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

Fifth Review Meeting (May 2015)

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

1.	Country Belgium	Article General	Ref. in National Report Section A

Question It is stated that "The license of the NRWIS facility was recently renewed by EEAE for the interim storage of radioactive waste and disused radiation sources, low activity sources dismantling, characterization of radioactive waste, re-packaging and re-sorting of radioactive waste and radioactive sources and de-characterization and clearance of radioactive waste."
The exact meaning of the word "de-characterization" is not very clear. Can Greece explain this more in detail?

Answer In this context "de-characterization" means the process followed in order to characterize a waste as non-radioactive.

2.	Country France	Article General	Ref. in National Report Executive summary

Question The Greek Report should include an Executive Summary where the main evolutions and updates that have occurred since the last report should be highlighted and where an overview of the follow-up of the last Review meeting, addressing among others the challenges and the measures to improve safety reported for Greece, should be clearly given.
This comment was already made by France about the previous Greek Report (4th edition).

Answer Changes and developments since the last review meeting are clearly summarized in the Introduction section of our National Report. An executive summary is not included in our National Report since it is not foreseen in the Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3, 18 December 2014).

3.	Country France	Article General	Ref. in National Report Section A: p. 4

Question According to the new Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3 Draft 3), Greece's National Report should include an overview matrix to be used by the Rapporteur during the Country Group review.

Answer We thank for the comment. The overview matrix was omitted by mistake but it will be provided to the rapporteur in the conference.

4.	Country France	Article General	Ref. in National Report Section K: p.29

Question According to the new Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3 Draft 3), Greece should change the title of section K into "General Efforts to Improve Safety". Section K of the Report of Greece should describe the objectives (medium or long term) associated with future activities to improve safety.This last comment was already made by France about the previous Greek Report (4th edition).

Answer We believe that the text reflects the “General Efforts to Improve Safety”. However, from the formal point of view, we accept the comment.

5.	Country South Africa	Article General	Ref. in National Report A, 4

Question ‘GRR-1 is licensed for extended shutdown’.
For how long has been the license granted?

Answer According to the legislation the duration of the extended shutdown license is up to five years. The current license is a license under conditions granted for one year.

6.	Country Czech Republic	Article Article 3	Ref. in National Report C, 10

Question Do you have developed guidelines for the control of NORM to adequately protect public health and the environment?

Answer The Radiation Protection Regulations (transposition of EC Directives 96/29 and 97/43Euratom) include provisions for radiation protection of workers in NORM industries.
NORM industries and NORM depositions are under the regulatory control of EEAE. In this respect and in the framework of EEAE environmental monitoring programme, systematic inspections and measurements (in situ and laboratory) are performed.
Since the whole Radiation Protection Regulatory Framework is under revision on the occasion of the transposition of the new EC Directive 59/2013 Euratom, the NORM issues will be revised accordingly.

7.	Country South Africa	Article Article 3	Ref. in National Report C,10

Question ‘(b) Greek legislation declares waste that contains NORM as radioactive waste, only if the exposure to the general public exceeds predefined limits’.
Can you give more information regarding predefined limits?

Answer The existing Radiation Protection Regulations (transposition of EC Directives 96/29 and 97/43Euratom) include provisions for radiation

protection of workers in NORM industries.
Additionally, EEAE has adopted the EC Publication RP122 (Part II), where a specific methodology is proposed for the regulation of NORM industries:

a. for a specific exposure situation and all pathways, a dose level for the public, is proposed (300μSv/y).
b. according to specific exposure scenarios provided in the document, the above mentioned dose can be transformed to a measurable physical quantity (radionuclide concentration).
c. a table is produced with a list of natural radionuclides and respective concentrations.

Since the whole Radiation Protection Regulatory Framework is under revision on the occasion of the transposition of the new EC Directive 59/2013 Euratom, the NORM industry issues will be revised accordingly.

8.	Country Czech Republic	Article Article 11	Ref. in National Report H, 25

Question What is the process of radioactive organic liquids waste treatment and conditioning?

Answer Organic liquids originate from research and biology experiments (scintillation counters), where very small amounts of radioactivity are used. In this respect, the radioactivity concentration is below clearance levels and the organic liquids are not treated as radioactive.

9.	Country Belgium	Article Article 12	Ref. in National Report Section H

Question It is stated that “Solid radioactive waste is permitted to be disposed as ordinary waste if it does not contain reusable objects and its concentration is below the clearance levels for each radionuclide.” Could Greece precise what are the clearance levels used for solid waste and how are they determined?

Answer The Radiation Protection Regulations include a table with the clearance levels for solid waste based mainly on EC Publication RP122 (Part I). These levels are identified from a derived-limits analysis to ensure that the dose to the public remains below the 10 μSv/y for each specific practice (according to EC Directive 96/29/Euratom). Additionally, EEAE adopted EC Publication RP122 (Part II), where a specific methodology is proposed for the regulation of NORM industries:

a. for a specific exposure situation and all pathways, a dose level for the public, is proposed (300 μSv/y).
b. according to specific exposure scenarios provided in the document, the above mentioned dose can be transformed to a

measurable physical quantity (radionuclide concentration).

c. a table is produced with a list of natural radionuclides and respective concentrations.

Radiation Protection Regulations are under revision on the occasion of the transposition of the new EC Directive 59/2013 Euratom.

