ΕΛΛΗΝΙΚΗ ΕΠΙΤΡΟΠΗ ΑΤΟΜΙΚΗΣ ΕΝΕΡΓΕΙΑΣ
EEAE GREEK ATOMIC ENERGY COMMISSION

Joint Convention
on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Seventh Review Meeting (June-July 2022)

Questions Posted to Greece by the Contracting Parties and Answers provided by Greece, pp. 2-13

A. Questions Posted to Greece by the Contracting Parties and Answers provided by Greece

Posted By	Article	Ref. in National Report	Question / Comment	Answer
Switzerland	Article 27	Section I, p. 26	Does the regulatory body (Greek Atomic Energy commission) conduct any inspections in the transport of radioactive substances?	EEAE conducts inspections to all practices utilizing ionizing radiation, including the transport of radioactive material.
Switzerland	Article 27	Section I, p. 26	Is the Greek Atomic Energy commission also responsible for authorizations of transboundary movements?	EEAE is responsible for the notification and the authorization, i.e. registration or licensing, of the transport of radioactive material, including transboundary shipments. Notification or authorization applies per package basis and UN number.
Switzerland	Article 27	Section I, p. 26	How are the international regulations (e. g. IAEA SSR-6) for the transport of radioactive material implemented into national regulations?	IAEA SSR-6 are reflected in the international provisions for the transport of dangerous goods and the relevant EU legal instruments. The latter are transposed to the national framework, per transport mode, including Class 7 radioactive material.
Switzerland	Article 27.2	Section I, p. 26	We found that Greece have acceded to the Antartic Treaty. This should be mentioned in your next national report.	Thank you for the comment. We will mention it in the next report.
Switzerland	Article 24	Section F, p. 18	What is the difference between "Activity Work Control" and "Radiation Work Permits"? Which requirements are laid down for those aspects of the radiation protection program?	"Activity Work Control" is all procedures and measures undertaken by the operator, based on engineering controls, to ensure that a work is conducted in a systematic manner, according to the local rules and in compliance with the radiation protection requirements. The activity work control includes the control of access to the radioactive sources, the reduction of exposure times, the distance between the worker and the source or the use of specialized Personnel Protective Equipment (PPE) and respiratory protection equipment. "Radiation Work Permit" is the permit granted by the operator (usually by the radiation protection officer, RPO) to a staff member to conduct a specified work. This kind of permit is related to administrative control of personnel entering or working in restricted areas.

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Switzerland	Article 32	B, p. 6	«The national policy aims to […] look into the possibility of concluding cross-border agreements for the shipment of radioactive waste abroad for recycling or final disposal». «The import of SF&RW for disposal purposes within the borders of Greece shall be prohibited». Question: Is there any scientific rationale (e. g. earthquake hazards) to deny disposal of foreign radioactive waste inside Greece, while at the same time to seek export of RW to other countries? Comments: Export of RW bears the risk of losing control. A safe treatment, according to the Greece standards, might not be guaranteed abroad and challenged by e.g. financial shortage of the accepting country.	Import of foreign RW is not allowed. The infrastructure or the capacity to manage, treat, condition and dispose RW other than that produced in the country are not available. Export of RW originated in Greece for disposal is not a solution that is sought. Nevertheless, such option is mentioned in the policy document for legislative completeness, namely to reflect the references made: in Directive 2011/70/Euratom on the possibility of future relevant projects between member-states concerning sharing facilities for RW management; in Directive 2006/117/Euratom where it is recognized that agreements should be promoted between member-states in order to facilitate the safe and efficient management of radioactive waste or spent fuel from Member States that produced it in small quantities and where the establishment of appropriate facilities would not be justified from a radiological point of view. However, it is clear that this possibility is not considered in the actions of the national program of SF & RW management.

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United States of America	Article 32	B (iv), p. 7	The U.S. commends Greece's prompt action to address radioactive waste management challenges identified during the 6th Review Meeting. The report states that most radioactive waste in Greece is low-level waste. However, "a very small amount of [intermediate level waste] may eventually arise, mainly from some parts of the dismantled core of the reactor. This type of [radioactive waste] is stored in a safe place in the reactor building." How long does Greece plan to store this material in the reactor building before pursuing disposal in a not-yet-built engineered near-surface disposal facility?	We thank the U.S. for the kind compliment. The research reactor spent fuel has been repatriated. Characterization of the radioactive waste material stored at the research reactor facility by the operator showed that the remaining activated and contaminated materials and components can be characterized as LLW and small amounts as ILW. Therefore, the operator management strategy comprises retaining these materials under safe storage at the reactor facility, pending developments regarding the proposed near-surface disposal facility. This is considered to be the best available option, since the reactor facility retains its surveillance, radiation and physical protection programs, as well as the availability of operator personnel with relevant experience and facility knowledge. There is currently no plan as to the storage time of these materials. Nevertheless, according to the national legislation (PD No 122/2013 as amended by PD No 91/2017), the maximum storage time may not exceed one hundred (100) years.
Switzerland	Article 29	p. 19-20	Is there no preliminary decommissioning plan for GRR-1 that has to be updated on a regular basis? Does the national legislation require a decommissioning concept/plan during the licensing process (from planning, constructing, to operating)? How is the later decommissioning financed?	The national legislative framework (MD No Π/112/305/2012 as amended in 2017 and 2020) includes requirements for the decommissioning planning during all licensing processes of the facility. The operator is in the process of the preparation of the research reactor decommissioning plan. Nevertheless, funds have not been allocated to the reactor decommissioning project yet.

