

In 2011, Krško NPP experienced another year of safe and stable operating at full capacity and finished the year with the expected business result in accordance with the business plan, thus meeting the annual production plan. From a broader point of view, it could be said that year 2011 was marked by natural calamities which redrew global nuclear energy prospects. From the perspective of severe beyond-design-basis accidents, nuclear safety has become the main topic. In line with its high safety culture and based on new knowledge, Krško NPP reacted pro-actively and efficiently. Among the challenges in the field of labour potentials, in the forefront in 2011 were the development of human resources and their competence. A high level of safety culture has remained a vital point of our activities, reflected in the strict supervision of deviations in the systems and equipment, rapid and pro-active response to important events, provision of technological maintenance sources, safety investments, and high-quality staff training.

Hrvoje Perharić

in one year which meant a successful completion of the power plant construction and assembly work, and the beginning of power generation. In February 1981 reactor building leak rate tests were successfully conducted, while in May the first nuclear fuel was loaded; since then the power plant has been a nuclear facility operated by Krško NPP staff. The next professional challenge and a milestone was stable reactor operations at a constant power; this was achieved on 11<sup>th</sup> September. The test results at low reactor power confirmed that the design and assembly were suitably conservative. Testing at increased power up to the rated power was started with the first synchronisation of the power plant to the power grid on 2<sup>nd</sup> October 1981. Since then up to the present, NPP has generated 137 billion kWh electricity. The Krško NPP story is a story of economic and developmental success.

Three decades ago several events took place in Krško NPP

In this annual report pictures of certain events which marked these past decades have been included.

#### Annual Report 2011



Krško **Nuclear** Power Plant



Stane Rožman



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#### Dear reader,

You have in front of you an overview of operational and business results and main activities per organisational units in 2011. Krško NPP's operations were safe and stable at full capacity and ended the year with the expected business result in accordance with the business plan. The only exception was one unplanned shutdown due to external factors in the switchyard. Significant effects were long-running periods of low Sava flows and high temperatures. Owing to good coordination of the water regime by means of hydro-power plants on the Sava river and full readiness of the plant's own cooling capacity, the annual production plan was reached.

From a wider perspective, we could say that 2011 was marked by natural disasters which lead to a redefined nuclear energy prospects world-wide. The destruction of three nuclear reactors in Japan was a shock to the nuclear industry. The subject of nuclear safety has now become an essential topic from the point of view of severe beyond-design-basis accidents. International political and technical specialist organisations as well as governmental bodies have initiated processes which have brought about new knowledge and requirements in the area of nuclear safety. For us, the compulsory activities included "stress tests" in accordance with ENSREG and analyses in accordance with WANO and NRC.

The reaction of Krško NPP was, in line with its good safety culture and based on the new knowledge, proactive and efficient. The operability of the SAMG (Severe Accident Management Guidelines) was systematically analysed, system adjustments were carried out and the mobile equipment for electric energy, compressed air and cooling water during potential failure of fixed systems was replenished. Furthermore, staff training was carried out, all of which resulted in confirmation that we are ready to face severe beyond-design-basis accidents. On the basis of URSJV's decision, a 5-year plan of safety investments was prepared which will ensure Krško NPP's long-term expected level of nuclear safety.

ADDRESS BY THE MANAGEMENT BOARD



Staff development and competences in human resources were a challenge and our main concern. Approximately 150 new staff have been recruited in the last four years, while about one hundred left the company due to retirement. Systematic training has been going on according to high standards and high quality. A major part of the newly recruited staff shows high promise and we look forward to their enthusiasm and excellent results. In this way, provisions are being made that even the most demanding functions will be taken over by high quality staff when the generations change. At the time of new staff recruitment positive and good relationships are our important priority. Safety culture and business ethics have faced major internal criticism in the last year and insufficient systematic attention by serious discussions. It is vital that our company holds important attributes which are a guarantee for nuclear safety and operational stability. A relatively high level of safety culture is expressed in strict surveillance of any deviations of the systems and equipment, rapid and pro-active response to important events, ensuring resources for technological maintenance and safety investments, and high-quality staff training. There was an admirable readiness on the part of the employees to take responsibility, coupled with enthusiasm in tackling safety issues and their engagement in problem solving.

Management

ADDRESS BY THE MANAGEMENT BOARD



In October 2011 the Krško Nuclear Power Plant had been carrying out its mission for thirty years - safely, generating power in an environmentally acceptable and at the same time cost effective and competitive manner. A rounded figure of operation itself is not an achievement. However, when the results through decades of operation meet and in many aspects surpass the set aims, this is an achievement and at the same time a challenge for the future.

In their programme of performance indicators the World Association of Nuclear Operators (WANO) defined eight indicators which represent the operational position of a nuclear power plant regarding safety, reliability, operational capacity, waste generation, personnel safety, etc. The performance indicator index reflects the complete power plant operation and takes into account all WANO indicators with certain weight factors. In 2011 the performance indicator index - which rages from 0 to 100, was 98.3 for Krško NPP. The result achieved places Krško NPP firmly in the one quarter of best nuclear plant currently in operation in the world. Since the supplier was Westinghouse, it is sensible to compare the result with those achieved by American power plants; among these Krško NPP's performance indicator index takes the 18th place in comparison with 105 American facilities in operation.

Last year, Stane Rožman, Krško NPP's President of the Management Board, was granted a prestigious recognition award for his contribution to safe operation of nuclear facilities at the general meeting of WANO whose main mission is mutual assistance in safe and efficient operation of nuclear facilities. The award has been conferred since 2003, last year it was won by eight individuals from different countries.

# IMPORTANT ACHIEVEMENTS IN 2011 AND CHALLENGES FOR 2012



In spite of an unplanned shutdown due to external factors in the switchyard, Krško NPP achieved the planned annual production and operated within budgeted figures; this can be considered as an achievement as the year was marked by the natural calamity, followed by the destruction of three nuclear reactors in Japan. Nuclear industry and Krško NPP immediately responded to the events with system adjustments and procurement of mobile equipment to ensure the supply of electric power, compressed air and cooling water in the event of a failure of fixed systems. In accordance with EU and URSJV requirements, Krško NPP prepared a report on the plant's special safety review. The report results demonstrate that Krško power plant is well designed and built, while additional equipment in case of severe accidents makes it prepared for the gravest circumstances. The report was well received at the EU level as well. When they have completed its review, the international team will prepare the final assessment of the national report.

In the future the demands concerning nuclear safety will continue to increase, posing a professional and financial challenge. Krško NPP has already prepared an analysis of the plant's safety and proposed its upgrading. It includes proposed modifications and installation of new systems, structures and components. These will ensure: better reliability of AC power supply, better reactor core cooling, the integrity of the containment, reduction in radioactive emissions into the environment during a potential severe accident, control of severe accidents from the auxiliary control room, and an alternative cooling of the spent fuel pit. The programme anticipates gradual introduction of changes within the next five years.

The reactor head replacement, the finalisation of the third diesel generator set project, the rotor replacement on the main electric generator during the refuelling and various other checks are only some of our planned activities during the 2012 outage. The outage which will, due to its scope of work, last for approximately 40 days, will be professionally and logistically very demanding.

At their work, the staff of Krško Nuclear Power Plant respect the highest safety, technical and quality standards, determined by internal direction and goals set by NPP. In 2011, the external audit confirmed that our practice is in line with the environmental standard certificate ISO 14001:2004, gained by Krško NPP in 2008. Thus, we proved the compliance with and commitment to future safety and health at work policy in accordance with BS OHSAS 18001:2007 standard.