10.	Country Belgium	Article Article 12	Ref. in National Report Section H pg 25/33

Question It is stated that: "Regulatory system for controlling waste from nuclear medicine labs (…). The RPR contain the following provisions: Liquid:

- The disposal of liquid radioactive waste to the public drainage is permitted only if the maximum concentration in any part of it is less than 1GBq/m3. "

The activity concentration of the releases from nuclear medicine labs appears to be rather high. Which radionuclides are concerned by this release limit? How was determined this activity concentration limit?

Answer In nuclear medicine laboratories, the short lived radionuclides usually used for diagnostic or therapeutic practices are such as Tc-99m (6h), F-18 (2h), Tl-201(2.6d) and I-131 (8d).

The value of 1 GBq/m3 refers to the max concentration at any part of the drainage system of the laboratory, i.e. inside the laboratory, prior to the connection to the outer public drainage system and it is related to a potential external exposure of a worker inside the facility (eg a plumber that will repair a pipe, a worker that is seated close to a pipe, etc).

As it concerns the release criteria from the nuclear medicine laboratories, since unconditional releases are not foreseen, RPR include a table with values of concentrations per radionuclide in liquids, above which the release is not allowed. These values have been deduced taking into account conversion factors (Sv/Bq), dose limits for the public and relevant scenarios.

The licensee has the prime responsibility for the implementation of the above daily release criteria and for keeping the respective records.

11.	Country Germany	Article Article 15	Ref. in National Report p. 29 (Section K)

Question Safety assessment report:

Prior to the JC Fourth Review Meeting in May 2012, Greece answered the question of France, how the experience feedback of the Fukushima accident will be taken into account regarding the safety of spent fuel and radioactive waste management in Greece with:

"A new SAR is under preparation taking into consideration IAEA guidelines and the experience feedback of the Fukushima [accident] with relation to the prevention of natural risks. Regarding radioactive

waste management, the step-up of the safety measures against fire and flood for the radioactive waste management facility, as well as the emergency preparedness plan are included in the licensing process". Could you please provide more specific information on the current status and progress achieved so far in these projects?

Answer In respect to the nuclear fuel, since the last review meeting the research reactor GRR-1 did not proceed to operation. A license for extended shutdown was issued in 2014. Currently there is no spent fuel in the reactor, only irradiated LEU fuel, which is safely stored until repatriation to the US under surveillance conditions and measures approved by EEAE.
In respect to the radioactive waste management facility, due to its site morphology, flooding is not considered to be applicable. Fire protection, including fire both inside and outside of the facility is taken into account in the emergency planning of the facility, submitted, as part of the facility's safety documentation, during the recent licensing.

12.	Country South Africa	Article Article 19	Ref. in National Report E,14

Question Is the public invited to participate during the process for issuing a license or during the drafting of legislative documents?

Answer Regarding publication of safety relevant documents, EEAE has published on its website the safety evaluation reports and the licenses for the reactor and the radioactive waste storage facility.
In the Presidential Decree No 122 (PD122) of 2013, (transposes the EC Directive 2011/70/Euratom for the responsible and safe management of spent fuel and radioactive waste), the requirement for public information and participation in decision making regarding the management of radioactive waste and spent fuel is explicitly provided. In PD 122 legislative documents of second degree are foreseen in which the requirement for public information and participation shall be specified. These documents have been drafted and are in the process of Ministerial approval and signing.
As a kind of example of the provisions: The authorization process of a radioactive waste management facility requests the safety evaluation report to be sent to the prefecture and posted on the Internet for consultation. Reactions by the prefecture, interesting parties and the public are requested to be submitted to EEAE within 30 days for evaluation. Only after this step EEAE can further proceed.
As a general rule, established platforms and initiatives taken by the Government (e.g. http://diavgeia.gov.gr/, http://www.opengov.gr) aim at the participation of the general public in the decision making process applied in the public sector.

13.	Country Bulgaria	Article Article 20	Ref. in National Report p. 16

Question On page 19 of the report is noted that the Regulatory Authority (EEAE) manages a National Radiation Protection Database. Could you give more information about the data that are included in it.

Answer The National Radiation Protection Database (home-made application based on the INGRES commercial product) of EEAE includes: data regarding the facilities using or producing radiation (infrastructure, inspection results, list of personnel, etc.);

- data regarding the number of medical examinations and therapies involving ionizing radiation and the typical doses to patients;
- the inventory of the radiation sources used in the country as well as the inventory of the disused and orphan sources;
- the National Dose Registry, where information related to occupationally exposed workers and the registered doses are kept. This database also includes data about the educational background of those working with ionizing radiation;
- data regarding the transport of radioactive materials at national level, including the distribution of radionuclides/radiopharmaceuticals;
- the environmental radioactivity measurements' results;
- the results from electromagnetic fields, in situ inspections and measurements.

Recently EEAE developed an effective tool for electronic management of its regulatory, control and supervisory work; environmental radioactivity measurements, radon concentrations, data on ionizing radiation laboratories in the country, results of inspections, test doses / patients, doses of the occupationally exposed workers, data on ultraviolet radiation (UV) systems etc, are collated to an e-platform made available to public and/or professionals according to different access rights.
Beneficiaries of the project outcomes are:

- the general public,
- stakeholders and interested parties of the radiation protection system in the country (e.g. physicians, technicians, medical physicists, staff working in solarium centers),
- occupationally exposed workers,
- the central and local authorities involved in the licensing process of radiation facilities (Ministries, Regions).

The project will contribute to the optimization of the radiation protection system in the country and of the services provided to citizens and organizations, in line with the principle of transparency.

