



REPUBLIC OF SLOVENIA
MINISTRY OF AGRICULTURE AND THE ENVIRONMENT
SLOVENIAN NUCLEAR SAFETY ADMINISTRATION

**Fourth Slovenian Report under the
Joint Convention on the Safety of Spent Fuel Management
and on the Safety of Radioactive Waste Management**

Answers to questions raised by other contracting parties



Answers to questions raised by other contracting parties under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management were prepared by the Slovenian Nuclear Safety Administration, the Krško NPP, the Agency for Radwaste Management and the Ministry of Infrastructure and Spatial Planning.

Q.No 1	Country Italy	Article Planned Activities	Ref. in National Report Section K pag.109
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Question/ Comment With reference to the LILW repository, could Slovenia describe in details which are the radiological criteria (dose constraints) for the operational and for the post closure phases?

Answer The effective dose limit for an exposed worker is 20mSv/year, or 50 mSv/year, under condition that within five consecutive years the effective dose does not exceed 100mSv.

For the normal repository-development scenario the dose constraint of 0.3 mSv/year for a member of population was set in the site approval process of the LILW repository Vrbina.

Q.No 2	Country United Kingdom	Article Planned Activities	Ref. in National Report Section K Page 109
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Question/ Comment From the report it is understood that there are uncertainties regarding the decision on a joint solution for the disposal of LILW and that these are having an impact on the preparation of environment impact assessment and preparation of the safety case for the LILW repository.

Can Slovenia provide an update on the joint solution for the LILW disposal facility, including timescales to achieve an operational LILW repository?

Answer So far Slovenia and Croatia have not reached an agreement on joint solution regarding the disposal of radioactive waste and spent fuel due to operation of the Krško NPP.

In 2008, Slovenia and Croatia started the preparation of a Program of NPP Krško Decommissioning and SF&LILW disposal revision 2. In this document several different possible scenarios and timescales are provided. Among them there is also a joint solution for a LILW disposal facility. The document is still under discussion. Due to the uncertainties it is not possible to provide a firm timescale to achieve an operational LILW repository.

Q.No 3	Country Croatia	Article General	Ref. in National Report G & H, 88,91
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Question/ Comment The Vrbina site in the municipality of Krško has been approved by the Government decree on the national spatial (physical) plan after public hearing was organized in spring 2008. Three repository variants were considered for Vrbina site - the surface repository, the silo type repository and the tunnel type repository. 2 silos are foreseen in the preliminary design of LILW repository on Vrbina site with an overall capacity of 9400 m³ of LILW. This capacity is sufficient for all the LILW that will be generated by NPP Krško operation and decommissioning even for lifetime extension to 2043.

What is estimated cross-border impact of the Vrbina site to Croatian territory and on what technical grounds and assumptions was the impact derived?

Answer The Environment Protection Act determines that consultancies with the neighbouring countries must be performed if the Strategic Environmental Assessment indicates cross border impacts. In this preliminary phase it was concluded that there will be no cross border impacts. The eventual environmental impacts, including cross border impacts will be further addressed through the Environment Impact Assessment (EIA) in the near future. Croatia will be timely informed and consulted about the EIA findings.

Q.No	Country	Article	Ref. in National Report
4	Croatia	General	G & H, 93,94,127

Question/ Comment Within the scope of national project, Slovenia had various IAEA expert missions reviewing establishment of LILW repository on the Vrbina site. Please share what were findings of the missions and what are the plans in Slovenia to implement IAEA recommendations?

Answer Slovenia had several Expert Missions regarding the LILW repository project:

- WATRP Review, IAEA, 21-25 January, 2008, (J-M. Potier, Ian Crossland, Alain Van Cotthem, Michael Dutzer, Milos Kovaèik, Miklos Garamszeghy),
- IAEA Expert Mission, 27/28 August 2009, (Alain Van Cotthem, František Fiedler);
- IAEA Expert Mission, March 8-10, 2010;(M. Garamszeghy, J-M. Potier& L. Valencia),
- IAEA Expert Mission, 18-20 January 2011; (J. Pacovsky, R. Chaplow).

Besides, there were two additional international reviews of the LILW Repository Preliminary design:

- Peer Review of LILW Repository Preliminary Design, Vrbina, Krško; Technum - Tractebel Engineering; Technical note N° P.001189.050-001.A; June 2010;
- Review of the Preliminary Design of the Vrbina LILW Repository, URS, May 2010.

All, the expert missions and reviews provided a lot of very useful recommendations and suggestions. Some of them are very good guidance for the future work and the others have already been considered.

Most of the EM and Reviews included the comments regarding additional site investigations on the exact location of the siloses. The plan for 2012 is to perform additional site investigations in order to confirm input data for seismic parameters and geomechanical modelling of the site.

Another item that has been recommended several times is a Functional Analysis of the Repository. The Optimization of the Repository design was also a common recommendation of the EM and Reviews. The design has been analyzed in additional studies. The main focus was on silo design (water tightness), access shaft (incorporation into the silo) and design of the closing structure of the silo. Additionally, studies have been performed regarding necessary capacity of the repository, possible optimizations regarding waste packages, characteristics of the backfill material, treatment for disposal regarding suggested optimizations of waste packages and disposal of larger components. A special road connection between NPP and Repository has also been taken into consideration as suggested in some EM reports.

Q.No 5	Country Croatia	Article General	Ref. in National Report E & G & H,33,81,82
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Question/ Comment What is planned timeline for pre-operational, operational and pos-operational periods for the Vrbina site, and when do you expect commencement of waste packages acceptance to take place?

Answer The latest estimates on time schedule for the LILW repository project are that Slovenia will need about 6 to 7 years to complete the first silo construction and to acquire a trial operation permit.
The operational period depends on the life time of NPP Krško. According to the present plan the repository will operate until the NPP decommissioning will be finished. After that the decommissioning and closure of the repository and its institutional control are foreseen.
As all necessary (governmental) decisions on the project are not final yet, there are some uncertainties that can affect time frames and postpone the project.