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Russian Federation	Article 32	Section K	It is mentioned on page 28 of Greece NR that since the last review meeting the second version of the National Programme for the management of spent fuel and radioactive waste has been entered into force with specific milestones and clear timeframes. Could you list the key milestones and timeframes in the National Programme?	According to the second version of the National Programme there are two main actions: A. Recycling of sealed radioactive sources and other material with the following main milestones and time frames – Recycling of category 1 and 2 radioactive sources (40% by the end of 2022 and the rest by mid-2023). – Recycling of category 3 radioactive sources (by the end of 2023). – Export of the remaining quantity of unused (non-irradiated) nuclear fuel of the research nuclear reactor of NCSR “Demokritos” (by the end of 2021). – Exploring possibilities for the final export of the uranium fuel (fresh) of the National Technical University of Athens (2022). B. Temporary storage facility and radioactive waste disposal facility operation with the following main milestones and time frames - Memorandum of understanding between the regulatory body (EEAE) and the NCSR "Demokritos" related with the participation of the NRWIS of NCSR “Demokritos” (INRASTES) to the management of orphan sources (by the end of 2020). - Review and update of the regulatory framework for the licensing procedures of the management and storage waste facilities (by the end of 2022). - Decision making whether the existing NRWIS facility can be extended to accommodate a waste disposal facility (by the end of 2023).

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Russian Federation	Article 32	Section D	It is stated on page 11 of Greece NR that the research reactor at NCSR "Demokritos" is currently licensed for extended shutdown. Are there any regulatory requirements in Greece specifying maximum duration of extended shutdown?	The duration of the license for extended shutdown is five years. The operator shall submit the updated documentation for the renewal of the license before the end of the licensing period. There are no regulatory requirements for the number of renewal licenses issued for the same facility as long as the relevant regulatory requirements are satisfied.
France	Article 19	Page 4, section A Page 18, section F	The Report mentions that "de-characterization" activities are performed in the frame of the license given to INRASTES, in parallel with clearance criteria and the methods to verify the clearance, that are part of the Interim Storage license. Could Greece give information about past release of RW, in terms of quantities, type of waste and potential feedback of experience? Could you explain what are the abovementioned "de-characterization" activities? More precisely, to what extent is it linked to clearance activities?	The clearance procedures are planned on a case-by-case basis based on clearance criteria in radiation protection regulations. Techniques used to ascertain that clearance criteria are met: non-destructive gamma spectrometry, scanning by using of calibrated contamination monitors, sampling for radiochemical analyses for DTM radionuclides. Main clearance activities at the facility NRWIS: Clearance of operational waste by using the pre-mentioned techniques; clearance of Ge-68, Co sources used for calibration of medical equipment after storage and verification of clearance by using the non-destructive gamma spectrometry. The operator of INRASTES plans to apply the clearance criteria for the liquid waste in the near future.
France	Article 27.2	Section B - page 6	A Ministerial Decision stands that "the national policy aims […] to look into the possibility of concluding cross-border agreements for the shipment of radioactive waste abroad for recycling or final disposal." Is Greece already working out potential partnerships with specific countries to organize final disposal of RW outside its borders? Could Greece give more details on the terms of the cross-border agreement?	Greece is not working out potential partnership with other countries for the final disposal of RW abroad and puts in efforts for the RW final management, including disposal, within the country. The under question statement is included in the Ministerial Decision related with the policy of SF and RW for legislative completeness, to reflect the reference made in Directive 2011/70/Euratom on the possibility of future relevant projects between member-states concerning sharing facilities for RW management. Thus, details or other information on cross-border agreement do not exist,