IMPORTANT ACHIEVEMENTS IN 2011 AND CHALLENGES FOR 2012

IMPORTANT ACHIEVEMENTS IN 2011 AND CHALLENGES FOR 2012





In 2011 the plant's operation was safe and stable, the performance indicator was 98.3. There was one unplanned shutdown due to faulty operation of the 400-kW switchyards. The plant generated 5.9 terawatt net electric energy, which was in line with the plan. Following the requirement to ensure alternative methods of reactor core cooling with mobile equipment in the event of a commercial plane crash into the plant and due to the events in the Japanese Fukushima Daiichi plant, the activities associated with the necessary modifications and mobile equipment procurement were stepped up. The plant had to perform a special safety review (stress tests) and report the results to URSJV. The interim report was prepared by 15<sup>th</sup> August and the final report by the end of October. NPP fulfilled all its obligations by the prescribed deadlines, proving by the analysis and reports as requested its high resistance to natural calamities, such as earthquakes and floods, by far exceeding the designed figures.



NEK target for 2011: 5,9 TWh Total (production from the start of commercial operation): 136.45 TWh



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In order to facilitate the performance monitoring and benchmarking, a performance indicator index was established, calculated using weighted values of individual factors and whose value is from 0 to 100. The target figure for 2011 NPP's performance indicator index was not less than 91, while the actual achieved value was 98.3, which proves a very successful performance of the plant.

## Performance indicator index



In line with Slovenian legal requirements concerning nuclear safety and the decision issued by URSJV, Krško NPP had to prepare a safety upgrading programme for the prevention and mitigation of severe accidents. After the necessary analyses had bee conducted, a programme was prepared which included a number of technological upgradings which have to be completed, as stipulated in the decision, by the end of 2016. The areas include AC power supply, core cooling by injecting into the primary system and cooling by injecting into the secondary system. Additional measures are planned covering the area of the containment integrity and controlled emissions from it. The programme also includes additional technical solutions for equipment control from the auxiliary control room as well as alternative solutions for spent fuel pit cooling.

In 2011 NPP's operation was stable and in accordance with the requirements set by the Slovenian legislation and international regulations and standards. The key targets demonstrated by performance indicators as defined by WANO (World Association of Nuclear Operators) were achieved. The collective dose was adequately low, as there were no major preventive or corrective measures undertaken on the equipment nor planned shutdown - outage.





SUMMARY REPORT





NPP carries out radioactive measurements of the waste water discharges into the Sava river and emissions from the ventilation system into the air. An extensive programme of radiation surveying is carried out by NPP and external authorised institutions in the surroundings and from samples taken from the surroundings, in particular in the area around NPP within a distance of 12 kilometres. In addition, there are 13 automatic radiation survey stations located in the vicinity of the power plant which can detect any change in the natural radiation due to precipitations as well as potential changes due to the nuclear facility. The Sava river is monitored downstream for 30 kilometres from the plant.

The objective of the radiation monitoring is to monitor the plant operations and assess the impact on the surroundings and the local population. This is also the basis for verifying compliance with legal limits.

The effects on the population are so low that they are practically immeasurable. However, they can be calculated by models for the most exposed groups of the population and the annual dose can be compared with the dose received due to natural and other radiation sources. The assessment of an individual dose received by a reference critical group (an adult receiving the highest doses and whose food originates exclusively from locally grown food and fish) shows that the annual dose of such an individual so far has been approximately 1 µSv or that it is less than 0.1 percent of the dose on average received by a person due to natural sources of radiation (approximately 2,500 µSv). The annual dose for NPP is limited to 50 micro Sv per person (at a distance of 500 m from the reactor or more) from air and water media. The results of measurements taken are dealt with in detail in a special report for 2011, prepared for NPP by the Jožef Stefan Institute together with the Institute for Occupational Safety, and the Ruđer Bošković Institute.

Wastewater may contain fission and activation products. In 2011 the activity of fission and activation products (excluding tritium H-3, carbon C-14 and alpha particle emitters) amounted to less than 0.03 percent of the additional annual limit of activity for liquid discharges. The activity of discharged tritium was approximately 8.2 percent of the prescribed annual limit. Tritium is a hydrogen isotope found in water and, in spite of being more active than other contaminants, it is less important due to its low radiotoxicity.

The plant observed technical norms which require that in any (although brief) discharge of such wastewater the concentration of radioactivity in the channel does not exceed the prescribed limits.

# Liquid radioactive discharges



#### Data on liquid radioactive discharges in 2011

radioactive substances	annual limit	percentage of the limit
fission and activation products	100 GBq	0.026%
Tritium (H-3)	45 TBq	8.200%

### Radioactive releases into the atmosphere

The annual dose limit of 50  $\mu$ Sv is checked for discharges into air and water monthly separately for air in a 500-meter distance from the reactor by calculating a dose that could have been received by a person at such distance in

one year due to external and internal radiation. The least favourable monthly average rarefaction values and releases near the ground are taken into account for individual wind directions. The result for 2011 was 1.2  $\mu$ Sv (2.4 percent of the annual limit). More detailed data is given in the table below.

#### Data on radioactive releases into the atmosphere in 2011

radioactive substances	total annual limit	dose	percentage of the limit
fission and activation gases (total)		0.0621 µSv	
lodine (I-131 and others)		Ο μSv	
dust particles (Cobalt, Caesium, etc.)	50 μSv	4.9E-06 µSv	2.4%
Tritium (H-3)		1.14 µSv	
Carbon (C-14)		0.005 µSv	

The plant's technical specifications were taken into account; therefore the current radioactive concentrations in the air/dose rate within a 500-metre distance from the reactor did not exceed the prescribed value.

### Measurements of the Sava river and groundwater

In accordance with the environmental permit concerning the water emissions (OVD) and partial water permit measurements of temperature, flow rate and oxygen concentration in the Sava river, and monthly measurements of biological and chemical oxygen consumption were carried out.

The increase in temperature of the Sava river water for cooling purposes during NPP's operation has never exceed the permitted limit of 3 °C.

Groundwater is regularly inspected by NPP who constantly measures the ground water level and temperature in three boreholes and two locations on the Sava river and, on a weekly basis, in ten boreholes in the Krško-Brežice fields. Due to low rate of precipitations in 2011 the groundwater level was lower than in previous years.

#### Data on radioactive waste and spent nuclear fuel

In 2011, 78 cases of radioactive waste were stored, with a volume of 34.7 cubic meters. In accordance with the accepted practice all compressible waste material is compressed in the super compactor on a regular basis as it is generated, while combustible waste is prepared for shipment to the external contractor for incineration. The total volume of radioactive waste in the interim storage on 31<sup>st</sup> December 2011 was 2,234.1 m<sup>3</sup>, while the total activity was 20.5 TBq.

The spent fuel storage pool contains 984 spent fuel elements from the previous 24 fuel cycles. The overall mass of spent fuel material is 402 tonnes.

#### Environmental management and communal waste

Since the end of 2008, NPP has had an ISO 14001 environmental management standard implemented. Since the certificate was granted, the system has been checked regularly on an annual basis by an external certification organisation. The 2011 recertification audit was carried out on 5<sup>th</sup> and 8<sup>th</sup> December. It was established that NPP suitably respects the environmental management system requirements, following which the validity of the certificate was extended for another period of three years.

In line with the environmental management system, waste separation practice was introduced. The volume of mixed communal waste was similar to that in the previous year; similarly, this was the case with the volume of collected separated waste.

