



*Greek Atomic Energy Commission*

***GREECE***

***NATIONAL REPORT***

*on the implementation of the*

***Code of Conduct***

*for the safety and the security of radioactive  
sources*

*and its Supplementary Guidance on the Import and  
Export of Radiation Sources.*

**July 2013**

## **Executive Summary**

The Greek Atomic Energy Commission (GAEC) is the national competent authority for radiation protection and nuclear safety. GAEC is a decentralized (autonomous) public service, having as mission the protection of the public, the workers and the environment from ionizing and artificially produced non-ionizing radiation.

Greece, through GAEC, has submitted to IAEA its commitment to implement the *Code of Conduct* and its Supplementary Guidance on the Import and Export of Radioactive Sources.

Radioactive sources are used for medical, industrial, research and educational applications in Greece; their activities range from a few Bq to TBq. There are several legislative, regulatory and enforcement measures in place for safety and security of the sources throughout their useful life, including provisions for the orphan sources, disused sources and HASS. Current national legislation considers security of radioactive sources as part of the radiation safety, imposing certain measures. HASS legislation refers explicitly to security aspect.

The Greek 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 the every radiation sources a qualified person in charge is appointed, who is responsible against law and GAEC for the safety and security of the sources.

GAEC maintains the national inventory of radioactive sources. GAEC performs inspections (with and without prior notification) on a regular basis (at least every 3 years) to all facilities.

For the import and export of radiation sources to/from Greece from/to EU, the ANNEX I must be submitted and approved by the competent authorities prior to shipment. For HASS, the consent form must be submitted to the non-EU countries competent authorities prior to shipment. The import, export and transport of all radioactive sources are licensed by GAEC (with an exception of the radioactive smoke detectors, where special provisions apply). Prior to import of the radiation sources, a legal written declaration from the source manufacturer for accepting back the source after its useful life, is necessary, as well as a legal written declaration from the source user for undertaking all financial and administrative provisions to export the source back to manufacturer or other licensed storage/recycling facility abroad.

GAEC reassures 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" center is available, where these sources can be collected, temporarily stored and then exported to recycling facilities abroad. Furthermore, financial resources to cover intervention costs relating to the recovery and management of orphan or disused sources are provided to GAEC by the Greek Government.

GAEC is responsible for the recovery of orphan and unattended sources and for the emergency preparedness, planning and response for incidents and accidents involving radioactive sources. The radiological emergency response is included in the General Civil Protection Plan ("Xenokratis" part "R") where General Secretariat for Civil Protection, GAEC, first responders, police, fire department, first aid, etc participate. As a defense-in-depth system for the detection of orphan and uncontrolled sources radiation detectors – radiation detection portals operate at metal processing - scrap metal factories, at country borders, main ports and airport (Athens). Additionally, customs officers are trained to use portable radiation detection equipment. GAEC is immediately informed for any alarm or radiation source event and acts accordingly to its internal emergency plan.

Although improvements could be made, the CoC and its Supplementary Guidance are applied quite satisfactorily in the country.

## 1. Introduction

The Greek framework for safety is set out primarily in a number of Laws, Decrees and Joint Ministerial Decisions. In particular:

- Legislative Decree 181/1974 “Protection against ionizing radiation”.
- Law No. 1733/1987 “Transfer of technology, inventions, technological innovation and establishment of the Greek Atomic Energy Commission”.
- Ministerial Decision No. 17176 “Powers and competences of GAEC Administration Board”.
- Presidential Decree No. 404/1993 “Organization of the Greek Atomic Energy Commission”.

These legislative documents provide for the initial establishment of an authorization procedure for the use of ionizing radiation in Greece, the issuance of regulatory decisions, compliance monitoring and penalties. In addition, they provide for the establishment of the *Greek Atomic Energy Commission (GAEC)* as an autonomous legal entity within the public sector and for the powers and competencies of the GAEC Board.

