can easily have an impact on children and the general public to the benefit of nuclear power industry. That’s why the guest assessed the meeting with the representatives of WiN-Bulgaria as very useful for exchange of opinions and experience.



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a part of the nuclear fuel cycle stages; (2) countries with developed nuclear program and adequate infrastructure, operating nuclear power facilities unaided; (3) countries, with limited infrastructure, users of nuclear technologies of general designation; (4) countries, lacking or with partial infrastructure, intending to develop nuclear power programs.

The objectives of the Conference included several major directions: To present the advantages of nuclear power as a specific branch with a unique complex of features; (a) potentially risky production of enormous social importance; (b) continuous application of top achievements in the entire technological spectrum; (c) mandatory constraints to managerial decisions within certain norms; (d) strict compliance with specific requirements regarding organization of work, human factor and equipment; (e) implementation of specific culture and strict observation of clearly defined rules. IAEA explicitly emphasizes these principles, as it receives numerous applications for new-

build (more than 50 countries worldwide), most of them lacking the prerequisites required and need long time to prepare.

Human factor is most definitely pointed out to be the key element both for the newly created national nuclear programs and the developed countries with experience in nuclear industry. The problems are related to the necessity of providing succession and continuity between generations and the risk of loss of scientific, engineering and operational capacity.

The circumstance all participants in nuclear business are equally responsible and each of them may exert considerable influence on nuclear industry as a whole was emphasized as well. The importance of international cooperation and the open exchange of information via all existing channels was emphasized. The Conference gave the participants the opportunity to gain access to a large amount of various materials to overview the issues in a global aspect as well as to specify and outline the trends in the time to come.

SPORTS AND ARTS



KNPP tourists on their third walking tour for the year - in the Balkan Mountains from 23rd to 25th April.



The theatrical team at KNPP House of Culture with their new performance for the season



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

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