A special waste water treatment plant is used for communal waste water. Measurements of pH, temperature, non-soluble substances, chemical and biological use of oxygen at the outlet are taken by an external organisation, which is in line with the OVD requirements. ENVIRONMENTAL IMPACT



NPP pays special attention to ensuring and checking the execution of regulations and standards for nuclear technology, as well as other modern technologies in project solutions (equipment upgrading), operation and maintenance activities, the purchasing process and other activities which contribute to safe plant operation and the safety of the population. We are committed to on-going improvement, professional work and personal growth. Our mission is performed through independent review, on-going improvement of human performance and safety culture, critical self-assessment of results achieved, constant comparison with the best comparable facilities in the world, by learning from both in-house and foreign operating experience, and on-going plant assessment in terms of plant operation safety and stability.

Due to its specific nature, NPP took an especially cautious stand towards the environment at an early stage of the project (extensive research concerning its location prior to a final decision, strict respect of standards during construction). During the plant start-up and its operation, independent monitoring of the effects on the environment was put into action (radioactive releases into water and emissions into the air, and nuclear fuel and hazardous waste management). A Protection and Rescue Plan (NZIR) for emergency events was prepared, detailing the organisation, measures and means of emergency management when there is a potential danger of radioactive effects on the environment. Care for the environment has always been a special concern of the plant's business policy. In order to assess and improve the NPP practices concerning the environment, the plant implemented the ISO 14001 standard, internationally the most widely recognised environmental management system.

One of the vital aspects of maintenance and safety improvement in the nuclear industry is respecting operating experience. In 2011, the nuclear accident at Fukushima Daiichi nuclear plant in Japan had a great impact on the entire nuclear industry. The plants in Fukushima withstood the earthquake well; however, the devastating effects were those of a tsunami not foreseen in the design of the plants. The management boards and the nuclear industry, therefore, initiated a number of actions to verify the resistance and abilities of nuclear facilities to withstand and control circumstances which are unlikely but still might happen and which would leave devastating results. Krško NPP had implemented some time before (in 2009) certain measures of the action plan which was made after the analysis of a commercial plane crash into the plant. In response to the events in Japan, certain short-term actions were prepared and implemented in NPP. In addition, a long-term plan of activities was made, which included certain additional improvements to the plant enabling a rapid connection of the mobile equipment which should provide sufficient cooling media and sources of energy to operate the vital parts of equipment in the event of a long-period loss of external sources of supply. Adequate modifications were carried out on the plant's systems to facilitate the connection of the new mobile equipment. Staff were properly trained. The plant's documentation, such as procedures and drawings, were revised.

MAINTAINING AND IMPROVING HIGH LEVELS OF NUCLEAR SAFETY



In November an operative exercise in the event of an emergency was carried out in NPP. Some external organisations took part in the exercise. It was carried out as a regular annual verification of NPP readiness in the event of an emergency in NPP. The main objective of the exercise was to verify suitability and harmonisation of the NPP's Protection and Rescue Plan (NZIR), operational and other procedures, organisation and expertise of the intervention teams and support institutions, as well as harmonisation of NPP's protection and rescue plan with the procedures in the event of an emergency by URSJV and external support institutions. Special emphasis was given to control strategies in the event of beyond-design-basis emergencies and the use of mobile equipment. This exercise proved the suitable readiness of NPP for such events and revealed areas where improvements are possible.

The legislation and international standards require that, from time to time (every ten years), the plants carry out a safety review and prepare a report which is to be submitted to a competent administrative body. The first such review in NPP had begun in 2001 and was competed by submitting the final report to URSJV in 2004. In 2011 the second periodic safety review of NPP was started. The legal basis for it is stipulated in the Ionising Radiation Protection and Nuclear Safety Act and the Rules on operational safety of radiation and nuclear facilities. The main objectives of these periodic safety reviews are to prove that the plant meets the requirements stipulated in the administrative permits and international safety standards, to demonstrate the suitability of the measures until the following such periodic review, and to compare the safety results with those of the previous safety review. The final report of the second periodic review must be submitted to the competent authority by the end of 2013.

In 2011 Krško NPP successfully prepared and implemented BS OHSAS 18001, the occupational health and safety management system. Following a successful internal audit, an external audit was carried out by a certification commission who issued NPP a BS OHSAS 18001 certificate. During the same period, the company successfully renewed its Environmental Management Standard ISO 14001.

Within a quarterly inter-laboratory chemical comparison study, the NPP's chemical laboratory, among 37 chemical laboratories at pressurized water reactor plants in the USA and Europe, again achieved the best agreement results with the prepared standards. The achievement is even greater, as this was the sixth such success within the last few years, which has not been repeated by any other chemical laboratory. This high accomplishment demonstrates a high quality level and reliability of measuring systems, which is of great importance in the process of valuation and adjustments of chemical and radio-chemical parameters.

#### Process auditing

Maintaining nuclear safety has been one of the priorities in every field of work in NPP. By

maintaining high levels of quality, the plant's systems and equipment are kept in operation in compliance with the design values; in this manner, different processes of the plant can be under independent surveillance, such as design changes, plant procedure revisions, spare parts and services purchasing, work order process and other processes. In addition, independent audits are carried out - plant processes auditing and verifications by external companies, contractors and equipment suppliers. The purpose of such verifications is to ensure independent assessments of processes and thus to maintain criteria defined in international standards concerning nuclear technology, including:

- Organisation
- Quality programme
- Internal processes (design, production, etc.)
- Records control
- Non-compliance control
- Training, etc.

There were eight audits concerning NPP's internal processes auditing in 2011, including environmental management, health and safety at work, safety culture, corrective programme and operating experience, operations, maintenance, radiation protection, chemical processes, security, etc.

Suppliers are audited by NPP's own staff or together with NUPIC, an international company who organises and carries out regular team audits at suppliers' premises. There were 24 independent audits in 2011 of external suppliers from Slovenia, Croatia, Germany, France and the USA. With the NUPIC organisation we took part in seven audits. The annual audit plan was thus successfully completed and at a larger scale than in previous years.

ity level of the plant.

The fundamental objective of observations is to identify deviations in the work processes and take relevant corrective actions, and to underline the desired standards. Achieving high standards of work processes in terms of their excellence is a complex task, necessitating time and on-going observations and simultaneous corrective acting. In order to ensure uniform observation, a special procedure has been prepared with instructions for the preparation, execution and observation results analysis.

More than 150 observations were carried out in NPP in 2011; these were performed both during plant operation and during the shutdown. All disciplines and work groups underwent the observation procedure in different organisational units and external contractors. The monitoring results analyses of the last few years showed that some work processes could be improved, in particular in the sphere of documentation and work preparation.

MAINTAINING

AND IMPROVING

HIGH LEVELS OF

NUCLEAR SAFETY

Following the second WANO Peer Review Followup, NPP demonstrated a considerable improvement in those areas where potential improvements were identified during the regular audit. Further up-grading of work processes remains one of our high priority tasks. Improvements have a direct impact on the safety and reliabil-

#### Observation

MAINTAINING AND IMPROVING HIGH LEVELS OF NUCLEAR SAFETY



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In 2011 NPP continued with the strategy, distinctive for nuclear power plants where continual investments in technological upgrading and modernisation are vital. In 2011 the nuclear industry was marked by accelerated modifications in order to ensure alternative methods of core cooling with mobile equipment in the event of a crash of a large commercial plane into the plant and due to the events at the Japanese Fukushima nuclear power plant. Following these events, internal audits had to be carried out, and these necessitated certain short-term measures to prevent and reduce the consequences of potential beyond-designbasis nuclear accidents. In line with the longterm investment plan, 54.2 million Euros was invested into technological upgrading. As there was no outage during the year, technological modernisations were performed as they could be completed with the plant in operation. Major such modernisations included:

Investments

#### AC power supply upgrading

This activity involved the upgrading of the plant's AC power supply by the provision of an alternative source in the event of SBO. The upgrading of the existing supply system included installation of a diesel generator set (DG3), of 4 MW (6.3 kV, 50 Hz, starting time less than 10 seconds), which will be connected through a new 6.3 kV busbar (MD3) with the safety busbars MD1 and MD2. To accommodate the

new diesel generator set, a new building was built approximately 20 meters away southwest from the present decontamination building. The building will protect the diesel generator set from potential project events including a plane crash in the vicinity or fuel spill over the platform. By the side of the DG3 building, a diesel fuel tank was dug in, whose capacity is sufficient for a 7-day operation of the diesel generator set at its rated power. To support its start and regulation, 125-Volt batteries with a charger will be placed in separate rooms. There will also be a 6.3 and 0.4 kV switches for the equipment installed in a separate room. As the third diesel generator set is a safety set, it can replace one of the existing ones.