Detailed regulations are set out in a set of legislative documents based primarily on the relevant EURATOM directives concerning radiation protection and nuclear safety including:

- Joint Ministerial Decision No. 1014 (FOR) 94, Second Issue, Folio No. 216, March 6, 2001, “Approval of Radiation Protection Regulations”.
- Ministerial Decision No. 9087(FOR)1004, Folio No: 849, Second issue, September 13, 1996 “Operational protection of outside workers exposed to the risk of ionizing radiation during their activities in controlled areas”.
- Ministerial Decision No. 10828/(EFA)1897, Folio No. 859, Second Issue, July 10, 2006, “Control of high-activity sealed radioactive sources and orphan sources”.
- Presidential Decree No. 60, Folio No. 111, First Issue, May 3, 2012, “Establishing a National framework for the nuclear safety of nuclear installations”.

## 2. Greek Atomic Energy Commission: Responsibilities and function

The Greek Atomic Energy Commission (GAEC) is the national competent authority for radiation protection and nuclear safety. GAEC was initially established by an Act in 1954. The organization has been re-established with a different mandate in 1987, as an autonomous, decentralized, civil service supervised by the General Secretariat for Research and Technology, under the Ministry of Education and Religious Affairs. GAEC is responsible for matters of nuclear technology, radiation protection and nuclear safety in the country. It is governed by a seven member Board. GAEC reports to the Greek Government, the European Commission and IAEA when required or according to the existing arrangements and obligations.

Its responsibilities (regulatory and inspection duties, education and research duties, radiological emergency response) cover issues of nuclear energy and nuclear technology, safety and security of radioactive sources, as well as issues related to the protection of the public, workers and environment from ionizing radiation and artificially produced non-ionizing radiation. Moreover, its participation in the “General Civil Protection Plan” entails responsibilities for the prevention, preparedness and response to radiological emergencies. GAEC also participates in the “National Emergency Plan for Chemical, Biological, Radiological and Nuclear Threats” (CBRN).

According to its statutory role GAEC responsibilities include:

- development of safety procedures and regulations;
- *licensing procedures*: GAEC issues licenses for possession, use, import, export and transport of radioactive sources. It also issues certificates of compliance and/or licenses for medical, industrial, research and other applications of ionizing radiation in the country;
- *inspections and enforcement*: GAEC performs on-site inspections (with or without prior notification), in order to assure the radiation protection of the public, workers and patients and the safety and security of radioactive sources, as well as to assess and verify the compliance of with the requirements and terms of Radiation Protection Regulations. The

graded approach is applied;

- *radiation and radioactive source registry:* GAEC keeps the national inventory of radiation sources, radiation equipment and radiation facilities;
- *radiation protection of workers and the public:* GAEC runs the only individual dosimetry service in the country and monitors more than 12,000 occupationally exposed workers (external and internal exposure) throughout the country. GAEC keeps the National Dose Registry;
- *environmental monitoring:* GAEC operates the telemetric environmental radioactivity monitoring network throughout Greece and performs laboratory measurements by alpha and gamma spectroscopic analysis and total  $\alpha/\beta$  measurements in drinking water, air filters, soil and other type of samples, as well in materials and industrial waste for NORM;
- *emergency preparedness:* GAEC, as the competent authority for responding to radiological and nuclear emergencies, participates in the General Plan for Civil Protection “Xenokratis” and in the National Emergency Plan for Chemical, Biological, Radiological and Nuclear (CBRN) threats. GAEC has established and operates its internal emergency plan and has the appropriate infrastructure and experienced personnel for the purpose. Furthermore, GAEC is the national contact point for the early notification systems ECURIE and ENATOM of the European Commission and the IAEA respectively;
- *education and training:* GAEC provides education and training in the fields of radiation protection, nuclear safety and nuclear security. GAEC is the European Regional Training Centre of the International Atomic Energy Agency (IAEA) in the fields of radiation protection and safety of radiation sources and nuclear security. It participates to and partly hosts the national Inter-University Postgraduate Course in Medical-Radiation Physics and organizes several educational activities;
- *research in the fields of its competence:* GAEC participates in research and development programmes, taking advantage of European financial resources, opportunities of cooperation within European scientific networks, national resources. GAEC’s scientific and technical personnel are of a high scientific level (45, of the total 70, have M.Sc. and/or Ph.D. degrees). They participate in several working groups and committees at a national, European or international level. Their contribution in European research projects and scientific networks, as well as their scientific work in GAEC produces a number of publications in international journals and presentations in conferences. These facts prove that GAEC’s personnel are of high scientific level;
- *public information:* GAEC holds the responsibility of providing credible and accurate information to the general public and the media regarding its fields of competence, by organizing events, producing information material, keeping website update, while in case of radiological emergencies, it provides all the necessary data and information;
- *international cooperation and national representation :* IAEA, EC, NEA OECD, ENSREG, HERCA, EURADOS, EURAMET and other bodies;
- *calibration of ionizing radiation instruments:* GAEC operates the Ionizing Radiation Calibration Laboratory (IRCL) which is the national metrology laboratory and has an official partnership with the National Metrology Institute.