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				other than the criteria established within EU in accordance with Article 16(2) of Directive 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent fuel.
France	Article 16.8	Section F - page 20	Research reactor GRR-1 is currently licensed for extended shutdown. A decommissioning plan could be established soon, i.e. 2021. Could Greece give detail about possible strategic guidelines, regulatory framework and allocation of responsibilities for the decommissioning of GRR-1?	The regulatory framework for decommissioning has been established consisting of one Presidential Degree (PD No 60/2012) and a Ministerial Decision (MD Π/112/305/2012 as amended in 2017 and 2020). NCSR-D has started the decommissioning planning activities establishing a core team for the implementation of the project. Moreover, a characterization of the radioactive waste inventory has been done. Since the research reactor spent fuel has been repatriated to the US under "The United States Department of Energy, US-DOE, Global Threat Reduction Initiative's U.S. Nuclear Remove Program, Foreign Research Reactor Spent Nuclear Fuel Acceptance Program", the remaining radioactive waste comprise activated and contaminated materials characterized as Low Level Waste and a small amount of ILW. Since a radioactive waste facility for the disposal of LLW and ILW is not available, the appropriate strategic option and indeed the one adopted by the operator for decommissioning of the research reactor is that of the Deferred Dismantling. Sufficient early dismantling and safe storage has been performed to active components, such as the grid and plenum, the reflectors, control rods, and the experimental beam tubes and irradiation rigs, to allow conversion of the facility to a safe enclosure. Final dismantling has been deferred to a later date with an intervening period to allow for the decay of medium lived

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				isotopes and pending developments regarding the availability of a disposal facility, as well as of funding for the decommissioning.
France	Article 15.2	section H - page 23 Section K - page 29	The Report indicates that there is currently no plans for construction of disposal facilities in Greece. It also states that decision-making is needed regarding a future disposal facility that could be built at a new site or on the extension of the existing storage facility. What are the current perspectives, plans and schedule to develop a disposal for the waste that is currently stored at NRWIS and GRR-1? Could you specify on what grounds the decision will be made?	The technical solution, currently considered, for the disposal of the radioactive waste is a near surface facility with engineered barriers (vault). According to the National Program, the feasibility of a disposal facility shall be first evaluated for the existing site where NRWIS and GRR-1 are located, as this solution shows some clear advantages (lower cost, shorter construction timeline, existing transport infrastructure, site already restricted, existence of security infrastructure, no foreseeable change in the use of the site, future institutional control and memory for the site can be maintained as it is unique and prominent as the single nuclear site in Greece). At the moment, a preliminary feasibility study for the disposal of the radioactive waste at this site is underway. The study assumes a typical near surface engineered facility, based on disposing the waste, grouted in drums, inside a concrete vault. The actual inventory and the corresponding estimation of the facility dimensions will be used. Higher activity waste (mainly activated metals from the past operation of the reactor) and/or longer-lived sources (e.g. Ra226) will be further segregated from the other waste by emplacement of the grouted drums in additional concrete boxes. The overall depth of the facility is considered equal to 10 m, the first 5 m, of which, will be clear of waste and serve as an engineered intruder barrier. The study concerns the estimation of the radiological impact during the post-closure period, by assuming an active institutional period of 100 years after the closure. Typical scenarios are considered

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				for human exposure, including, exposure via the underground water pathway and inadvertent intrusion. The end point of the study is the effective dose to a person, which will be compared to the dose constraint stipulated in the current regulations. A conservative approach will be followed in selecting the important properties and parameters regarding the geology and hydrogeology of the site area, along with a sensitivity analysis, which, in addition, can help specifying the most important parameters that might be further analyzed and/or measured in a next step.
France	Article 13.1.3	Section H- page 23	The report stands that the public should be given opportunities to participate in the decision-making process regarding SF&RW management. What is the framework for such public participation (organization, scope and terms of participation)? Has there already been such a participation for recent decisions about waste management? Is it planned to get the public involved in the future decisions about decommissioning of GRR-1?	The framework for public participation is ensured by two elements: open public consultation and proactive provision of public information. Open public consultations for SF & RW management have been conducted two times so far, during the development of two relevant legislation acts (PD No 91/2017 and MD No 131207/I3/2015), by means of the Government website www.opengov.gr. Numerous comments were received by the public and they were considered to revise the legislation texts. With respect to proactive provision of information, EEAE maintains web-pages with appropriate, detailed information regarding the management of SF&RW. Moreover, the RW inventory is uploaded to the EEAE website and systematically updated (Current inventory, as in Nov. 2021: https://eeae.gr/files/Current_INVENTORY.pdf). The initial decommissioning plan of the GRR-1 was developed by the operator during the authorization process of the facility. Although GRR-1 is at extended shutdown and all used spent fuel elements have been repatriated to the USA (in 2005,