The estimated effects of the AC power supply upgrading on the CDF are reduced by about 30 percent. The CDF due to internal events is reduced by approximately 40 percent and due to seismic events by approximately 52 percent.

The finishing construction work continued on the diesel generator set building. The fuel tank was purchased and built in. Contracts were concluded for assembly work. All main and auxiliary equipment was procured. The project documentation was prepared and the process for obtaining the necessary permissions and expert opinion was initiated. MAJOR TECHNOLOGICAL



### Reactor head replacement

Based on operating experience of the industry, reporting of corrosion problem on the reactor head penetrations, connected with the head material - Inconel 600, and in order to ensure safe operation of the plant until the end of its (extended) life span, the replacement of the reactor head was proposed. Better corrosion resistance materials and better manufacture procedures ensure a safe and reliable operation of the plant after its expected life span.

The proposed replacement was due to several reasons, including:

- a) events in nuclear power plants globally;
- b) administrative measures after annual reactor head ISI inspection;
- c) inconel 600 material sensitivity to stress corrosion cracking (PWSCC);
- d) the fact that 15% of the head inspections scope cannot be carried out;
- e) the fact that head replacement in a package means modernisation of the control rod drive mechanism and instrumentation systems which are beginning to show signs of damage;
  f) the fact that modification may mean shorter outages, smaller doses received by the staff and safer work, and

g) potential reduction of maintenance and ISI-costs.

The modification in 2012 will improve the operational safety of NPP, which means lessened risk of fault or forced shutdown, considerably shorter time for the head ISI or its removal and adjustment. This will result in a lower radioactive exposure of staff. The faster removal and adjustment is due to certain new head design solutions, including integrated cooling lines, radioactive shields, lifting attachment and cable panels. The control rod drive mechanism will be replaced, which is advantageous also from the point of view of time optimisation of the new reactor head installation. During the modification package designing, analyses and drawings were prepared. The reactor head penetration with relevant control rod guide attachments and other attachments took place in the Spanish ENSA facility, while the reactor head upgrading with ventilations systems, reactor shields and shields to prevent control assembly ejection took place in the USA.

#### Main generator rotor replacement

NPP decided to replace the main generator rotor based on recognition that the generator was designed and generator components built on the 30 year life span assumption, under normal conditions and operational reliability. Due to the plant's life span extension to 60 years, it is necessary to determine which of the components will not meet these requirements and should be replaced. The expected life span of the main rotor parts is between 20 to 60 years. Several independent electrical measurements were carried out during the 2011 outage on the main generator rotor winding, which confirmed the presence of inter-turn shorts on one of the four rotor poles. This results in an uneven temperature and magnetic stress of the equipment - pole dis-balance. The dis-balance measured in NPP was 4.5 percent. The history of the Westinghouse fleet of large 4-pole generators demonstrates a relatively low level of risk for operating at 4-5 percent pole dis-balance. Quite a few nuclear power plants decided to operate during one or two fuel cycles with inter-turn shorts present. Although NPP made the same decision, the generator manufacturer recommends that the fault be rectified during the first longer generator shutdown; until then certain limitations must be respected during operation. In 2011 the following activities took place: preparation and forged piece processing, rotor sub-components manufacture, rotor assembling and testing during the assembly, project documentation preparation and approval, and quality control of all components manufacture.

MAJOR

TECHNOLOGICAL

MODERNISATION



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#### Fire alarming system modernisation

The replacement of conventional alarming system (smoke, thermal and manual) is planned to be replaced with an addressable one and the installation of addressable modules for activating spraying and flooding systems. In addition, the intelligent fire station is planned to be extended to several sub-stations and an extension of the detection system to the entire technological part of the plant, including DB.

Certain actions will have to be undertaken within the framework of this project to protect the equipment, as required by the American NRC and as required by URSJV some years ago.

The modification is needed to improve the capability of locating potential fire, to improve the reliability of the systems and remove difficulties related to old equipment (unavailability of spare parts in the market). In 2011 a part of the detection system was installed in the turbine building, essential service water building and transformer stations; in addition, the detection system above busbars M1 and M2 was replaced and tested. The System 3 loop was disconnected and new detectors were installed on the new FP station. Three new FP stations and graphic inspection PC stations were installed in the main control room and fire department.

#### Analysis and investments with regard to the second 10-year safety review

Pursuant to the provisions stipulated in the Ionising Radiation Protection and Nuclear Safety Act and in line with the URSJV ruling of 15th May 2010, NPP began with the second periodic safety review (PSR), which has to be completed by 15 December 2013. This set of activities includes programme preparation, to be prepared by NPP and harmonised with URSJV. On the basis of the approved programme, NPP is, either by own staff or by external contractors, to carry out analyses to be documented in periodic reports for individual safety indicators, this will be followed by prioritisation and action plan preparation. In 2011 the contractors prepared certain work reports. Intensive plant walk-downs were performed and interviews were conducted with responsible individuals for relevant areas. Some working reports were submitted in December, while the others are expected to be completed at the beginning of 2012.

#### Investments to improve flood safety

On the basis of the latest newly determined probable maximum flood (PMF) and using the hybrid hydraulic model, the height of the flood around NPP has been determined. The newly determined height is a new input data for raising the existing anti-flood protection.

In 2011 we, therefore, started with the reconstruction work to raise the present embankments, and as no interventions were allowed into water life, the embankments were extended to the land away from the river bed. The embankment sections along the Sava river and the Potočnica stream had already been built. In the section where the road joins the embankment, building work was started. Eighty percent of the embankment was finished, while its third section in the area of the future Krško ring road is planned to be finished in the first half of 2012.

#### The replacement of the portal crane on the dam

The 750 kg portal crane on the dam is out-ofdate and overused (out-of-date control system, overuse due to environmental effects, crane reliability and safety are at the lower limit of acceptability). Maintenance has become difficult due to spare part purchasing, and maintenance work expensive and demanding.

A decision was taken about the purchase of a new crane which could remove heavy objects (logs) from the Sava river. The present crane was not designed for removing heavy loads as this does not allow the load control on the handle (there is no precise data to read actual load on the hook), which could lead to crane overload resulting in destabilisation and potential turn-over. The Safety at Work Institute advised against such reconstruction.

To solve the problem of occasional removal of logs from the Sava river, a hydraulic log grabber could be used placed near the dam. Such a solution was suggested in the document entitled "The study of optimisation of the tertiary cycle CW treatment system in NPP".

new one.