Q.No 6	Country Argentina	Article Article 9	Ref. in National Report Page 7
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Question/ Comment It has been mentioned that a life extension of the Krško NPP is being considered. Is there any information about Project stage and the foreseen extension period?

Answer In 2009, the Krško NPP requested the approval of the Ageing Management Program for Systems and Components. The implementation of such a program is one of the prerequisites for the long-term operation of a power plant. The Krško NPP suggested such changes of safety documentation which would fit the assumption of the Krško plant operating for 60 years. Comprehensive documentation was enclosed to the application, as well as the detailed explanation of the Krško NPP's approach to ageing management and analyses. An international group of experts has reviewed the submitted documentation and issued a positive expert opinion. The SNSA is in the process of a detailed review and assessment of documentation. The SNSA also reviews and inspects the situation in the plant. The SNSA will consider the approval of the program based on the review and inspection findings.
In a decision making process the SNSA will also take into account the actions and changes which have to be performed in the light of the Fukushima event. The Krško NPP performed the "stress tests" analysis, in parallel they are also preparing other changes regarding the lessons learned from the Fukushima event.
A possible extension of the operation will depend on the owners of the plant and on periodic safety reviews in the years 2013 and 2023.
As it was mentioned the envisaged life extension period is 20 years.

Q.No 7	Country United Kingdom	Article Article 9	Ref. in National Report Articles 9 and 16, Page 96
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Question/ There is little change to the principle nuclear legislation in Slovenia (2002 Ionising Radiations and Nuclear Safety Act 2002), however,

Comment on Page 96, it is stated the Act will be amended to allow 24 months for the issuing of the license after the complete application is received from the current 90 days. Has this change been made and why was it necessary?

Answer Yes, the change has been introduced in the amended act. But to be precise, the prolonged timeframe is meant for the regulatory body (SNSA) to issue the SNSA approval, which afterwards an investor must attach to the application for a license to build a facility or carry out construction works due to which measures of nuclear safety must be implemented.

But again, the prolonged period relates not to all facilities but rather only to the construction of the new NPP or radioactive waste repository (see para.3 of Article 77 of unofficial consolidated text of the 2002 Act).

The reason for introducing that change is that the complexity of such applications can not be solved within a three-month period as it was foreseen in a previous version of the Law.

The 24-month limit, however, does not prevent the SNSA to issue the approval faster. If the applicant provides good and sufficient evidences about the safety of the facility well in advance, the licensing process at the SNSA can be also completed faster.

Q.No	Country	Article	Ref. in National Report
8	Hungary	Article 10	G and H, page 102

Question/ Comment If the USA does not agree to ship and dispose of the spent fuel, how will the TRIGA Mark II research reactor manage the spent fuel until a disposal facility for the spent fuel of Krško NPP is available?

Answer The Jožef Stefan Institute (IJS) has concluded a contract with the USDoE, according to which it has the right to return to US its remaining SF, regarding the current time frames, between 2016 and 2019. If the IJS continues the operation of the RR beyond 2016, the disposal of SF will be the responsibility of Slovenia. Adequate technical solutions and financial resources should be made available by the IJS as a license holder. The solution for the spent fuel from the TRIGA research reactor will have to be found together with the spent nuclear fuel of the Krško NPP.

Q.No	Country	Article	Ref. in National Report
9	Bulgaria	Article 12	H p.79

Question/ Comment Could Slovenia explain what is the difference between the two types of licenses issued (2005 and 2008) for the RAW central storage facility?

Answer After the construction every radiation or nuclear facility must first undergo a trial operation. The license for the trial operation was issued with the consent of the SNSA by the Directorate for Spatial Planning in 2005. It was valid for two years.

The license issued in 2008 is an operational license issued by the SNSA and is valid for 10 years. The operating license can be extended after successful PSR for another ten years.

Q.No 10	Country Ukraine	Article Article 12	Ref. in National Report G,H, page 79
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Question/ Comment Is there actual practice of releasing radioactive materials from the regulatory control at an NPP? If so, then what are the types of radioactively contaminated materials embraced by this procedure?

Answer Every material coming from the controlled area or part of the technological procedure inside of the technological area is considered as controlled material. Therefore, the release of that material from the controlled is performed after checking of its compliance with the clearance criteria. Typical types of material that follow the clearance procedure are spent ion exchange resins from secondary circuit, scrap metal, spent charcoal, plywood, equipment etc.

Q.No 11	Country Australia	Article Article 13	Ref. in National Report Page 10f.
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Question/ Comment What are the “uncertainties regarding the decision on a joint solution for the disposal of LILW” that have delayed the preparation of environmental impact assessment and preparation of the Safety Case?

Have all problems related to the siting of the LILW repository now been resolved?

Answer There is no agreement on joint solution for the LILW repository. The reasons for the absence of such agreement are complex and also politically influenced. Slovenia adopted a spatial planning decree on the LILW repository in 2009 for its share of the LILW in such a way that it does not impede the joint solution foreseen in the bilateral agreement with Croatia.

Q.No 12	Country Germany	Article Article 13	Ref. in National Report GH, 81-94
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Question/ Comment What is the time schedule for putting the repository for low and intermediate level waste (LILW) at the Vrbina site into operation?

Answer The latest estimates on time schedule for the LILW repository project are that Slovenia will need about 6 to 7 years to complete the first silo construction and to acquire a trial operation permit.
The operational period depends on the life time of NPP Krško. According to the present plan the repository will operate until the NPP decommissioning will be finished. After that the decommissioning and closure of the repository and its institutional control are foreseen.
As all necessary (governmental) decisions on the project are not final yet, there are some uncertainties that can affect time frames and postpone the project.