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				2019), final decisions for the practical work plan, schedules and timeframes for the GRR-1 decommissioning have not been developed by the operator, yet. Therefore, the necessity for public participation to the decisions for the GRR-1 decommissioning, has not been considered yet.
France	Article 9.2	Section E - page 16 Section K - page 29	The report issued after the IRRS follow-up mission in 2017 states (discussion about the changes linked to Recommendation #15 from initial IRRS mission) that important limits and conditions such as the maximum volume of waste to be stored at the Interim Storage facility NRWIS would be defined in the update of the safety report that was due December 2017. Could Greece give information about the next steps following the IRRS 2017 mission, in relation with this topic?	The operator of the interim storage has not fully addressed this kind of information on the report submitted for approval and the issue still remains as one of the conditions of the operation license. However, there is improvement in this area, as the operator has started a procedure for a better system of recording of the disused sources and the estimation of the volume of the waste.
Germany	General	p. 32	In the matrix it is said that longer lived waste is stored until final management solution is available. Can you give the share of such a waste in comparison to all other waste-types? Are there any actions to be taken for this waste type due to the long-term storage?	The longer lived radioactive waste is about 5 % by weight to the total waste. The treatment and conditioning of this waste will be decided in the next years and will be compatible with the final disposal solution.
Germany	Article 12	p. 23	The operation licence of the interim storage of radioactive waste NRWIS was renewed 2015. What is the duration of an operation license in Greece and what is the procedure for a renewal process? Are periodic safety reviews for the interim storage prescribed?	The operation license was renewed in 2015 and again in 2019. An amendment to the last license was issued in 2021, due to changes in the one of the license conditions related with the security system. Based on the new regulatory framework the duration of the operation license for the interim storage is 5 years. The procedure for the renewal includes the submission of all documentation and information related with the radiation protection programme, the physical protection system, the emergency planning, the

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				quality assurance programme, the allocated resources and responsibilities and the training of personnel involved. Finally, based on the provisions of PD No 122/2013 as amended by PD No 91/2017, the license holder shall assess the safety of the facility periodically, taking into account possible changes, ageing effects, operational experience, the international experience and developments in research and technology.
Germany	Article 32	p. 7	A very few RW which concern regeneration bed resins and activated or contaminated objects in connection with GRR-1 operation have not been classified yet. What is the proportion of unspecified radioactive waste from the operation of the research reactor (activation products, resins) to the rest of the waste already declared? Has preparatory work for classifying of such waste been started?	The unspecified radioactive waste from the operation of the research reactor which have not been classified yet is about 10% by volume to the rest of the waste. The operator of the research reactor has already provided characterization lists of all radioactive components and materials at the reactor facility, including grid and plenum, pool and primary cooling system components, control rods, beryllium reflectors, water treatment systems, graphite pile, beryllium reflectors, experimental tubes, activated parts and components of irradiation rigs and facilities, equipment and instruments, radiation sources, as well as historic waste material stored at the facility.

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Germany	Article 32	p. 11	It is stated that the research reactor at NCSR "Demokritos" is currently licensed for extended shutdown. Are there any projects or plans to determine or characterize the radioactive waste inventory in this facility as a preparatory work for decommissioning?	The operator has already provided lists of all radioactive components and materials at the reactor facility, including grid and plenum, pool and primary cooling system components, control rods, beryllium reflectors, water treatment systems, graphite pile, beryllium reflectors, experimental tubes, activated parts and components of irradiation rigs and facilities, equipment and instruments, radiation sources, as well as historic waste material stored at the facility. Some remaining historic LL waste comprising activated or contaminated metallic components or parts of experimental facilities from the 60s and 70s will also be included in the above lists as soon as their characterization by measurement is completed. The above lists are considered the starting point for the decommissioning of the reactor facility.
Slovenia	Article 28	J	Do you in your country collect consumer goods and products containing radioactive substances? Do you have any restrictions on the available disposal options at the end of their useful lifetime? If yes, what are the basis for such decision?	The majority of consumer products containing radioactive substances in Greece are lightning rods containing Am-241 (typical 1000 -5000μCi) or Ra-226 (1000 μCi) sources used in the decades of 1970 and 1980 and smoke detectors containing Am-241 in the range of 0,5-72 μCi. Interim storage at licensed facilities (there are three in Greece) until their final disposal is the management option currently applied. Export of the consumer products at an approved facility for recycling is the desirable final management option.

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Iceland	Article 23	p. 17	Does EEAE have a certified quality management system for its own operations?	EEAE implements an integrated management system based on management by objectives. EEAE policy is to serve the public interest in accordance with our vision, mission and values, by providing high-quality services and regulatory work. The integrated management system, includes a quality management system and has been certified according to ISO 9001:2015 standard requirements. It incorporates all EEAE processes and accreditations.