MAJOR TECHNOLOGICAL MODERNISATION

In 2011 the hydraulic machine was procured and placed at its position for removing heavy loads (logs) from the water. In order to finalise the modification, the old overused crane on the dam structure will have to be replaced with a

MAJOR TECHNOLOGICAL MODERNISATION

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#### Mobile AC power supply sources and pertaining equipment

In accordance with the recommendations of the industry and in line with the American NRC, NPP started with accelerated modifications following the requirements to find solutions to ensure alternative nuclear core cooling methods with mobile equipment in the event of a crash of a large commercial plane into the plant. The modifications are also due to the events in the Japanese power plant at Fukushima. After the completion of the analyses and based on the findings of internal EOP and SAMG review, the decision was made to purchase two mobile sources of AC electric power supply - two diesel generator sets with all necessary equipment for its independent and autonomous operation for a period not less than seven days. A smaller unit, of 1,000 kVA/0.4 kV will provide an additional source of supply for the safety batteries charger and the positive displacement pump

MAJOR TECHNOLOGICAL MODERNISATION for the supply of sealing water to the reactor pumps. A larger unit, a 2,000 kVA/6.3 kV set, will serve as an additional supply source for the SW pump, and for the component cooling and spent fuel pit pump (CC). Both power generating sets are mobile (portable cabin on a trailer) and include additional equipment to support independent and autonomous operation (controls, cooling, fuel tank, transformer, distribution box, connection cables, etc.). In addition, three 150 kVA diesel power generating sets were purchased to supply emergency equipment at the 400-Volt level.

#### Mobile pumps for steam generator and containment water supply

In the event of a beyond-design-basis accident a complete loss of power could occur, so that the only source of power would be the turbinedriven auxiliary feed (TDAF) pump. If this were to fail, another alternative source would have to be found for water transportation into the steam generators and containment. The pumps would need to be capable of pumping the water from the existing tanks, the Sava river and other available sources. To ensure the water supply to the steam generators and containment flooding, a pump is needed which could overcome the pressure in the steam generators, thus its capacity should be 56 m<sup>3</sup>/h at 13.8 bar.

In order to supply water by pumping, suitable submersible pumps have been purchased, with the capacity of 1000 I/min (60 m<sup>3</sup>/h). These submersible pumps can also be used for other purposes, such as for pumping water out from flooded areas, water supply for spent fuel pit cooling and fire fighting. In the second half of 2011 an additional fire fighting pump was purchased of a higher capacity (HS-450).

To assist the pump transportation, a vehicle was purchased thus enabling access to more difficult locations, such as the Sava river. In addition, the other necessary supporting equipment, such as connectors, hoses, handles, etc.

were procured.



MAJOR TECHNOLOGICAL MODERNISATION



Appropriate inspection, maintenance and upgrading ensure the operational readiness of equipment. Maintenance falls into the categories of preventive maintenance, carried out at specific intervals defined in programmes, predictive maintenance, which is used for establishing the status of equipment (diagnostics), and corrective maintenance, related primarily to equipment not crucial to the availability and safety of the power plant. The mechanical maintenance was carried out as outlined in the preventive maintenance programmes. The main activities included overhaul of various pumps, compressors, valves and other components. There were no major corrective actions.

During corrective measures on important equipment, which is included in the preventive maintenance programme, a detailed root cause analysis is carried out and if necessary the preventive maintenance programme is revised accordingly.

The maintenance activities were carried out mainly during plant operations in accordance with the preventive maintenance plan. There were also some corrective actions - the majority of these during plant operating, while some were completed during the unplanned shutdown. The major maintenance activities are summarised below. MAJOR MAINTENANCE ACTIVITIES AND INSPECTION OF

**PRESSURE BOUNDARIES** 







The instrumentation maintenance staff carried out regular surveillance tests of automatic reactor protection instruments and the radiological control system. As there was no outage, the instrumentation gauging and preventive maintenance activities were performed during the plant operations.

The predictive maintenance included determining the equipment condition on the basis of various techniques not part of primary maintenance - thermovision inspection, vibration inspection of major rotating components, and oil inspection.

There was no regular outage in 2011, therefore the component integrity inspection programme activities which are at the boundaries of the primary system by means of a non-destructive method, were carried out to a limited degree. There were no deviations. Within the scope of the secondary system components inspection programme due to erosion and corrosion effects, no condition was detected which would necessitate major corrective measures.



MAJOR MAINTENANCE ACTIVITIES AND INSPECTION OF PRESSURE BOUNDARIES







MAJOR MAINTENANCE ACTIVITIES AND INSPECTION OF PRESSURE BOUNDARIES





#### The NPP's 2011 total output at the generator outlet was 6 214 748.00 MWh of gross electricity or 5 902 238.80 MWh of net electricity. The planned output was 5 900 000 MWh; the actual annual output was slightly higher than the planned figure. The availability factor was 89.18 percent, while the capacity factor was 99.20 percent. There was no plant outage in 2011.

On 23<sup>rd</sup> March 2011 at 10:29, the operation of the 400 kV busbar G2 protection which is managed by ELES, resulted in automatic disconnection of all circuit breakers connected to this busbar as well as the NPP's main generator. This caused the plant to be cut off from the network and its shutdown; re-synchronisation was established after 6.69 days. There were no other unplanned shutdowns and no major reductions in the plant's power during the year.







WANO performance indicators demonstrate that the majority of our targets for 2011 were achieved.





### Nuclear fuel and secondary chemistry system

In 2011, the specific activity of the primary coolant and its contamination were below the required levels. The fuel reliability indicator for 2011 was exceptionally good (6.21E-06 Ci/m<sup>3</sup>) and proves that the nuclear fuel was during operation reliable and without major damage.

## Unplanned automatic reactor shutdowns at 7000 hours criticality

0.00	0.00	0.81	— 2
			- 1
2009	2010	2011	— 0 (Number of
NEK targ	et for 201	1: ≤ 1	unplanned automatic reactor shutdowns)

39



PERFORMANCE







#### Service and equipment purchasing

manner.

To support successful operations and plant modernisation, the necessary services and goods were purchased during the year in a timely manner, correctly and in accordance with the requirements set by internal purchase orders, company's internal rules and legal regulations.

On the basis of self-assessment of the purchasing process the plan of action was structured to improve the situation. It was finished with the central receipt of goods in NPP.

#### Fuel reliability indicator



PERFORMANCE

Low input and aggressive electrolytes and consequently limit-value deposition in the secondary cycle demonstrate a good WANO secondary chemistry performance indicator, which in 2011 again reached the targets set. This was due to effective prevention of chemical contaminants input by suitable monitoring, efficient treatment systems and a good secondary system chemical programme. The concentration of free iron during the stable operation of the plant was below targeted WANO values.

# Secondary chemistry performance indicator



We duly reported in accordance with our obliga-

tion under European nuclear legislation, such as requesting certificates, recording data and reporting about purchases within the EU; the reports were submitted regularly and in a timely PERFORMANCE

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### Experience of others – guidance for our work

At NPP we are aware of the importance of joining international organisations and the international control of our operations. It is the only way to achieve internationally comparable operating and safety results.

#### WANO

All nuclear facilities in the world are members of the World Association of Nuclear Operators (WANO). NPP has been a member of this organisation since its establishment in 1989. Its aim is to promote the highest standards of operational safety, availability and excellence of nuclear power plants. WANO supports several programmes for sharing information and the promotion of communication, mutual comparison and copying of best practice and solutions among its members.

