

KRŠKO NPP

I.1. REFUELING OUTAGE 2010

Refueling outage of the Krško NPP took place from 30 September to 5 November 2010. During the outage the equipment status was checked and some of it was upgraded. Also the preventive maintenance programme was implemented. No unexpected major degradation of the equipment during the operation was found. In the reactor core, 56 new fuel elements and 33 new control rods were inserted.

39 modifications were implemented. The most important are: main generator stator replacement, overwelding of pressure surge line, replacement of seismic instrumentation, installation of additional ex-vessel neutron dosimetry, replacement of polar crane hook, replacement of 125 VDC batteries and replacement of reactor coolant pump motor.

The most important works done in the field of preventive maintenance were monitoring and refurbishment of secondary pipelines and replacing equipment, pumps, motor drives and valves, as demanded by the ageing management program. The following activities influenced duration of the outage: debris in the reactor vessel, preventive maintenance of motor-driven auxiliary feedwater pump, leak test of the main generator and problems during generator ventilation test. Major contribution to the final extension of the outage duration was contributed by overheating of main turbine bearing during final acceptance test.

I.2. THE KRŠKO NPP DURING SEPTEMBER FLOODING

An unusually, but forecasted in advance, heavy rain in the whole area of Slovenia on the third weekend of September has caused the flooding of the Sava River. Because the increased flow can splash down greater amount of debris and items accumulated on the river bank, the Krško NPP preventively started its cooling towers and shut off water intake for turbine condenser cooling. On 18 September, the Sava river flow and level exceeded threshold for classifying the event into the lowest emergency class, i.e. unusual event. During the event the plant intensified the monitoring of the flooding. There was no plant power decrease needed, as well as there were not any other influence on its operation.

The assessed peak flow at the Krško NPP was around 3150 m³/s, while the Krško NPP flood protection dikes along the Sava River are designed to protect the site against a ten-thousand-year flow of 4272 m³/s. The probable maximum flood, up to which the plant's safety would still be assured, is 6500 m³/s.

At the figure it can be seen Sava River flooding the right river bank, which is lower and provides a natural drainage area for excess water in case of extreme Sava River flow. The NPP is located on the left river bank. The structure in the river is top of the Krško NPP river dam, which provides water for plant systems cooling.



Photo courtesy Krško NPP

II. FIRE IN THE HOT CELL OF TRIGA RESEARCH REACTOR

On the 17 October 2010, a fire broke out in the hot cell of the TRIGA research reactor of Jožef Stefan Institute in Brinje. The most probable cause for the ignition was the malfunction of the drier in the laboratory. The drier and its contents, which also contained some uranium compounds, had completely burned down. The aluminum tray on which the contents were placed had melted and the contaminated melt poured out on to the ground in front of the drier.

The employees of the Institute extinguished the fire and secured the area to prevent contamination from spreading. The staff exposure was very low due to the use of appropriate protection. The preliminary assessment showed that there were no radioactive releases to the environment. The event was estimated as rate 1 on the INES scale.

III. RADWASTE MANAGEMENT

III.1. MANAGEMENT OF LIQUID RADIOACTIVE WASTE

During characterization of historic waste a certain amount of liquid waste was discovered in the Central interim radioactive waste storage. Because this facility is licensed only for the storage of solid dry waste, the Agency for Radioactive Waste Management arranged the solidification of liquid waste at the Jožef Stefan Institute. Additional several hundred liters of relatively low level liquid waste was discovered at medical laboratories. As the Agency for Radioactive Waste Management has neither license nor facilities for treatment of such waste, the waste is stored at generators. The adequate corrective measures are being discussed. Most probably it will be solidified in the nearby hot cell of the Jožef Stefan Institute.

III.2. REMEDIATION OF THE ŽIROVSKI VRH URANIUM MINE

The remediation of the Žirovski Vrh uranium mine is almost finished. Until now, both the uranium processing plant and the mine, together with the accompanying objects, have been successfully decommissioned. Remediation of mine tailing is completed. On the mill tailing Boršt, only a small surface of tailing was not covered with the final humus layer due to bad weather at the end of 2009.