14.	Country Ireland	Article Article 20	Ref. in National Report p.19

Question Ireland notes with interest EEAE's plans for full compliance with the requirements of IAEA Safety Standard on the Management System for facilities and Activities (GS-R-3) and is interested to learn more about those plans and the anticipated improvements to EEAE's operations and activities through full compliance.

Answer In 2013, EEAE has integrated the pre-existing systems (accreditations based on ISO 17025 for the laboratories, ISO17020 for inspections and 29990 for E&T) under the umbrella of ISO 9001 at first and IAEA GS-R-3 Safety Standards, "The management system for facilities and activities", afterwards. The recommendations and suggestions of the IRRS Mission in May 2012 regarding the management system of EEAE were taken into account. A working group was appointed in order to set the framework for the development of an integrated management system within our authority.
The main features of the developed integrated management system are the following:

a. The harmonisation of all records and files of the pre-existing quality management systems under the umbrella of a new system according to ISO:9001 and GS-R-3
b. A new process for the organizational structure of EEAE based on risk analysis
c. The safety culture is explicitly mentioned in the new integrated management system; a working group is tasked to evaluate the, up to now status, and to develop an improved one, based on the results of a specially designed questionnaire.
d. The graded approach has been introduced in the integrated management system, mainly in the inspection part and soon in the licensing process.

The implementation of the above requires the combined and simultaneous effort by all the personnel of EEAE and the active support/commitment of the senior management. A lot of work has been done and the previous system is significantly upgraded. The internal inspections have shown that there are still a few issues to be settled, but we believe that the system applied is in compliance with GS-R-3 requirements.
EEAE consider that the implementation of the integrated management system has resulted so far to the following improvements:

a. The communication of safety culture within EEAE's personnel has been improved
b. The decisions taken are based on more objective criteria
c. The common understanding of all the procedures is significantly improved due to the new homogenized system

d. Safety in the working place has been upgraded
e. The policy statement is well communicated to all EEAE's personnel
f. The setting up of EEAE's strategical goals and their continuous dissemination to the personnel has improved everyone's attitude towards his/her work and clarified his/her role within the organization.

Finally, it is worthwhile to mention that, so far, the implementation of the integrated management system does not seem to have any effect in term of spending savings.

15.	Country Belgium	Article Article 20.1	Ref. in National Report Section E

Question It is stated that "Full compliance with requirements of IAEA Safety Standard, The Management System for Facilities and Activities, GS-R-3, is also a goal for EEAE and is currently in progress." Could Greece give more details about the planning for this action?

Answer In 2013, EEAE has integrated the pre-existing systems (accreditations based on ISO 17025 for the laboratories, ISO17020 for inspections and 29990 for E&T) under the umbrella of ISO 9001 at first and IAEA GS-R-3 Safety Standards, "The management system for facilities and activities", afterwards. The recommendations and suggestions of the IRRS Mission in May 2012 regarding the management system of EEAE were taken into account. A working group was appointed in order to set the framework for the development of an integrated management system within our authority.
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d. The graded approach has been introduced in the integrated management system, mainly in the inspection part and soon in the licensing procedure.

The implementation of the above requires the combined and simultaneous effort by all the personnel of EEAE and the active support/commitment of the senior management. A lot of work has been done and the previous system is significantly upgraded.

The internal inspections have shown that there are still a few issues to be settled, but we believe that the system applied is in compliance with GS-R-3 requirements.

16.	Country Belgium	Article Article 22	Ref. in National Report Section F

Question It is stated that "For the import of sealed radioactive sources, licensing imposes that full financial provisions are made by the licensee for waste management and the return of the sealed sources to the manufacturers. In case the collected funds are insufficient for the real costs of management, the government will cover the difference (implementation of HASS Directive)."
Does there exist a system/institution to control the financial provisions?

Answer Prior to import of radiation sources, an official written declaration is required by the source owner (licensee) for undertaking all financial and administrative provisions to export the source back to manufacturer or other licensed storage/recycling facility abroad, as well as an official written declaration from the source manufacturer for accepting back the source after its useful life.

EEAE has taken provisions for the safe and secure interim storage of orphan sources or sources that cannot be exported to manufacturer or other source recycling or management facility (e.g. in case of bankruptcy, facility closure, etc). These provisions include the collection and the temporary storage of the sources in the interim storage facility in NCSR "Demokritos", until they are exported to a recycling facility abroad.
Currently, there is no system/institution to control the financial provisions.

17.	Country South Africa	Article Article 22	Ref. in National Report F,20

Question Do you request a periodic review from the Licensee of his financial provisions for waste management?

Answer There are no specific requirements in the existing legislation for periodic review of the financial provisions for waste management from the licensee. There are legal obligations (Article 9 in Presidential Decree 122 of 2013) regarding the adequacy of the financial resources and the responsibility of the waste producer to bear the cost of the waste management. In addition, as provided in article 12 of the Presidential Decree 122, the plans for the funding of the management of radioactive waste shall be part of the National Program, recently drafted, as part of the secondary legislation implementing the EC Directive 2011/70/Euratom for the responsible and safe management of spent fuel and radioactive waste.

18.	Country Belgium	Article Article 25	Ref. in National Report Section F

Question It is stated that "The emergency plan for the NRWIS facility is based on the assessment of the possible risks and dangers that might arise: (i) during the RW management activities (ii) in case of fire (iii) in case of larceny."
Are these the only identified risks that are taken into account? What is considered about earthquake, flooding, station black out, etc.?