Q.No 13	Country United States of America	Article Article 13	Ref. in National Report H, 35
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Question/ Part of the site selection process for a LILW repository (Krško) ensures additional financial benefits. Please describe these benefits.

Comment Are such benefits different for the individual stages of the project, such as site development, construction, operation, decommissioning? If so, please describe.

Answer Financial benefits for local communities are defined in a Decree on the Criteria for Setting Compensation Level Payable for Limited Use of Space within the Area of a Nuclear Facility. The compensation is included into local community budget during siting, construction, operation, and decommissioning. It must be spent for municipality public infrastructure and municipality public service to improve life quality in the municipality. Compensation during siting is 10 % of basic compensation amount. Compensation during licensing, construction and operation is 100 %. During the siting phase the local community was also entitled to the financing of local partnership activities and expert advising and expert opinions requested by local partnership. Municipality independently negotiated with the government in the final stage of siting and five protocols were signed with the government. These protocols were not part of siting procedure as defined in the Program of Preparation of Detailed Plan of National Importance for a Low and Intermediate Level Waste Repository at Vrbina in the Krško Municipality. In the protocols the government in principle agreed to finance investments in local roads, broadband network, communal infrastructure and cultural heritage. Compensations are paid yearly while other above-mentioned benefits are paid to cover the presented expenses.

Q.No	Country	Article	Ref. in National Report
14	Argentina	Article 14	Page 89

Question/ Comment As regards the silo type LILW repository at Vrbina site, it is mentioned that voids among concrete containers will be filled with backfill material. Have you decided to use a “concrete friendly” material which also has the capability of withhold radionuclides in case of container failure?

Answer The backfill material for the voids around concrete containers has not been finally decided yet. In the Preliminary design the usage of drainage material was proposed. Right now different studies are conveyed to ascertain all properties of different types of the backfill material (permeability, hardness, sorption effects ...). The final decision will be made in the final design.

Q.No	Country	Article	Ref. in National Report
15	United Kingdom	Article 14	Page 90

Question/ Comment Possibilities of optimisation of some activities regarding radioactive waste management were suggested by an international peer-review of the preliminary repository design, what were these and how are they being looked at?

Can Slovenia provide information on the waste management optimisation activities suggested by the international peer review group who peer reviewed the preliminary repository design?

Answer Slovenia had several Expert Missions regarding the LILW repository project:

- WATRP Review, IAEA, 21-25 January, 2008, (J-M. Potier, Ian Crossland, Alain Van Cotthem, Michael Dutzer, Milos Kovaèik, Miklos Garamszeghy),
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Another item that has been recommended several times is a Functional Analysis of the Repository. The Optimization of the Repository design was also a common recommendation of the EM and Reviews. The design has been analyzed in additional studies. The main focus was on silo design (water tightness), access shaft (incorporation into the silo) and design of the closing structure of the silo. Additionally, studies have been performed regarding necessary capacity of the repository, possible optimizations regarding waste packages, characteristics of the backfill material, treatment for disposal regarding suggested optimizations of waste packages and disposal of larger components. A special road connection between NPP and Repository has also been taken into consideration as suggested in some EM reports.

Q.No	Country	Article	Ref. in National Report
16	United Kingdom	Article 15	Page 94

Question/ Comment On Page 94 of the report there is reference to field investigations being performed at the planned LILW repository can you give any information on these and what is planned to help take the repository safety case forward?

Can Slovenia provide further information on the field investigations for the planned LILW repository including the requirements to support the repository safety case?

Answer Up to now, Slovenia finished the preliminary site characterization for the Vrbina Krško site.

In 2012, it is planned to perform additional investigations of geosphere and hydrosphere to better assess the constructability and safety of LILW Repository at Vrbina, Krško. The purpose of these investigations is to verify and improve quality of data used for the preparation of a Preliminary design and to assure a reliable input for the preparation of the Design for construction and related environmental impact reports.

Investigations of geosphere and hydrosphere are intended for the following:

- To define the data for the preparation of the project to obtain the construction license for the repository

- To define the data for the preparation of the Safety analysis in accordance with ZVISJV (Ionizing Radiation Protection and Nuclear Safety Act)
 - To define the data for the preparation of the environmental impact assessment and to obtain the environmental permit
- The scope of the main investigations of the geosphere and hydrosphere is focused on the implementation of the field and laboratory investigations directly on the site of the repository.

Q.No	Country	Article	Ref. in National Report
17	Czech Republic	Article 16	p. 95

Question/ Comment How are the interdependencies among the different steps in radioactive waste management taken into account, if there are no disposal facilities in Slovenia. What are the WAC for conditioned waste and how can Slovenia assure that they will be compliant with WAC for disposal?

Answer Slovenia has two interim radioactive waste storages. In the NPP for waste from the NPP and the Central interim storage at Brinje near Ljubljana for waste from all other producers. Both have their own WAC for their storage facilities. During the development of the WAC for storing the institutional radioactive waste in the Central Storage Facility at Brinje, the ARAO considered the generic WAC for the planned LILW repository, the IAEA TECDOCs, Safety Standards, Safety Standards Series, Slovenian legislation, especially the regulation Rules on radioactive waste and spent fuel management, and operators' practices. Regarding LILW repository WAC, in 2009 Preliminary waste acceptance criteria were prepared but not really site specific. Slovenia is now working on a new revision of safety assessment and waste acceptance criteria preparation for LILW Repository at Vrbina site in Krško, for approved near surface silo concept. During the licensing process for LILW repository the SNSA will approve WAC through the Safety analysis report. All waste producers will be then obliged to meet the prescribed criteria before the waste will be delivered for disposal. The operator of the repository will be responsible to check if they are compliant with prescribed WAC.