#### INPO

From as early as 1988 NPP has been a member of the Institute of Nuclear Power Operations (INPO) in the USA. Its primary objective is to increase the level of nuclear power plant safety and reliability. All American nuclear plants and/or their operators are INPO members. Its membership extends both to nuclear operating organizations in other countries, as well as to the manufacturers and designers of nuclear facilities. The International Atomic Energy Agency (IAEA) is an independent intergovernmental organisation which operates within the United Nations Organisation. Its primary objective is to help members in planning and using nuclear technology for various peaceful purposes. These include electricity generation as well as technology and/or know-how transfer in this field. The IAEA develops safety standards that promote achievement of a high level of safety in the use of nuclear energy and in protection of the population from ionising radiation. The organisation operates on the basis of various programmes such as control over nuclear material, nuclear technology application, nuclear energy, nuclear safety and technical cooperation. As part of these programmes, the IAEA organises OSART (Operational Safety Review Team) missions which involve visiting power plants in order to inspect and assess their operational safety.

For over ten years, NPP has been a member of the NUMEX organisation (Nuclear Maintenance Experience Exchange) engaged in the exchange of experience in the sphere of nuclear power plant maintenance.

#### IAEA

#### NUMEX



#### EPRI

EPRI (Electrical Power Research Institute) is a non-profit and independent organisation for research in the area of electricity production and environment protection. It was established in 1973 in support of the development of the electrical industry. The Institute currently covers all aspects of production, transmission and use of electricity.

#### NRC

The NRC (Nuclear Regulatory Commission) is an independent agency in the USA in charge of safety and protection of the population against the effects of radiation from nuclear material, reactors and facilities for processing nuclear material. Together with the Slovenian Nuclear Safety Administration (URSJV) and the Jožef Stefan Institute (IJS), NPP is a member of a number of programmes which give access to information and literature on various relevant fields.

#### PWROG

PWROG (Pressurized Water Reactor Owners Group) is the association of all the pressurized water reactor (PWR) operators and Westinghouse. It offers various programmes related to improved equipment, optimisation of technical specifications, reduced number of unplanned shutdowns, increased power of the plant, simplification of the plant systems, the manufacture and use of nuclear fuel, analyses by contemporary programmes and analytical methods, etc.

#### ISOE

ISOE (Information System on Occupational Exposure) works within the joint Secretariat of OECD - Nuclear Energy Agency and IAEA as a forum for specialists in radiation from nuclear plants and administrative authorities and coordinates cooperation in the field of the protection of people employed by nuclear power plants.

#### NPP activities in 2011

The President of the NPP Management Board is a Supervisory Board member of the WANO Paris Centre, made up of representatives of all member countries of the Centre. At its regular biennial general meeting of WANO organisation, this time held in China, our President, Mr. Stanislav Rožman received a special recognition award for a long-term exceptional contribution to promotion of excellence in safe operation of nuclear plants.

We have had a representative in the WANO Paris Centre since 2004. In 2011 our representative held the function of process improvements.

NPP has had an active part in WANO and INPO for several years now. We have had three missions of WANO Peer Review so far, while our representatives took part in 34 such missions world-wide. NPP representatives took an active part in the international specialist inspections of plant operation (WANO Peer Review mission) in: Beznau, Switzerland, in the field of plant operations; Asco, Spain, in the field of plant management; and St Laurent, France, in the field of design changes.

In April 2011 there was the second WANO Peer Review Follow-up of the plant operation when WANO checked and assessed the implementation of recommendations following the third Peer Review.

Within the framework of Technical Assistance Missions, NPP received 29 such missions covering all activities of the plant. Two of our experts took part in the mission in Sizewell B, Great Britain, in the field of maintenance efficiency, and Doel, Belgium, in the field of procurement of equipment with special requirements.

Our representatives regularly take part in specialist training programmes organised by these organisations.

As part of our cooperation with IAEA, we have organised three OSART and some other missions. Our specialists have taken part in 16 such missions world-wide. In 2011 one of them participated in one such mission in Dukovany in the Czech Republic. IAEA's inspectors, who safeguard nuclear fuel, are our regular visitors.

NPP takes an active part in some major areas of the EPRI Institute, including:

- cation Centre),
  - Engineering),
- - Group).
  - Group).

Our plant participated in the PWROG annual conferences, which are specially organised for nuclear power plants in European countries. Furthermore, as a member of NUMEX, NPP took an active part in the exchange of information in the field of maintenance.

INTERNATIONAL

COOPERATION



 equipment maintenance in nuclear power plants (NMAC - Nuclear Maintenance Appli-

• improvement, procurement and qualification of equipment (PSE - Plant Support

non-destructive testing and researches (NDE – Non-Destructive Examination),

 exchange of experience in application of programmes for accident analysis (MAAP - Modular Accident Analyses Program User

 exchange of information in the field of erosion/corrosion - CHUG (Checworks Users INTERNATIONAL COOPERATION



# 7

Professional training was carried out to ensure that training programmes were well prepared and executed, thus contributing to a high degree of personnel expertise, subsequently resulting in a higher level of safety and reliability of the power plant operation in line with its goals and policy.

These programmes were largely prepared and executed in-house and partly in collaboration with external institutions, both national and foreign.

Annual plan and training needs as established and prepared together with heads of individual organisational units of the power plant, were the basis for preparation and execution of individual courses.

# Training of operating personnel

Professional training courses for operating personnel were prepared and carried out taking into account relevant legal regulations, internal procedures and the two-year plan. The initial training of licensed operators continued according to the programme; this included the completion of internal training of eight new reactor operators. All were successful at the exams and obtained the first reactor operator licence awarded by an expert examination commission, appointed by URSJV.

At the same time, initial training of 11 candidates was started, after having completed successfully the first training phase - Theoretical Basis - in April 2011, and then started the second phase - Systems and Plant Operation; this training stage entails, in addition to lectures, practical exercises on the simulator and handson training within the technological part of the plant. Ten candidates successfully completed the first stage and in the second phase training they were joined by a candidate from ICJT and two NPP candidates upon their own request to upgrade their knowledge in the area of plant operation. The total number of second phase training candidates - Systems and Plant Operation, was 13 candidates.

In November, the training of the next generation of 11 operators and newly employed graduate engineers was started in collaboration with the Training Centre for Nuclear Technology (ICJT).

# TRAINING





On-going professional training of licensed personnel was conducted in accordance with the approved outline programme and NPP internal procedures. The training was conducted through classes and simulator scenarios, during four weekly segments, attended by all operations crews and other licensed personnel.

In the final annual session, 21 candidates successfully passed tests for licence renewal, of which eight were for reactor operator, four for senior reactor operator, and three for shift engineer. Six candidates successfully passed the exams for the first award of senior reactor operator.

The on-going professional training for equipment operators was conducted in parallel with the training for licensed personnel, in four weekly training sessions. The programme focused on hands-on training by using system operation procedures in the technological building or in the classroom which was actively linked with the full-scope simulator. Other training was rendered aimed at refreshing and upgrading existing knowledge and skills which equipment operators need in their day-to-day work.

Three groups of operating personnel attended four-day practical training, which included refuelling which was aimed at preparing all participants for safe and first-class performance of this important refuelling activity. Prior to refuelling, as the practice was in the past years, training was conducted for staff connected with refuelling activities; the training was attended by personnel from different departments, while in-house refreshing training for staff taking part in the refuelling activities is to take place in 2012.

Operating personnel underwent training on the full-scope simulator prior to major activities in the facility. All major modifications which affect the operation and response of the plant were simulated on the simulator.

#### Training for personnel in maintenance and other support functions

The professional training of technical personnel included courses whose aim was for candidates to acquire or refresh the legally required general and specialist skills needed for performing maintenance and supporting functions.