Answer Due to the morphology of the facility's location, the facility is not considered to be vulnerable to flooding. Earthquake or station blackout are not expected to have any significant radiological impact and are not taken into account in the emergency planning of the facility.

19.	Country Czech Republic	Article Article 25	Ref. in National Report F, 22

Question How often is National Emergency Plan for Civil Protection updated? What is the content of this plan? Who is responsible for processing the document?

Answer The National Emergency Plan for Civil Protection is under the responsibility of the General Secretariat for Civil Protection. It covers the management of the consequences from major disasters (earthquake, flood, fire etc). Its Annex "R" deals with the management of the consequences after a nuclear accident and EEAE Chairman is responsible for its activation. The Plan is constantly updated by the General Secretariat for Civil Protection. An overall review and revision of the Plan is initiated when such a need is identified. Presently, the Annex "R" of the Emergency Plan is under revision on the occasion of the transposition on the national legislation of the EC 59/2013/Euratom Directive (new BSS).

20.	Country Austria	Article Article 26	Ref. in National Report page 23

Question Are there any plans for working out a decommissioning concept for the research reactor GRR-1? What is the actual schedule for working out such a decommissioning plan?

Answer NCSR "Demokritos", owner and operator of the Greek Research Reactor GRR-1, has the legal obligation to submit a decommissioning plan to the EEAE for GRR-1. GRR-1 is presently in an extended shutdown state. Prior to a possible restarting it must provide –among others- a plan for its future decommissioning to the EEAE.
The Presidential Decree 122 for the responsible and safe management of spent fuel and radioactive waste (transposition of the EC Directive 2011/70/Euratom), provides for the "National Programme for the management of spent fuel and radioactive waste" to be issued as a Joint

Ministerial Decision. This document, which is in process of Ministerial approval and signing, foresees a period of 2 years after its publication to the Official Gazette, to estimate the waste from the decommissioning of the research reactor.
It is worth to mention that the aforementioned legislation for the National programme has been approved by EEAE Board.

21.	Country Belgium	Article Article 26	Ref. in National Report Section F

Question It is stated that "There are no plans submitted to EEAE, concerning the future decommissioning of the reactor. This obligation is provided by the relevant legislation (…)."
If one understand well, it is mandatory to have a plan for the future decommissioning of the reactor, but it doesn't exist yet. Is there any prospect for the future?

Answer NCSR "Demokritos", owner and operator of the Greek Research Reactor GRR-1, has the legal obligation to submit a decommissioning plan to the EEAE for GRR-1. GRR-1 is presently in an extended shutdown state. Prior to a possible restarting it must provide –among others- a plan for its future decommissioning.
The Presidential Decree 122 for the responsible and safe management of spent fuel and radioactive waste (transposition of the EC Directive 2011/70/Euratom), provides for the "National Programme for the management of spent fuel and radioactive waste" to be issued as a Joint Ministerial Decision. This document, which is in process of Ministerial approval and signing, foresees a period of 2 years after its publication to the Official Gazette, to estimate the waste from the decommissioning of the research reactor.
On the occasion of the implementation of the forthcoming legislation, it will become possible to further elaborate the technical solutions and possible options for the disposal of the waste.

22.	Country France	Article Article 26	Ref. in National Report Section F: p. 23

Question It is mentioned that the Greek research reactor GRR-1 is owned and operated by NCSR "Demokritos", a governmental institution. There are no plans submitted to the Greek Atomic Energy Commission (EEAE), concerning the future decommissioning of the reactor. This obligation is provided by the relevant legislation (Ministerial Decision P/112/305, Folio No. 2877, Second Issue, October 26, 2012, "Basic requirements – principles of nuclear safety and regulatory supervision of nuclear research reactors").
In addition, it is also mentionned that decommissioning of the waste management facility and the interim storage facility of the NCSR "Demokritos", that is not foreseen for the near future, will be included in the National Program for radioactive waste management which is currently under development.

Could Greece indicate if, for these facilities, in-situ decommissioning (i.e. entombment) is considered as a possible decommissioning strategy and endorsed in the legal and regulatory framework on decommissioning or waste management? In addition, could Greece indicate if entombment is explicitly excluded or not for decommissioning in the legal and regulatory framework?

Answer There are no specific technical methods provided or excluded for decommissioning in the existing legislation. All technical solutions will be considered as part of the development and implementation of the National Program for the management of radioactive waste and decommissioning, in connection with the decision on a feasible final disposal option.
Such National Programme has been recently developed and approved by EEAE Board. The process of issuing the legislation has started.

23.	Country Germany	Article Article 26	Ref. in National Report p. 23 (Section F)

Question Decommissioning of research reactor:
The report says that there are no plans submitted to the Greek Atomic Energy Commission (EEAE) concerning the future decommissioning of the research reactor GRR-1 although this obligation is provided by the relevant legislation.
What is the current strategy and timescale regarding (a) the continuation of operation of the research reactor, and (b) the decommissioning of the research reactor?

Answer NCSR "Demokritos", owner and operator of the Greek Research Reactor GRR-1, has the legal obligation to submit a decommissioning plan to the EEAE for GRR-1. GRR-1 is presently in an extended shutdown state. Prior to a possible restarting it must provide –among others- a plan for its future decommissioning to the EEAE.
A decision has not been reached, yet, regarding the decommissioning of the research reactor. As it concerns the waste to be produced, the draft "National Programme" which results from the implementation of the Presidential Decree 122 for the responsible and safe management of spent fuel and radioactive waste (transposition of the EC Directive 2011/70/Euratom), foresees a period of 2 years, following the issuance of legislation, to estimate the waste streams from the decommissioning of the research reactor. On the occasion of the implementation of the forthcoming legislation, it will become possible to further elaborate the technical solutions and possible options for the treatment and disposal of the waste.
It is worth to mention that the National Programme has been recently approved by EEAE Board. The process of issuing the legislation has started.