Q.No	Country	Article	Ref. in National Report
18	Czech Republic	Article 16	general

Question/ Comment Do you use landfills for the disposal of very low level waste? If yes, please describe the WAC for such facilities and the method of their derivation

Answer So far there has been no plan for the disposal of very LLW in special land fills in Slovenia. According to the national program all LILW will be disposed of in an engineered repository (silo type). Clearance levels will be used to exclude control from waste which is no longer radioactive. Very low-level radioactive waste (VLLW) is defined in Slovene regulation as waste for which the SNSA may decide on clearance. In a few cases a conditional clearance of RW was approved.

Q.No 19	Country Hungary	Article Article 16	Ref. in National Report G and H, page 98
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Question/ Comment Does the regulatory body approve the Exceptional Review?

Answer According to the law the exceptional review is mandatory after an emergency at the facility or after the completion of the work related to the mitigation of the consequences of an emergency. The report of the exceptional review is not a subject to approval by SNSA. However, if it is concluded from the review that it is necessary to change or improve operational conditions and the limits in the safety analysis report, then the operator must draw up a proposal for modifications and propose amendments to the safety analysis report and apply for the SNSA approval.

Q.No 20	Country Czech Republic	Article Article 17	Ref. in National Report p. 103
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Question/ Comment What kind of arrangements for institutional control do you apply for the period after the closure of old mines, pits and tailing ponds from uranium industry?

Answer The institutional control of the disposal sites for mining and hydrometallurgical waste is envisaged according to Art. 76 of the 2002 Act. Article 96 of the 2002 Act further defines that long-term surveillance and the maintenance of the repositories of mining and hydrometallurgical waste is a responsibility of the ARAO. The plan of long-term surveillance is approved by the SNSA in a course of administrative procedure for closure of a disposal site. Additionally, after closure, the pertinent disposal facility will get a status of a “facility of national importance” and it will no longer be a “radiation facility”. Between operational monitoring and institutional control the so-called transitional monitoring takes place. The transitional period for the Jazbec mine waste disposal will last for five years. The main reason for the transitional period is monitoring of a disposal site and environmental parameters. The transitional period is followed by the period of permanent surveillance and maintenance (institutional control).

Q.No 21	Country Australia	Article Article 19.1	Ref. in National Report Page 33
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Question/ Comment If no agreement with Croatia is reached regarding the construction of a joint repository, how will Slovenia manage the wastes?

Answer There is no agreement on joint solution for the LILW repository. The reasons for the absence of such agreement are complex and also politically influenced. Slovenia adopted a spatial planning decree on the LILW repository in 2009 for its share of the LILW in such a way that it does not impede the joint solution foreseen in the bilateral agreement with Croatia.

Q.No 22	Country Hungary	Article Article 20	Ref. in National Report E, page 41
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Question/ "In general the competences between the SNSA and the SRPA are divided in the area of radiation protection, while the area of nuclear safety is the SNSA's sole competence."

Is there any formal agreement or memorandum of understanding between SNSA and SRPA how to divide competences in the field of radiation protection?

Answer The division of responsibility between the SNSA and the SRPA is clearly defined by law. For this reason no memorandum of understanding between two regulatory bodies is in place. Eventual issues regarding competences were clarified with a consensus of the involved parties.

Q.No 23	Country Ukraine	Article Article 22	Ref. in National Report F, page 45
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Question/ Does the special knowledge include knowledge of the safety culture principles? Is there any review of personnel's commitment to nuclear safety culture (procedures, criteria, frequency)?

Answer Safety culture principles are introduced to nuclear facility personnel in the form of training provided to all employees and continuous indoctrination by the management. This includes the awareness of the management system and related written procedures. Personnel commitment to radiological and nuclear safety culture is assessed through a conduct of periodical nuclear facility self-assessment programs.

The SNSA assess safety culture in nuclear and radiation facilities through its integrated safety assessment system including the review and assessment of reports coming from facilities and regular inspections.

Q.No 24	Country Bulgaria	Article Article 22.1	Ref. in National Report F p.45
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Question/ Have any estimation been done of the funds needed for the decommissioning of Krško NPP? Would the funds collected during plant operation (till 2023) be sufficient to cover the decommissioning cost?

Answer Extension of NPP Krško life-time is under consideration and a decision will soon be made. The first revision of the Programme for the Decommissioning of the Krško NPP and Disposal of Low and Intermediate Level Waste and Spent Fuel was prepared in April 2004. The costs for the decommissioning of the plant were included in that plan. Revision 2 of the Decommissioning Plan commenced in September 2008 with the purpose to incorporate relevant developments since the first revision, to improve the level of details and reliability of the decommissioning plan, and to propose updated and more accurate cost estimates and appropriate financing models. The revision has not been finished yet. According to current information the levy per

kWh shall be increased and will be sufficient to cover the decommissioning costs.

Q.No	Country	Article	Ref. in National Report
25	Australia	Article 22.3	Page 46

Question/ Comment Jožef Stefan Institute Reactor Infrastructure Centre – Financial Resources – the current arrangements do not appear to guarantee availability of funding for decommissioning operations if these become necessary. Is there any proposal to rectify this and establish a guaranteed source of funding for decommissioning?

Answer The Jožef Stefan Institute, the license holder for operation of the RR Triga is a public research institute. As such it is financed from the state budget through the Ministry of Education, Science, Culture and Sport. Therefore, the funding for decommissioning will be assured through the state budget.

Q.No	Country	Article	Ref. in National Report
26	Ukraine	Article 24	page 60-62

Question/ Comment Please specify the tritium and carbon-14 content limits in NPP releases and regulatory documents setting the limits.

Answer The limits for liquid releases of beta gamma emitters (including C-14) are 100 GBq/year and 45 TBq/year for H-3. The limit for particulates in gaseous effluents is 18,5GBq/year. They were originally set in the initial operating license in 1984 and amended by the SNSA in 2003 and 2006.

Q.No	Country	Article	Ref. in National Report
27	Ukraine	Article 24	page 60-62

Question/ Comment What equipment and what methods are used for carbon-14 and tritium control in NPP releases?