It should be noted that the remediation of Boršt mill tailing is complicated due to reactivation of a landslide on which the tailing is disposed of. The rate of movement is about 10 cm per year. It was established that the sudden collapse of the landslide is not likely to happen, except in case of the catastrophic combination of events (water saturation and earthquake). Therefore, the reactivation does not pose an immediate risk to the population or environment. It would, however, increase the cost of remediation and maintenance of this waste disposal.

Both mine and mill tailing sites have very successfully survived extremely strong rains during the third week in September 2010.

Radiation exposure of the adult member of the public living in the vicinity of the mine for 2009 was estimated at 0.12 mSv. The low level of exposure is due to the finishing of restoration at the mine repositories at the Jazbec and Boršt sites. The above dose is approximately one third of the effective dose which was estimated in the last decade of the 20th century.

IV. LEGISLATION

IV.1. NEW ACT ON THIRD PARTY LIABILITY

On 22 September 2010, the new Act on Third Party Liability for Nuclear Damage was adopted. The act governs the liability for nuclear damage resulting from the use of nuclear energy for peaceful purposes, the insurance of liability for nuclear damage and the procedure for claiming compensation for nuclear damage. On one hand, the act follows the provisions of the 2004 Protocol to the Paris Convention regarding, for example, the extended heads of damage, which are covered, raised liability amounts for compensation and extended prescription and extinction periods for nuclear damage claims. On the other hand, the act regulates those areas which the convention leaves to the national legislation to deal with. For example, the act specifically designates the one court which shall be competent to rule on compensation for nuclear damage. It also includes a number of provisions regarding the rules of procedure of claiming compensation and the distribution of compensation. Regarding the public funds, which have to be provided by the State, the act envisages that they shall be provided from the budget and that their amount and the manner and dynamics of their drawings shall be determined by the interventional act. Regarding

those risks which nuclear insurers are unwilling or unable to cover, the act provides that a premium based insurance agreement between the Government and the operator shall be concluded, but such an arrangement is limited in time (until the situation on the domestic and international insurance market changes, but no longer than four years). Last but not least, the act includes all necessary provisions which ensure its compliance with the 2004 Protocol to the Brussels Convention.

IV.2. NEW RULES ON THE USE OF POTASSIUM IODIDE

In July 2010, new Rules on the use of potassium iodide in case of nuclear or radiological emergency were issued by the Ministry of Health in agreement with the Ministry of the Environment and Spatial Planning, Ministry of Defence and Ministry of the Economy. The rules govern the use of potassium iodide for the implementation of iodine prophylaxis, an effective and simple protection of the thyroid gland against radioactive iodine, which can be released during nuclear or radiological accident.

V. EMERGENCY PREPAREDNESS

The Slovenian government adopted the revised national radiation emergency plan (version 3.0) in July 2010. The SNSA played major role in its development. The plan was revised from ground up:

- radiological emergencies are fully included,
- special commission is to be established for co-ordination of nuclear emergency preparedness on national level,
- MKSID¹ is introduced as an official communication tool during an emergency,
- co-ordination of radiation monitoring is centralized (under the SNSA),
- new concept for iodine prophylaxis is introduced,
- satellite communication is planned.

The Krško NPP and the SNSA successfully carried out annual joint exercise in June 2010. The main theme this year was terrorist threat.

VI. BILATERAL RELATIONS

VI.1. NEW AGREEMENTS WITH ITALY AND MACEDONIA

In May 2010, the SNSA director, Andrej Stritar, and the Commissioner Prefect, Vincenzo Grimaldi, who leads the Italian regulatory authority, the Institute for Environmental Protection of the Republic of Italy, signed an agreement on the early exchange of information in the event of radiological emergency and cooperation in nuclear safety. By signing the agreement with the Italian regulatory authority, Slovenia has concluded agreements on the early exchange of information in the event of radiological emergency with all four neighboring countries. With Austria, Hungary and Croatia, Slovenia concluded such agreements in 1990s.