24.	Country United States of America	Article Article 26	Ref. in National Report F, pg. 23

Question Please describe the status of incorporating the decommissioning of facilities into the National Program and implementing the findings of the IRRS mission related to national policy and strategy for radioactive waste management.

Answer The Presidential Decree 122 for the management of radioactive waste (RW) and spent fuel (SF) - transposition of the Directive 2011/70/Euratom - foresees secondary legislation, which has been prepared, approved by EEAE Board and is in the process of Ministerial approval and signing. The findings of the IRRS mission related to national policy and strategy for RW management have been taken into consideration.

This additional legislation refers to the policy and strategy and provides arrangements on RW & SF management, including RW from decommissioning activities; a specific Ministerial decision refers to the "National Program". Some indicative elements are:

- the national policy is the in-country management, from production through to disposal, of all types and streams of radioactive waste under the jurisdiction of the state. The producer of SF & RW has the sole responsibility of their management.
  • Stakeholders (i.e. ministers, competent authority, WMO, RW management facilities, RW producers and public) and their responsibilities are defined
- Principles of radiation protection and safety requirements for the management of RW & SF, including the RW disposal, are provided
- a system of authorization (i.e. Feasibility License, Establishment License in a specific site, Design approval, Operation License, Decommissioning License, Approval for site release from regulatory control), as well as a system of inspections and monitoring are substantiated.
- Provisions for the RW management procedures (for clearance, release, treatment, transport of radioactive waste), nuclear security, quality assurance and emergency response, information and public participation, sanctions / penalties, offsets are included.
- The National Program materializes the implementation of the National Policy, by providing milestones, timelines and performance indicators, elements for RW & SF inventory, RW management solutions, estimation of costs, financing, provisions for transparency & public information.
- According to the draft legislation for the National Program, within one year after its publication to the Official Gazette, EEAE completes the inventory of the existing, future and potential RW,

including those from decommissioning activities; within 2 years the RW streams and the categorization of the RW are defined. Within five (5) years, the parties involved make recommendations on the disposal options for the identified RW streams; the technical disposal solutions by RW stream, the content and extent of geological studies, environmental impact studies, security analysis studies required to establish a RW disposal facility (per RW stream); the need, scope and extent of research and development actions on options and techniques for RW disposal; the type of the RW disposal facility to establish (per RW stream). Finally, within ten (10) years, the parties involved make recommendations on the criteria for the selection and evaluation of the site where a RW disposal facility can be established (per RW stream); possible locations for establishing RW disposal facility (per RW stream); issues concerning the termination of the RW disposal facility (per RW stream) and the release of the site concerned from regulatory control; offsets and their application; actions to accommodate the views and positions of the public and local authorities regarding the creation of the disposal facility.

25.	Country United States of America	Article Article 28	Ref. in National Report J, pg. 23

Question Please provide a more comprehensive description of the status of disused sealed sources (DSS) within the framework of Greece's national legislation. In addition, please describe Greece's national tracking system.

Answer The national legislation attributes the prime responsibility of the safe and secure management of radioactive sources to the license holder (licensee) through the respective license (operation license, radiation source possession & use license, etc.).

For every radiation source a qualified person is appointed, who is responsible against law and EEAE for the safety and security of the sources, even when these sources become disused; the person in charge is named in the license. The license holder is also responsible for the overall management of the radioactive sources throughout their entire life (useful life and after use), including accountability, security, final export after their useful life and reporting to EEAE for every incident and accident. The source registry that is maintained by EEAE is kept updated.

EEAE maintains the national inventory of radioactive sources (imported, being in use, disused, orphan, exported). EEAE performs inspections (with and without prior notification) on a regular basis (at least once every 3 years) to all facilities possessing radioactive sources. Every year about 25% of the facilities operating or using radioactive sources (most of them possessing a number of sources in use or disused) are inspected, following a graded approach.

The orphan or disused sources that cannot be exported to the manufacturer or to a recycling facility abroad are collected and temporarily stored at the interim storage facility of NCSR "Demokritos", which is under the regulatory control of EEAE. In some few cases, sources are temporarily stored in-situ (under regulatory control also).

26.	Country United States of America	Article Article 28	Ref. in National Report J, pg. 28

Question Does Greece have procedures/policies in place for addressing disused sealed radioactive sources that cannot be returned to the supplier (for example, if the manufacturer is unable to accept the return of the source, or if the country of origin fails to authorize import of the source)? If so, please elaborate.

Answer EEAE controls the safe and secure interim storage of orphan sources or disused sources that cannot be exported to the manufacturer or a recycling facility abroad. An interim storage facility in NCSR "Demokritos" is available, where these sources are collected and temporarily stored.

27.	Country Austria	Article Article 32	Ref. in National Report D, page 12

Question How many drums of conditioned radioactive waste are stored in the storage facilities at the moment? Does Greece have any estimations (based on current information) for the total number of conditioned drums after decommissioning of the research reactor?