Answer In all water samples, except the ones from the waste monitor tank water, tritium is enriched with distillation and electrolysis procedure. Measurements are performed with 1220 QUANTULUS Ultra Low Level Liquid Scintillation Spectrometer. C-14 in air is continuously sampled by a differential CO₂/CH₄ sampler manufactured at the Institute of Isotopes at the Hungarian Academy of Science. It consists of two parallel lines for air sampling. The air in the first line passes through potassium hydroxide trap where CO₂ is absorbed. In the second line hydrocarbons are converted to CO₂ on a Pd catalyst at 873K and are passed through the second potassium hydroxide trap to absorb CO₂ originating from hydrocarbons. The absorbed CO₂ was precipitated as BaCO₃ by adding BaCl₂ solution. Beta activity is measured with a liquid scintillation analyzer (Packard Tricarb 2550TR A/B).

Q.No	Country	Article	Ref. in National Report
28	United Kingdom	Article 24	Page 67

Question/ On Page 67 an exceptionally high monthly reading of 3.8 mSv on the personal dosimeter of one worker for 2010 is reported. Although

Comment a clear reason for this high dose has not been established, were there any lessons learnt form the event?

Answer The case was investigated and an inspection control was performed without definite explanation. Since the dose was still below the legal limits no further action was deemed necessary. During the process of inspection and fact finding a heavy emphasis was placed on importance of safety culture and radiation protection rules. Since then, no recurrences have been recorded.

Q.No	Country	Article	Ref. in National Report
29	Czech Republic	Article 25	p. 68

Question/ There are two authorities with responsibilities and competencies to regulate and supervise emergency preparedness.”

Comment Who is the coordinating authority and what is the manner to settle the discrepancies in measures possible adopted by both of authorities?

Answer The Administration for Civil Protection and Disaster Relief is responsible for preparedness and response to all types of emergencies, from fires and earthquakes to nuclear accidents. But due to the specifics of nuclear and radiological emergencies the Slovenian Nuclear Safety Administration acts as an adviser for preparedness and response to these types of emergencies. In case of an emergency the top command and decision-making are in the hands of the Civil Protection Chief Commander. He collects information and recommendations about protective actions from the nuclear facility and from the SNSA and has the ultimate responsibility to decide about the actions taken.

Q.No	Country	Article	Ref. in National Report
30	Czech Republic	Article 25	p. 69

Question/ The state is responsible for the local and national radiological emergency response planning and maintenance of the radiological response plans.”

What is the task of local (municipal if exist) authority in the framework of the radiological emergency planning?

Answer They are the ones to implement any protective actions that are ordered by the national civil protection commander. In order to do that they have their own emergency plans on local level.

Q.No	Country	Article	Ref. in National Report
31	Australia	Article 25.1	Page 69

Question/ Overall National Emergency Preparedness Scheme and Off-Site Emergency Plans – are plans in place to repeat the 2009 joint field exercises?

Answer These joint field exercises are regular annual exercises.

Q.No	Country	Article	Ref. in National Report
32	Australia	Article 25.1	Page 71

Question/ Central Storage for Radioactive Waste in Brinje – in view of the events at Fukushima, is the statement that “The emergency response

Comment plan for the Central Storage for Radioactive Waste in Brinje, prepared by the ARAO, covers all anticipated abnormal events and emergency situations related to the operation of the facility and handling of radioactive waste” under review?

Answer The emergency response plan for the Central Storage Facility at Brinje is under review. It will be harmonized with the National Emergency Response Plan for Nuclear and Radiological Accidents, version 3.0 and with the emergency response plan for the Reactor Centre of the Jožef Stefan Institute which is at the same location. However, there are no special issues recognized from the Fukushima accident that would require special actions in that facility.

Q.No	Country	Article	Ref. in National Report
33	Denmark	Article 26	F, 74

Question/ (Krško NPP): Is the Slovenian fund for decommissioning of the Krško NPP, the "Programme for the Decommissioning of the Krško NPP and Disposal of Low and Intermediate Level Waste and Spent Fuel", expected to cover the Slovenian expenses of all decommissioning projects, for instance including the Žirovski vrh Uranium Mine or the future decommissioning of the Triga Mark II research reactor, or will the fund only cover the costs associated with Decommissioning of the Krško NPP?

Answer The fund for the decommissioning of the Krško NPP is intended only to cover the Slovenian share of costs associated with disposal of radioactive waste, SF, and decommissioning of the Krško NPP. The funds for the remediation of the Žirovski vrh Mine are assured through the state budget. The funds necessary for institutional control and monitoring (long term supervision of the disposal sites) will be also assured through the state budget. Financial provisions for the decommissioning of the Triga Mark II research reactor will be assured through the state budget.

Q.No	Country	Article	Ref. in National Report
34	Denmark	Article 26	F, 74

Question/ (Krško NPP): Does the fund cover expenses of treatment as well as disposal of the waste arising from decommissioning of the Krško NPP?

Answer The fund for the decommissioning of the Krško NPP covers the Slovenian share of expenses for treatment as well as for disposal of waste and SF arising from the decommissioning and operation of the Krško NPP.

Q.No	Country	Article	Ref. in National Report
35	Denmark	Article 26	F, 74

Question/ (Operational Radiation Protection, Discharges and Unplanned and Uncontrolled Releases): What provisions (i.e. legal requirements and limitations) have been made for decommissioning activities, which are not subject to requirements and limitations applicable to operating facilities?

Answer Each decommissioning activity in Slovenia is a radiation practice according to Art. 11 of the 2002 Act and is therefore subject to licensing. All the requirements and limitations that are applicable to radiation practices in general are also applicable to an individual

decommissioning activity. If the nuclear facility is decommissioned, among others the safety analysis report including “operating limits and conditions” must be presented and approved.