Within the framework of initial training for technical personnel, a course in the fundamentals of nuclear power plant technology (OTJE) was carried out. In line with regular practice, the course was conducted in collaboration with the Training Centre for Nuclear Technology (ICJT). The OTJE courses are conducted in two parts in the first part theoretical fundamentals are covered, while the second part focuses on systems and operations of the power plant. A total of 39 NPP staff attended this training in 2011. Training of maintenance personnel continued in 2011 with the programmes of specialist and legally required training, which were prepared on the basis of matrices of required qualifications. Some courses were conducted in the Maintenance Personnel Training Centre in NPP and in NPP technological units, and partly in cooperation with external institutions. The training was conducted, as the practice has become, by engaging, at the training preparation and execution stage, in addition to our own training staff, mentors of practical training from individual Maintenance departments.

Within the scope of on-going training of maintenance personnel, two training segments were carried out to support the refresher training programme on the subject of general and legally required areas. The maintenance personnel were updated on the new aspects of plant processes and operational experience. Part of the training was dedicated to specialist subjects. We continued with the implementation of established programmes of initial and refresher courses related to legally prescribed skills, such as health and safety at work, fire protection, hazardous substances, protection and rescue plan (NZIR), etc.

Initial and refresher training in radiation protection was continued according to legal requirements.

Furthermore an extensive NZIR drill was conducted, supported by the full-scope simulator.

In addition, other courses were carried out for other departments within the power plant, intended to update the staff on new legislation, and introduce innovations in the area of production processes; we also continued with general courses in the areas of computer literacy and foreign languages.

An extensive general programme of courses was conducted for external contractors: the general employee training programme, the programme related to radiation protection (Radiation Protection 2, Radiation Protection 3), and training for work group leaders.

TRAINING



#### Other legally prescribed and general training

TRAINING

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# 8

In accordance with the Companies Act (ZGD-1) and the Articles of Association of NPP, a summary of the NPP Report for 2011 is given below. The summary includes the main characteristics of business operations in 2011 and consolidated fundamental financial statements. The full versions of fundamental financial statements are presented in the NPP Annual Report for 2011 prepared in accordance with the Agreement concluded between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on regulating the status and other legal issues related to investments in Krško Nuclear Power Plant, its utilisation and decommissioning (Intergovernmental Agreement], the Articles of Association of NPP, the Companies Act (ZGD-1) and Slovenian Accounting Standards (SAS).

The Annual Report of NPP for 2011 was submitted to the organisation authorised to process and publish the data the first working day after it had been accepted at NPP's General Meeting, and is published on its website. In 2011 faced with the economic crisis, the company performed successfully. In spite of the automatic shutdown at the end of March, our two partners were supplied with 5,902 GWh of electricity, which is 2 GWh more than planned.

The 5,902 GWh revenue amounted to a total of €199,992 thousand. The majority of this revenue was generated from electricity supplied to the partners, while the remaining amount of the operating revenue was other business and financial revenue.

Due to the nature of production, our stocks demonstrate neither unfinished production nor semi-products nor finished products; therefore, our costs are our expenses. In 2011 our expenses amounted to a total of €199,992 thousand.

The structure of expenses is illustrated in the graph below.

SUMMARY OF THE 2011 FINANCIAL STATEMENTS

# Structure of expenses in 2011



expenses.

The largest portions in the structure of expenses are represented by the cost of depreciation, the cost of nuclear fuel, the cost of material and services, and the cost of labour, amounting to a total of 92 percent of all expenses.

Major investments were made in technological upgrading, while some expenses represent minor investments. The long-term debt was reduced in accordance with the plan. Two repayments of the loan taken for plant modernisation were made in 2011 out of depreciation funds generated. The long-term loan taken for Attachment 3 to the Intergovernmental Agreement was repaid in full.

The average stock value was lower than planned.

The financial position of NPP is satisfactory. Long-term resources cover all long-term assets and also the majority of inventories. Business results are demonstrated in the consolidated fundamental financial statements. These should be interpreted together with notes detailed in the NPP Annual Report 2011 which is published on AJPES (Agency of the Republic of Slovenia for Public Legal Records and Related Services) website (www.ajpes.si).



KPING

#### Auditor's Report for Public Reporting Purposes

We have audited the financial statements of the company Nuklearna elektrarna Krško d.o.o. and the related notes for the financial year ended 31 December 2011, in accordance with International Standards on Auditing, on which the summaries of financial statements are based. In our report dated 23 March 2012, we have issued the opinion that the financial statements and the related notes on which the summaries of financial statements are based, give a true and fair view of the financial position of the Company as of 31 December 2011, the results of its operations, its cash flows for the year then ended in conformity with the International Contract entered into between the Republic of Croatia and the Republic of Slovenia, and in conformity with Slovenian Accounting Standards issued by Slovenian Institute of Auditors.

In our opinion, the attached summaries of the financial statements comply, in all material aspects, with the financial statements from which they originate.

For a better understanding of the financial situation of the Company as of 31 December 2011, the results of its operations, its cash flows for the year then ended, and the scope of our audit, it is necessary to read the summaries of the financial statements together with the financial statements from which they originate and with our Auditor's Report on these financial statements

> **KPMG SLOVENIJA**, podjetje za revidiranje, d.o.o.

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Tomaž Mahnič, B.Sc.Ec ACCA, Certified Auditor

Marjan Mahnič, B.Sc.Ec Certified Auditor Partner

KPMG Slovenija, d.o.o.

Ljubljana, 23 March 2012

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SUMMARY

FINANCIAL

OF THE 2011

STATEMENTS

#### on financial statements to be published for public use

SUMMARY OF THE 2011 FINANCIAL **STATEMENTS** 

# Balance sheet as at 31 December 2011

		in thousand EUR
Balance sheet	31/12/2011	31/12/2010
Assets		
A. Long-term assets	402 286	419 090
Tangible fixed assets	401 540	418 279
Investment property	556	590
Long-term financial investments	190	221
Long-term operating receivables	-	-
B. Current assets	110 199	96 991
Inventories	79 390	67 077
Short-term financial investments	1,187	11 282
Short-term operating receivables	29 610	18 622
Cash	12	10
C. Short-term deferred expenses and accrued revenue	165	248
Total assets	512 650	516 329
Off-balance sheet assets	12 026	10 228

			in thousand EUR
Ba	lance sheet Equity and liabilities	31/12/2011	31/12/2010
A.	Equity	439 515	439 515
	Called-up capital	353 545	353 545
	Revenue reserves	88 675	88 675
	Retained earnings	(2 705)	(2705)
	Net profit or loss for the financial year	_	-
B.	Provisions and long-term accrued costs and deferred re-	venue 6211	4 744
	Provisions for jubilee benefits and termination benefits	5 467	3 924
	Other provisions	744	820
C.	Long-term liabilities	10 224	16 890
	Long-term financial liabilities to banks	9 960	16 603
	Long-term operating liabilities	264	287
Č.	Short-term liabilities	56 524	55 074
	Short-term financial liabilities to banks	21 643	29 598
	Short-term operating liabilities	34 881	25 476
D.	Short-term accrued costs and deferred revenue	176	106
E.	Total equity and liabilities	512 650	516 329
	Off-balance sheet liabilities	12 026	10 228

#### Income statement

#### I. Operating revenue

- II. Operating expenses
- III. Operating profit or loss from operations (I II)
- IV. Financial revenue
- V. Financial expenses
- VI. Operating profit or loss from financing (IV V)
- VII. Operating profit or loss for the period (III + VI)
- VIII. Corporate income tax
- IX. Net operating profit or loss for the period (VII VIII)