Answer At the moment, according to the NRWIS facility inventory, 314 drums with resins from the regeneration of the GRR-1 pool water demineralization beds and other waste mainly from past biology research activities in the NCSR “Demokritos” are stored. 440 radioactive sources and other objects (e.g. illuminating radium dials) and about 6000 smoke detectors and lighting rods are stored in open drums until the decision for their final management. An estimation of the total number of conditioned drums after decommissioning of the research reactor is not available yet.

28.	Country Czech Republic	Article Article 32	Ref. in National Report B, 6

Question If you have not had a repository for disposal of LLW and ILW radioactive waste yet what acceptance criteria you use for conditioned waste to be met future one for a repository?

Answer They are not defined yet.

29.	Country Czech Republic	Article Article 32	Ref. in National Report B,8

Question What are the applied clearance levels?

Answer The clearance levels are included in the national legislation and in particular in the Radiation Protection Regulations.
These levels are identified from a derived-limits analysis to ensure that the dose to the public remains below the 10μSv/y for each specific practice (according to EC Directive 96/29/Euratom).

30.	Country France	Article Article 32	Ref. in National Report Section A : p.4 / Section B: p. 3

Question In 2012, answering a question from France, Greece reported that the National Technical University of Athens (NTUA) was about to negotiate the return of the fuel of the decommissioned sub-critical assembly of the NTUA to the country of origin (UK).
As there is no information about the final disposal of this assembly in the 5th Report, could Greece provide detailed information on the current status of this issue?

Answer The discussions on returning the fuel to UK have been suspended due to problems related to the implementation of public accounting and procurement rules. The fuel, which is considered as fresh, remains in safe storage in the NTUA premises and under IAEA and Euratom safeguards.

31.	Country France	Article Article 32	Ref. in National Report Section B: p. 8

Question It is mentionned that industrial waste produced by NORM industries with radionuclide concentrations exceeding the exemption levels has been exported for recycling.
Could Greece provide information about this issue?

Answer Following decommissioning activities of an abandoned fertilizer industry an amount of metallic materials with NORM deposits were produced. This material is considered as waste in Greece, since no further use can be foreseen in the country. Since a recycling industry within an EU Member State could characterize this material as recyclable material, Greece proceeded to the export of the material for recycling purposes. All essential licenses and documents were appropriately issued.

32.	Country Ireland	Article Article 32	Ref. in National Report B, p.7

Question It is noted in the National Report that orphan sources are managed on behalf of EEAE by the NCSR ‘Demokritos’ facility. Ireland is interested

to know more detail about the arrangements or agreements in place between the Regulatory authority and the licensee for the management of these sources particularly in relation to future final disposal plans.

Answer EEAE controls the safe and secure interim storage of orphan sources or disused sources that cannot be exported to the manufacturer or a recycling facility abroad. An interim storage facility in NCSR "Demokritos" is available, where these sources can be collected, temporarily stored and then exported to recycling facilities abroad. This is implemented through a written arrangement between EEAE and NCSR signed in 2003. According to this arrangement, radioactive materials and radioactive waste arising from emergencies, accidents or incidents and orphan sources (which, according to the opinion of the EEAE, pose a risk to the public health), can be temporarily stored in NRWIS facility of NCSR, until a final decision on their management is taken. In return, EEAE provided the financing of the initial investment.

33.	Country Germany	Article Article 32.1.3	Ref. in National Report p. 6 (Section B)

Question Strategy for disposal of radioactive waste:
The national policy for radioactive waste management foresees that, until the construction of a disposal facility, radioactive waste will be stored in a licensed storage facility.
What are the strategy and timescale for site selection and commissioning of a disposal facility in Greece?

Answer In transposing Directive 2011/70/Euratom for the management of radioactive waste and spent fuel, the “National Program” has been drafted, which currently is in the process of Ministerial approval and signing. This program provides the following timescale with respect to the disposal of radioactive waste:

- Within one year from the entry into force of the National Programme, EEAE completes the inventory of the existing, future and potential radioactive wastes, including those from decommissioning activities; within 2 years the radioactive waste streams and the categorization of the radioactive waste are defined.
- Within five years, the parties involved make recommendations on: the disposal options for the identified radioactive waste streams; technical disposal solutions by radioactive waste stream; the content and extent of geological studies, environmental impact studies, and security analysis studies required to establish a radioactive waste disposal facility (per stream); the need, scope and extent of research and development actions on options and techniques for radioactive waste disposal; the type of the radioactive waste disposal facility to establish (per stream).

- Within ten years the parties involved make recommendations on: the criteria for the selection and evaluation of the site where a radioactive waste disposal facility can be established (per stream); possible locations for establishing the radioactive waste disposal facility (per stream); issues concerning the termination of the radioactive waste disposal facility (per stream) and the release of the site concerned from regulatory control; offsets and their application; actions to accommodate the views and positions of the public and local authorities regarding the creation of the disposal facility.

34.	Country Belgium	Article Article 32.2.2	Ref. in National Report Section D

Question It is stated that "This infrastructure is still operating and includes:
- Central retention tanks for aqueous waste"
Is there any final solution foreseen for this kind of liquid waste?

Answer The liquid waste comes mainly from the biology laboratories and belongs to the category of the very low or low level liquid waste. The solution "decay and release" is applied, provided that the clearance levels are met. It is worthwhile to mention that the volume of liquid waste produced annually is very low (less than 1% of the tanks capacity).

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

1.	Country Austria	Article General	Ref. in National Report C2, 8

Question Greece acknowledges Austria for providing information regarding NORM waste, even if the issue is out of the scope of the convention. Apart from the dose to the public criterion, are there any further guidelines developed for the control of NORM?