Q.No	Country	Article	Ref. in National Report
36	Hungary	Article 26	F, p. 74-75

Question/ For Krško NPP the Report states:

Comment "There are no specific regulations for the decommissioning of nuclear facilities. All legal requirements and limitations that are applicable to all operating facilities are applicable to the nuclear facilities in the decommissioning process."

Q: What is the time period to update the preliminary decommissioning plan for the research reactor?

Answer The preliminary decommissioning plan for the research reactor was prepared in 2007. According to Art. 47 of the Rules on Radiation and Nuclear Safety Factors (JV5; Official Gazette of the Republic of Slovenia No. 92/09) the decommissioning plan has to be revised at least during the Periodic Safety Review (PSR). The PSR started in November 2011 and will last for two and a half years.

Q.No	Country	Article	Ref. in National Report
37	Ukraine	Article 26	D, page 27

Question/ There are references to current fuel assemblies and fuel rods in the spent fuel reference list, Section D, « (ii) Inventory of Spent Fuel».

Comment What are the plans for the management of the stored damaged irradiated fuel assemblies and fuel rods during decommissioning of Krško NPP?

Answer Detailed plans for the management of damaged irradiated fuel assemblies and fuel rods during the decommissioning have not been established at this time. In general, this will be a part of the national decommissioning plan or a part of interim storage (dry casks) implementation, whichever comes first. It is expected that standards for storage and transport of damaged fuel (such as NUREG-1536, “Standard Review Plan for Dry Cask Storage Systems” and ANSI N14.33-2005, “Storage and Transport of Damaged Spent Nuclear Fuel”) will be considered.

Q.No	Country	Article	Ref. in National Report
38	United Kingdom	Article 26	Page 74

Question/ It is predicted that when the revised decommissioning plan for Krško NPP is completed, the cost estimate for decommissioning and

Comment waste management will increase. Is there an estimate yet of the range of the likely increase?

Answer The decommissioning plan for the Krško NPP has to be endorsed by the governments of the Republic of Slovenia and the Republic of Croatia. Since there have been recent changes of the government of both countries, the endorsement will take some time. At this point of time we would not like to speculate about the new fee for the decommissioning of the Krško NPP, though we can confirm that there will be an increase compared to the existing fee, which is 3,00 EUR/MWh (adopted according to the 2004 decommissioning plan).

Q.No 39	Country United States of America	Article Article 26	Ref. in National Report F, 74
Question/ Comment	The National report states that there are no specific decommissioning regulations and the decommissioning financial assurance for the reactor and mines will be assumed by the government. However, there are other facilities in Slovenia that may require decommissioning in the future. Does Slovenia intend to develop decommissioning regulations in the future? Please also explain and provide a brief discussion on how decommissioning is considered during the siting, design, construction and operation of nuclear facilities in Slovenia per Articles 7/14 and 9/16		
Answer	At present there only three nuclear facilities that are subject to decommissioning, the NPP Krško, RR TRIGA and the Central waste storage. The latter two are not considered to be a big issue since the amount of waste is estimated to about 100 m3. On the basis of the regulation Rules on Radiation and Nuclear Safety Factors (JV5) the decommissioning plan is for the first time requested as a licensing document in application for SNSA consent to construction of nuclear facility. The decommissioning program must be reviewed and updated at a minimum in the scope of the periodic safety review of the facility to reflect any changes in the strategy of decommissioning, developments in technology, amendments in legislative provisions and modifications to the facility that may have impacts on the facility's decommissioning, progress of the decommissioning works, deviations from the planned program and the needs for decommissioning activities.		
Q.No 40	Country Czech Republic	Article Article 27	Ref. in National Report general
Question/ Comment	Do you have any negative experiences with protests of environmental activist during transports of radioactive waste and spent fuel according to the Council Directive 2006/117/Euratom?		
Answer	So far in Slovenia there have been no negative experiences with protests of environmental activists during transports of radioactive waste and spent fuel.		
Q.No 41	Country Czech Republic	Article Article 27	Ref. in National Report I/105
Question/ Comment	Did your national competent authority find any noncompliance related to the spent fuel or radioactive wastes transboundary shipments?		
Answer	Only in one occasion the transport index on shipment in transit was not properly specified. The problem was resolved at the border crossing with Slovenia.		
Q.No 42	Country United States of America	Article Article 28	Ref. in National Report J, 107
Question/	The report notes that Slovenia reported to the European Commission in December 2010 on the experience gained through the		

Comment implementation of the integration of Council Directive 2003/122/Euratom of 22 December 2003 into national law. What impacts did this have on Slovenia's regulatory infrastructure?

Answer The transposition of the Council Directive 2003/122/Euratom did not create difficulties since the majority of legal requirements already existed in Slovenian legislation. Therefore it had very little impact on Slovenia's regulatory infrastructure. A few legal requirements not implemented at that time, were transposed into the national legal framework by amendments of two subsidiary regulations in early 2006.

So far, Slovenia has not received any comment on relevant report submitted to the European Commission in December 2010.

Q.No	Country	Article	Ref. in National Report
43	Argentina	Article 32	Page 15

Question/ Comment What kind of conditioning of spent fuel elements is foreseen previous their transference to a deep geological repository?

Answer In case of a direct disposal of SF in geological repository, the approach developed by Swedish SKB is a reference scenario for SF conditioning. According to this approach the SF elements should be encapsulated in copper canisters and transferred with a special transport cask to the disposal position.

Q.No	Country	Article	Ref. in National Report
44	Argentina	Article 32	Page 17, 5th Para

Question/ Comment Would you mind giving more information about the characterization of historic radioactive waste?

Answer The characterization of historic radioactive waste in the Central Storage Facility (CSF) at Brinje was carried out in the years 2005 and 2008. During the detailed characterization process all institutional low and intermediate level radioactive waste, which was stored at the CSF were characterized, sorted, dismantled and re-packed. All waste was re-packed according to the valid waste acceptance criteria for CSF, the non-radioactive waste and waste components were discarded from the CSF, the radioactive waste inventory database was updated with the missing data. Based on the results of the characterization, re-arrangement of packages inside the CSF was made.