#### Cash flow statement

I.	Cash flows from operating activities
1.	Cash receipts from operating activities
2.	Cash disbursements from operating activities
3.	Net cash from operating activities $(1-2)$
II.	Cash flows from investing activities
1.	Cash receipts from investing activities
2.	Cash disbursements from investing activities
3.	Net cash from investing activities $(1 - 2)$
III.	Cash flow from financing activities
1.	Cash receipts from financing activities
2.	Cash disbursements from financing activities
3.	Net cash from financing activities $(1-2)$
IV.	Closing balance of cash (VI + V)
V.	Net cash inflow or outflow for the period
	+
	Opening balance of cash

SUMMARY OF THE 2011 FINANCIAL STATEMENTS

#### Income statement for the year ended 31 December 2011

	in thousand EUR
2011	2010
199 634	164 462
198 827	164 052
807	410
357	489
1 164	899
(807)	(410)
0	0
0	0
0	0

# Cash flow statement for the year ended 31 December 2011

2011	in thousand EUR 2010
217 920	174 603
152 139	132 192
65 781	42 411
10 259	81
60 674	48 176
(50 415)	(48 095)
90 680	75 360
106 044	69 678
(15 364)	5 682
12	10
2	(2)
10	12

SUMMARY OF THE 2011 FINANCIAL STATEMENTS



# Statement of changes in equity for the years 2011 and 2010

Equity components	Called-up capital		Profit reserves		Retained net profit/loss	Net profit or loss for the financial year	
	Called-up capital	Legal reserves	Statutory reserves	Retained net profit	Retained net loss	Net profit	
Opening balance - 1/1/2011	353 545	35 354	53 321	-	(2 705)	_	
Changes in equity capital - increase	-	_	_	-	_	_	
Changes in equity capital - decrease Allocation of net income as equity capi	_ tal	_	_	_	_	_	
elements as per decisions of Managem and Supervisory Boards	ient –	-	_	_	-	-	
Closing balance - 31/12/2011	353 545	35 354	53 321	-	(2 705)	_	
Opening balance - 1/1/2010	353 545	35 354	53 321	-	(2 705)	_	
Changes in equity capital - increase	-	_	_	_	-	_	
Transfer of net financial result of financial year	-	_	-	-	_	-	
Changes within equity capital Allocation of net income as equity capi	tal	_	-	-	_	-	
elements as per decisions of Managem and Supervisory Boards	ient –	_	_	_	_	_	
Closing balance - 31/12/2010	353 545	35 354	53 321	-	(2 705)	-	

SUMMARY OF THE 2011 FINANCIAL STATEMENTS



in thousand EUR

Total equity

439 515

439 515

439 515

439 515

SUMMARY OF THE 2011 FINANCIAL STATEMENTS

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In accordance with the intergovernmental agreement concluded between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on regulating the status and other legal issues related to investments in the Krško Nuclear Power Plant, its utilisation and decommissioning, and the Articles of Association, both having entered into force on 11<sup>th</sup> March 2003, NPP is organised as a limited liability company. The bodies of the company, having parity membership, are the General Assembly, the Supervisory Board and the Management Board.

The equity capital of NPP is divided into two equal business shares owned by the members GEN energija, d. o. o., Krško and Hrvatska elektroprivreda d. d., Zagreb. NPP generates for and supplies electricity exclusively to the members; it is their right and obligation to take 50 percent of the total available capacity and net electric power.

NPP's suitable organisation and competent staff who are committed to maintain the high safety culture, business ethics and NPP's targets, make a significant contribution to its safe and reliable operation. The personnel understand their responsibilities, thus ensuring professional execution of work processes.

Year 2011 was another year of high organisational and staff stability. All staff were offered personal and professional development coupled with systematic training and planned transfer of knowledge and experience.

#### With competent staff to the new decade of operation



The process of increased recruitment due to the retirement of older and experienced staff was very intensive in 2011; a total of 42 new employees joined the company. By the end of the year the number of all employees was 623. The annual number of leavers was lower than in the previous years, amounting to only 1.6 percent.

The educational level remained at a very high level; half of all employees have obtained university education, while the number of those with higher and less is gradually falling. There are five individuals with a doctor's degree and twelve masters of science.

The company is maintaining a 14 percent of female staff. In spite of their lower percentage figure, they are included into work processes in both non-technological and technological part of the plant. They are holders of important positions enjoying equality in their professionalism at work. The long-term provision of human resources of specific technical profiles in deficit is partly eased by granting scholarships, the practice in the last years. In 2011, we granted additional eight scholarships to students of the Bologna second degree studies in technical profiles in deficit.

We are aware that in order to achieve high business and strategic targets, we need competent and enthusiastic staff featuring not only suitable knowledge and expertise but also high values, motives and personal qualities.

The NPP organisational structure reflects contemporary standards of nuclear facility operators. Special attention is paid to the strengthening of vital functions of the organisation and to enhanced quality and efficiency of employees.



COMPANY

ORGANISATION



# 10

BS OHSAS	British Standard – International Occupational Health and Safety	NUPIC	Nuclear Procurement Issues Committee
СС	Management Standard Component Cooling	NZIR	Načrt zaščite in reševanja / Protection and Rescue Plan
CDF CHUG	Core Damage Frequency Checworks Users Group	OECD	Organisation for Economic Co-operation and Development
CW	Circulating Water System	OSART	Operational Safety and Review Team
ČD	Čisti dobiček / Net profit	OTJE	Osnove tehnologije jedrskih elektrarn /
ELES	Elektro – Slovenija		Fundamentals of Núclear Power Plant Technology
ENSREG	European Nuclear Safety Regulators Group	OVD	Okoljevarstveno dovoljenje / Environmental Permit
EOP	Emergency Operating Procedures	PMF	Probable Maximum Flood
EPRI	Electrical Power Research Institute	PSE	Plant Support Engineering
FP	Fire Protection	PSR	Periodic Safety Review
IAEA	International Atomic Energy Agency	PWROG	Pressurized Water Reactor Owners
ICJT	Izobraževalni center za jedrsko	1 11100	Group
	tehnologijo / Training Centre for Nuclear Technology	PWSCC	Primary Water Stress Corrosion Cracking
IJS	Institut Jožef Stefan / Jožef Stefan Institute	SAMG	Severe Accident Management Guidelines
INPO	Institute for Nuclear Power Operations	SBO	Station Blackout
1&C	Instrumentation and Control	SRS	Slovenski računovodski standardi /
ISI	In-Service Inspection	0110	Slovenian Accounting Standards
ISO	International Organisation for	SW	Service Water
	Standardization	TD AF	Turbine-Driven Auxiliary Feedwater
ISOE	Information System on Occupational Exposure	URSJV	Uprava Republike Slovenije za jedrsko varnost / Slovenian Nuclear Safety
MAAP	Modelar Accident Analyses Program		Administration
NDE	Non-Destructive Examination	WANO	World Association of Nuclear Operators
NEK	Nuklearna elektrarna Krško / Krško Nuclear Power Plant – Krško NPP	ZGD	Zakon o gospodarskih družbah / Companies Act
NMAC	Nuclear Maintenance Applications Center	ZVISJV	Zakon o varstvu pred ionizirajočimi sevanji in jedrski varnosti / Act on
NRC	Nuclear Regulatory Commission		Protection Against Ionising Radiation
NUMEX	Nuclear Maintenance Experience Exchange		and Nuclear Safety

- clear Procurement Issues
- črt zaščite in reševanja / Protection d Rescue Plan
- nmittee

- bine-Driven Auxiliary Feedwater
- rava Republike Slovenije za jedrsko rnost / Slovenian Nuclear Safety ministration
- Id Association of Nuclear Operators on o gospodarskih družbah / npanies Act
- kon o varstvu pred ionizirajočimi vanji in jedrski varnosti / Act on otection Against Ionising Radiation d Nuclear Safety