Answer In Austria an „Ordinance on Natural Radiation Sources" has been enacted in the year 2008. This regulation contains the basic tenets of radiation protection like optimisation, dose limitation, dose assessment, information of the competent authorities, recording, information & training of workers, question of responsibilities and so on. It applies to a specified list of work activities with natural radiation sources which might cause a significant increase in the exposure of workers and/or which cause residues containing a high amount of naturally occurring radionuclides.

2.	Country Belgium	Article General	Ref. in National Report I.B.2, p.3

Question Immobilization in cement is commonly used for conditioning of concentrates and ion exchange resins. Could you please, provide some further information, with respect to the specific causes of the gel-like material formation and also for the safety implications of this phenomenon on operational safety of the interim storage and on the safety of final disposal?

Answer In March 2014 ONDRAF / NIRAS organized an 'International Expert Panel on waste drums showing gel formation'. The experts have different backgrounds and fields of knowledge and are linked to different institutes. The panel represents a mix of non-nuclear institutes (universities), ONDRAF / NIRAS peer organizations and nuclear research facilities. Based on the information available (observations from inspections and experimental results available so far) the experts believe it is a very credible hypothesis that [an] Alkali-Silica Reaction (ASR) is [at] the origin of the observed gel formation. The high amounts of sodium hydroxide added to neutralise the waste stream and the siliceous coarse and fine aggregates [used during the production of the matrix] are probably the root causes. The high temperature at which the concrete was poured and the highly variable composition of the waste stream rich in sodium salts (chloride and sulfate) have also likely contributed to the gel formation. It is however not a 'classic' ASR process in the sense that the gel composition is outside the usual ranges reported in the literature, its production seems in some cases to be very rapid and boron might be involved in the gel formation or its stabilisation.
As for the operational safety of its interim storage facilities, ONDRAF / NIRAS concludes that the waste packages showing gel formation do currently not pose a safety risk.
For the long term management point of view, ONDRAF / NIRAS deems the affected waste packages as not suitable for disposal in neither a surface nor a deep repository.
See also the answer to question 36

3.	Country Belgium	Article General	Ref. in National Report I.B.3.d, p.6

Question In your report it is stated that Ghent's University Health Physics Department "remains fully functional and has been expanded to deal with the increased work in waste management and clearance resulting from the dismantling activities. " Could you please provide more information regarding the expansion of the Health Physics Department, for example, regarding the increase in staff number, the new expertise needed and its dismantling-specific duties?

Answer In order to cope with the increased workload in waste management and clearance resulting from the dismantling of reactor Thetis, the

Health Physics Department has taken the following steps:

- purchase of a mobile gamma-spectrometer, to enable measurement of all produced waste during dismantling operations.
- increase of staff by employing one FTE during 5 years for: o calibrating the ISOCS equipment,

o Monte-Carlo calculations of the different solid waste categories in standard 200l waste barrels (metal, concrete, asbestos, low-density waste for incineration),
o standard measurement of sampled liquid waste,
o performing the ISOCS measurements of all waste produced during dismantling (> 800 barrels).

- the Health Physics Department (3 people) performed continuous on-site radiation protection measurements and triage of all produced waste during the dismantling. Although this significantly increased the workload by about 50 %, it enabled immediate actions to be taken on the floor when problems arose (since all people responsible were available on the spot), and avoided delayed triage of produced waste, thus keeping the working area free of debris.

4.	Country Belgium	Article General	Ref. in National Report II.B.2.b), 7c , p.18

Question In your report it is stated that "On request of ONDRAF/NIRAS, the waste producers have started to pay for future storage and disposal services from 1985 onwards." Could you please specify what portion of this fund comes from nuclear energy sector and what from the producers of institutional waste (i.e. medical, industry, research)?

Answer Roughly 50-50%.

5.	Country Czech Republic	Article General	Ref. in National Report 6.2.3, 53

Question Could you please specify the estimated total cost of decommissioning of the LVR-15? Does this cost cover also the cost for the up-to-end management of the radioactive waste predicted to arise from the decommissioning? What is the method used for estimating the cost for the decommissioning of the research reactor?

Answer The latest estimated cost of decommissioning of the LVR-15 research reactor (2010) is 144 805 600 Kè (1 Euro = 27 Kè). This sum covers also the management of resulting RAW. Additionally the cost for the decommissioning of the research reactor also covers the cost of the labour, technologies and energy needed and the cost for clearance of material from research reactor dismantling

6.	Country Czech Republic	Article General	Ref. in National Report 8.7.1, 124

Question In your report it is noted that "Institutional control is anticipated for a period of 300 years after the operation is terminated" for disposal facility Richard. Could you please outline what the institutional control consist of?

Answer Details of the institutional control will be defined in the decommissioning/closure safety case of the disposal facility. According to the recent operational safety case the institutional control period will be shortened to 100 yrs. It will consist of active and passive part. During the active part, planned for some lower tens of years, environmental monitoring will take place and security control of the site will be maintained in the same extent as during the operational period. In the passive part, monitoring will be finished, security control activities will be minimized, but records will be kept and restriction of the site use will be implemented.

7.	Country Czech Republic	Article General	Ref. in National Report 9

Question Could you please elaborate on the reason for the “increased demands” for RAW of institutional origin?

Answer As a result of ongoing rehabilitation of environmental liabilities in ÚJV Øež, a. s. the amount of institutional RAW has increased. E. g. in 2013 as a result of operational activities 52,4 m3 of solid RAW were generated. Additionally from rehabilitation of environmental liabilities 77,8 m3 of solid RAW has to be added to the RAW generation rate for this year.