Q.No	Country	Article	Ref. in National Report
45	Argentina	Article 32	Page 20, 5th Para

Question/ Comment What is the procedure that Slovenia apply to verify the compliance with the clearance levels for metals?

Answer All metals which are subject to clearance procedures are measured for surface contamination and volume distributed contamination (in depth contamination) and verified for compliance with limits for surface contamination defined in a Decree on dose limits, radioactive

contamination and intervention levels and limits for general mass specific clearance levels defined and in a Decree on practices involving radiation. The material is also checked for removable contamination.

Q.No 46	Country Argentina	Article Article 32	Ref. in National Report Page 21, Last Para
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Question/ Comment Which were the criteria employed for establishing the authorized levels for liquid discharges to Sava River?

Answer Authorized levels for discharges from the research reactor are set in the form of dose constraints for the critical group from the population with the value of 50 $f\dot{Y}Sv/year$. However, the operational constraints, upon which liquid discharges are released to the Sava river are much lower. In practice, liquid discharges are released only when they reach the levels of unconditional clearance for liquids (according to Slovenian legislation, Decree on dose limits, radioactive contamination and intervention levels).

Q.No 47	Country Argentina	Article Article 32	Ref. in National Report Page 29
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Question/ Comment Concerning tasks carried out in the auxiliary building at Ksrko NPP, do you have any immobilization process in use for radioactive liquid waste such as cementation, and if so, do you use “in drum” process?

Answer Up to 1998, classical immobilization with cementation was used. Since then In Drum Drying System has been installed and put in operation. Evaporator concentrate and spend ion exchange resins are dried in stainless steel drums and as such stored in a Temporary Storage Facility.

Q.No 48	Country Croatia	Article Article 32	Ref. in National Report B, 13
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Question/ Comment In Executive Summary under Governmental Policy on page 10 it is stated that NPP Krško shall continue to operate until 2023 with an option of life time extension.

What formal decisions Republic of Slovenia made or what documents were approved by governmental bodies regarding establishment of a new NPP (or new block in Krško NPP)?

Answer The draft of the revised midterm national energy plan (until 2030) foresees a possible construction of a new 1000-1600 MWe NPP at the location of the Krško NPP. The plan is to be adopted by the Parliament in the near future.
So far, there have been no other formal documents related to the new nuclear unit in Krško approved by the Government.

Q.No 49	Country Croatia	Article Article 32	Ref. in National Report B (i) & (ii), 13,16
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Question/ Comment Resolution on the 2006-2015 National Programme for Managing Radioactive Waste and Spent Nuclear Fuel was adopted by the Slovenian Parliament in February 2006. The National Programme implements the relevant provisions of the Agreement with Croatia

but not the first revision of the Programme for Decommissioning of the Krško NPP and Management of LILW and SF approved in 2004 by Slovenian government and Croatian parliament regarding LILW management. Why?

Answer The National Programme for Managing Radioactive Waste and Spent Nuclear Fuel was prepared taking into account relevant provisions of the Agreement with Croatia and relevant provisions of the Programme for Decommissioning of the Krško NPP and Management of LILW and SF, to the extent commensurate with the context of the National Programme. It should be noted that the latter is revised in 10- to 15-year intervals while revisions of the decommissioning plan are conveyed in 5-year intervals.

Q.No 50	Country Croatia	Article Article 32	Ref. in National Report B (iv),
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Question/ Comment Regarding the projections of LILW generation in Krško NPP what are the plans for utilization of Krško NPP radioactive waste storage?

Answer According to the approved Waste Management Program all generated waste is to be stored in space still available in the Temporary Storage on site. The manipulation area in the Storage can also be used in case the Final Repository is not available on time.

Q.No 51	Country Ukraine	Article Article 32	Ref. in National Report Ann. e), page 114
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Question/ Comment Which technology is planned to incinerate ion-exchange resins? Will the incineration facility be installed at the NPP site?

Answer Ion-exchange resins are now being dried in In-Drum Drying System. The Krško NPP considers external incineration service as an option. Momentarily, they do not plan to install incineration facility on site.

Q.No 52	Country Ukraine	Article Article 32	Ref. in National Report page 7
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Question/ Comment What is the origin of radioactive debris, which is stored on Jazbec site?

Answer The debris disposed at the Jazbec disposal site is mostly the mining waste. The details on disposed material are given in Table 10 of the fourth Slovenian Report.

Q.No 53	Country Ukraine	Article Article 32	Ref. in National Report page 16
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Question/ Comment What are the requirements to seismic robustness of spent fuel pool's?

Answer Spent fuel racks are classified as Safety Class 3 and Seismic Category I structure and designed according to the limits of ASME Boiler

& Pressure Vessel Code, Section III, Division 1, Subsection NF.

Q.No	Country	Article	Ref. in National Report
54	United Kingdom	Article 32	P.7

Question/ Comment What are the implications for spent fuel and radioactive waste storage of life extension of the Krško NPP?

Answer In case of life extension beyond 2023 spent fuel storage capacity will need to be further evaluated considering options such as spent fuel reracking and/or dry cask storage. Current capacity of the spent fuel pond is sufficient for the planned operation until 2023. The existing radioactive waste will be disposed of in the final repository which still has to be built. Doing that will result in having enough space for operational waste.

Q.No	Country	Article	Ref. in National Report
55	United Kingdom	Article 32	P.28

Question/ Comment What is the position with respect to “permanent closure” of the Jazbec disposal site and is it planned for it ever to be free of institutional control?