On 20 September 2010, on the margins of the General Conference of the International Atomic Energy Agency, the SNSA director, Andrej Stritar, and the director of related regulatory authority of the Republic of Macedonia, Nuzi Shahin, signed the Memorandum of Understanding on the exchange of information between the two authorities. Based on the Memorandum, the exchange of information on nuclear safety, the regulatory control of nuclear and radiation facilities, the control of sources of ionizing radiation and the transport of radioactive materials and waste will be facilitated.

VI.2. BILATERAL MEETING WITH AUSTRIA

On 14th October 2010 a regular annual bilateral meeting with Austria took place in Vienna. The meeting is organized in line with the bilateral agreement, which foresees early notification in case of nuclear or radiological

¹ Communication System during an Emergency for the SNSA internal as well as national communication. MKSID is a tool for communication during an emergency, created to replace conventional internal communication methods.

emergency and exchange of information. The meeting addressed the following areas: legal framework and administration, radiation protection, emergency preparedness, Slovenian nuclear power programme and radioactive waste management. These meetings contribute to regular contacts and exchange of views of both delegations, as well as to prompt resolving open issues, which may arise during the year.

Nuclear Slovenia in Brief

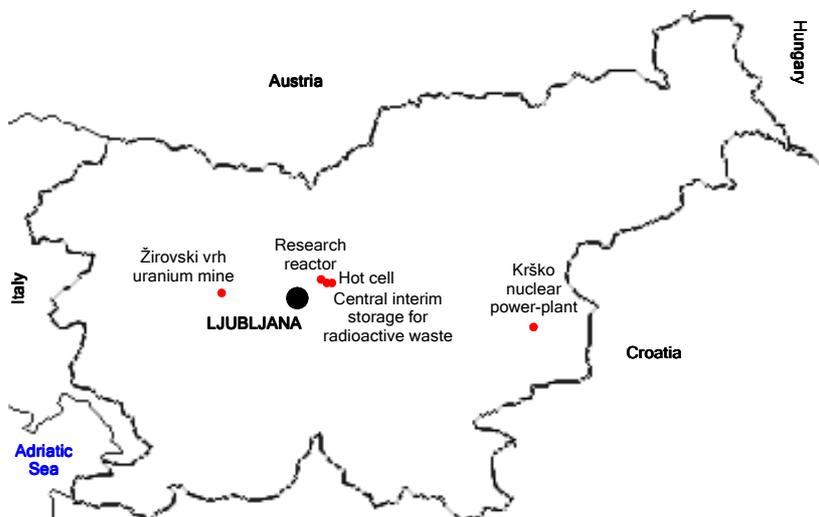
Slovenia is the smallest country with the nuclear power plant operating at its territory. Nuclear facilities include: **1 Nuclear Power Plant** in operation (PWR, 2-loops, Westinghouse, 696 MWnet), **1 Research reactor** in operation (TRIGA Mark II, 250 kW), **1 Central interim storage of radwaste** (not for NPP waste), Radioactive waste and spent nuclear fuel from NPP is stored within the NPP site; as well as radiation facilities and practices: 1 repository of hydro-metallurgical tailings, 1 repository of mine tailings, and around 300 organizations, engaged in radiation practices with altogether about 1200 radiation sources in use.

The **Slovenian Nuclear Safety Administration** was established in 1988 as a body within the Ministry of the Environment and Spatial Planning. It is responsible for nuclear and radiation safety, transport, and management of nuclear and radioactive materials in the Republic of Slovenia.

For the radiation safety in medicine, the **Slovenian Radiation Protection Administration** within Ministry of Health is competent.

Physical protection of nuclear materials and nuclear facilities is responsibility of Ministry of Interior.

Agency for Radioactive Waste Management deals with site selection and planning of the repository for low and intermediate level radwaste, and public service of radwaste management from small producers.



Link to the SNSA's public reports and previous News from Nuclear Slovenia: <http://www.ursjv.gov.si/index.php?id=4635&L=1>