8.	Country Ireland	Article General	Ref. in National Report B, 9 and K, 47

Question Could you please provide us some information regarding the siting process and criteria to will be used by the National Implementation Committee?

Answer Due to the success of the source reduction programme in reducing the volume of waste to very small amounts the requirements of a national waste storage facility have now changed significantly. It is very unlikely that a greenfield site development will be required. As a matter of priority, the Department of the Environment, Community & Local Government (DECLG) in conjunction with the Environmental Protection Agency (EPA) are actively exploring the possibility of the co-location of a source storage facility with an existing, fully licensed, hazardous waste processing and management facility. Specific siting requirements have therefore not been developed and work is focused on investigating the feasibility of incorporating a radioactive source store within existing hazardous waste management facilities where

operators are interested in extending their scope of activities. The focus of these examinations will be on appropriate waste segregation and management, processes and procedures as well as designing for safety and security.

9.	Country Ireland	Article General	Ref. in National Report H, 39 and 40

Question Greece acknowledges Ireland for providing information regarding waste produced by nuclear medicine laboratories. Could you please inform us:

a) if ORP verify the quantities discharged by the licensees to the sewage system and
b) are there any specific criteria for deciding if holding tanks are needed in nuclear medicine laboratories?

Answer ORP does not verify the quantities discharged by nuclear medicine department to the sewers through measurements. Licensees are however required to maintain records of all quantities administered to patients and to make these records available for inspection by the ORP. Holding tanks are not deemed necessary for facilities that undertake nuclear medicine applications for diagnostic purposes. However, in the case of an application for the development of an iodine ablation therapy facility, the applicant is required to perform a risk assessment to calculate doses that would be received by workers and members of the public arising from the discharges from the facilities. Where the EPA's design dose constraints cannot be met, consideration must be given to the inclusion of BAT in the design of the facility which may or may not require the installation of holding tanks.

10.	Country Czech Republic	Article Article 10	Ref. in National Report 10, 132

Question In your report it is noted that "To store disused sealed sources, which fail to meet acceptance criteria for disposal in the Richard disposal facility, …". Could you please provide a few examples of such sources, their origin and their particular characteristics that are inconsistent with the acceptance criteria of the Richard disposal facility?

Answer Disused sealed sources, which do not comply with waste acceptance criteria for Richard disposal facility, have to be safely stored and once available disposed in geologic disposal facility. E.g. Cs-137 sealed sources which activity exceeds the disposal limit of 1.1011 Bq for conditioned RAW (package No. 0007/382/U/2014 – 4,3909.1011 Bq, No. 0007/380/U/2014 – 2,7942.1011 Bq, …), PuBe source exceeding the disposal limit of 1.108 Bq for conditioned RAW (package No. 0007/444/U/2013 – 2,031.1012 Bq), etc.

11.	Country Poland	Article Article 22	Ref. in National Report 49

Question Could you please specify the share of the RWMP financial resources coming from service activities of RWMP?

Answer 52 % of RWMP budget comes from activities

12.	Country Austria	Article Article 22.2	Ref. in National Report F2, 20

Question In your report it is noted that "The final disposal fee is calculated using cost estimates based upon the comparison of costs on existing foreign repositories". Could you please provide more information for the final disposal fee, for example, which repositories abroad have you used as basis for its estimation and what is the order of the overall final disposal cost?

Answer The estimated disposal costs for the German repository „Konrad" were used as primary basis for the calculations. The disposal fee per kg was then calculated for all different types of incoming (raw) radioactive waste. The fees for all categories of waste can be seen on the website of NES.

13.	Country Poland	Article Article 25	Ref. in National Report 52

Question Could you please provide examples of the scenarios used for radiation emergency exercises, relevant to radioactive waste management facilities?

Answer According to Art.96.2 of Atomic Law, The minister of the interior shall conduct exercise on national level to test the national radiation emergency plan at least once every 3 years. Moreover both Art.96.1 of Atomic Law and Regulation of the Council of Ministers on the emergency plans for radiation emergency set the frequency of testing of the relevant plans at regional (provincial) and facility level. Minimum testing frequency set by the regulation of the Council of Ministers on the emergency plans for radiation emergency is once every 3 years at regional (provincial) level and once every 2 years at facility level (once every 3 years for practices concerning X-ray devices).

Appropriate scenarios used for radiation emergency exercises are part of emergency plans. Concise description of potential emergency situations, including fire and emergency procedures for routine technological processes are given in emergency plans on facility level. The Scenarios used for radioactive emergency exercises include: unsealed packages contain a radioactive waste as a result of the fall, fire, surface and humans radioactive contamination, car accident in the transport.

14.	Country Austria	Article Article 32.1.3	Ref. in National Report B3, 4

Question Could you please give some information on the current activities, plans and progress of ERDO on the implementation of a shared regional repository?

Answer Austria is still following the dual-track approach together with some other countries which are member of the ERDO Working Group. This comprises both the development of a national disposal site as well as the co-operation in order to find a common disposal solution with the idea of sharing expertise and knowledge in order to significantly reduce the resources required by each country.

In the last years, representatives of ERDO-WG participated on various conferences and workshops in order to promote the idea of close co-operation especially of countries with small or without nuclear programmes. Major events were a workshop in December 2013 in collaboration with the EC and in 2014 the presence at a meeting of the EC Working Party on Atomic Questions.