Answer Permanent closure means the completion of all the measures necessary for long-term safety of a disposal site. After the finalization of all works the disposal site will undergo long-term surveillance. The SNSA already received an application for approval of the permanent closure. It is possible that a license will be issued in 2012. After that the site will become a government property with limited (authorised) use for an indefinite period of time.

Q.No	Country	Article	Ref. in National Report
56	United States of America	Article 32	B, 19

Question/ Comment The slow progress in deploying a LILW repository is also impacting storage capacity for this waste at NPP Krško. Storage space is described as “almost exhausted,” but it appears new space is being developed in the storage building. Please provide the latest status of solving this problem during your national presentation at the Review Meeting.

Answer NEK will provide the latest status of solving this problem during the national presentation at the Review Meeting.

Q.No	Country	Article	Ref. in National Report
57	United States of America	Article 32	Executive Summary, 10

Question/ Comment The municipality council of Krško gave its consent to host a LILW repository in July, 2009. Due to uncertainties about the decision on a joint solution for the disposal of LILW, preparing the environmental impact assessment, and the safety case, the project is progressing at a “slow pace”. Are there any new developments in moving this key project to a faster pace and achieving the proposed operational objective for 2013? If so please describe. What are causing the uncertainties on a joint solution?

Answer So far Slovenia and Croatia have not reached an agreement on joint solution regarding the disposal of radioactive waste and spent fuel

due to operation of the Krško NPP.

In 2008, Slovenia and Croatia started the preparation of a Program of NPP Krško Decommissioning and SF&LILW disposal revision 2. In this document several different possible scenarios and timescales are provided. Among them there is also a joint solution for a LILW disposal facility. The document is still under discussion. Due to the uncertainties it is not possible to provide a firm timescale to achieve an operational LILW repository.

Q.No	Country	Article	Ref. in National Report
58	United States of America	Article 32	K, 109

Question/ Comment The report does not mention whether Slovenia is considering the implications and lessons learned with respect to spent fuel and radioactive waste management facilities resulting from the Fukushima incident in Japan. If so, please describe.

Answer Slovenia is considering implications and lessons learned with respect to spent fuel and radioactive waste management in the NPP Krško resulting from the Fukushima incident in Japan. Some (short-term) changes regarding SF have been already implemented. Long-term management implications are currently under review and/or in the process of implementation. More details can be found in the National Stress Test Report from the end of 2011, which is publicly available.

Q.No	Country	Article	Ref. in National Report
59	United States of America	Article 32	K, 109

Question/ Comment The report does not mention Directive 2011/70/EURATOM on establishing a Community framework for responsible and safe management of spent fuel and radioactive waste arising from both the nuclear and non-nuclear sectors. Will the final Directive have any substantial effect on the current regulatory requirements, and if so, how?

Answer The provisions of the directive mentioned were compared with the national legislative framework in this area. It was concluded that the existing national legislation and bilateral agreements are in compliance with the Directive.

Q.No	Country	Article	Ref. in National Report
60	Australia	Article 32.1.1	Page 14

Question/ Comment Is there a clear plan to develop the facility for ultimate disposal of the spent fuel by 2065?

Answer Geological disposal in hard rock is planned as a reference scenario, multinational option is also kept open. In case of a reference scenario and assuming NPP Krško operation until 2023 one joint deep geological repository (either in Slovenia or Croatia) would be operating from 2068-2077 and then be closed 5 years later. In case of NPP Krško lifetime extension to 2043 the joint repository would be operating from 2088-2102 and then be closed 5 years later. However, at present no detailed plans have been developed yet.

Q.No	Country	Article	Ref. in National Report
61	Germany	Article 32.1.2	B, 14-16
Question/	According to the report, a project of increasing the storing capacity of the spent fuel pool (reracking) was completed in 2003. After		
Comment	reracking, the spent fuel racks are of two types. The old racks (621 storage locations) are designed without neutron poison control, while the new racks (1073 storage locations) are designed with neutron poison control. For the new racks, criticality safety is assured by geometrically safe configuration, the use of a borated stainless steel absorber sheet and a procedure to verify that the reactivity equivalence curve is met. Does the criticality safety assessment of the new racks include a minimum burn-up credit? Is there any surveillance of a possibly reduced boron efficiency in the borated stainless steel absorber sheets?		
Answer	Yes, criticality safety assessment of the new racks includes a minimum burn-up credit – minimum required burn-up is provided as a function of initial U-235 enrichment of the fuel assembly. Yes, there is a plant program established specifying surveillance requirements (tests, frequency...) for borated stainless steel absorbed sheets in order to determine efficiency of the boron in the sheets (ED-4, Surveillance Program for Borated Stainless Steel Sheets).		
Q.No	Country	Article	Ref. in National Report
62	Australia	Article 32.1.4	Page 21
Question/	What does the statement “The hazards associated with radioactive waste management are kept reasonably low” mean in quantitative		
Comment	terms?		
Answer	In case of a severe accident (fire) in the Central radioactive waste storage at Brinje the most exposed individual from the population would receive a dose of 270 nSv under assumption of 1 hour inhalation of contaminated air in a cloud 1000 m away from the burning repository.		
Q.No	Country	Article	Ref. in National Report
63	Hungary	Article 32.1.4	Section B, page 21
Question/	It is mentioned in Section B that the Krško NPP has started using an external service for the incineration of combustible waste and		
Comment	melting of metal radioactive waste material. What kind of combustible waste is incinerated by Krško NPP? Is it possible to recycle the metal after melting?		
Answer	Burnable compressive waste like protective clothing and equipment, plastics and others, accepted by a service provider are incinerated. Waste has to meet all Waste Acceptance Criteria put into force by a service provider. Ash and filter dust are returned to and stored in the Temporary Storage Facility on the NPP site. Two metal melting campaigns have been performed until now. Melted metal meeting criteria, was free-released. The rest of the metal has been returned to the NPP and no recycling has been done yet. Nevertheless, the NPP considers to recycle it in the future.		