By the end of 2012, GAEC’s staff consists of 70 persons (60% scientific, 15% technician, 25% administrative) and has: regulatory and inspection duties, education and research duties and special duties in case of radiological emergencies. Their average age is 40 years.

### **3. IAEA - Integrated Regulatory Review Service (IRRS) mission**

At the request of the Government of the Hellenic Republic, an international team of senior safety experts met representatives of the Greek Atomic Energy Commission (GAEC) from 20 to 30 May 2012 to conduct an Integrated Regulatory Review Service (IRRS) mission. The mission took place at the headquarters of GAEC in Athens.

The purpose of the IRRS mission was to review the effectiveness of the Greek regulatory framework of radiation protection and nuclear safety. The review compared the national regulatory framework for safety against IAEA safety standards as the international benchmark for safety. The mission was an opportunity to exchange information and experience with the IRRS team experts in the areas covered by the IRRS.

The IRRS Review team consisted of nine senior regulatory experts from nine IAEA Member States, four IAEA staff members and an IAEA administrative assistant. The IRRS Review team carried out the review in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; development and content of regulations and guides; emergency preparedness and response; transport, control of medical exposure, occupational radiation protection, control of radioactive discharges and materials for clearance, environmental monitoring associated with authorized practices for public radiation protection purposes and the control of chronic exposures and remediation.

The IRRS review team identified a number of good practices and made recommendations and suggestions, where improvements will enhance the effectiveness of the regulatory framework and functions in line with the IAEA Safety Standards. GAEC based on these recommendations and suggestions works on a specific action plan and plans to revise the Radiation Protection Regulations (RPR).

### **4. Implementation of the CoC and its Supplementary guidance on import / export.**

Greece has developed and implemented policies, laws and regulations on the safety and security of radioactive sources since many years. The main requirements of the Code of Conduct and its Supplementary Guidance on the Import and Export of Radioactive Sources have been adopted and implemented in a satisfactory manner, although a few issues remains to be improved, which will be considered to the on-coming revision of the RPR. Greece – through GAEC - has submitted to the IAEA a written commitment to work toward the full implementation of the Code of Conduct and its Supplementary Guidance on the Import and Export of Radioactive Sources. A SWOT analysis for the safety and security of radioactive sources shows that:

#### ***STRENGTHS***

1. Greece - through legislation, regulations and GAEC Board decisions – has established and implements several measures for the safety and security of radiation sources, including disused and orphan sources.
2. GAEC applies similar policy of authorization (licensing) for radioactive sources. The prime responsibility for the safe and secure management of radioactive sources is set on the license holder (facility, laboratory, etc) through the respective license (operation license, radiation source possession & use license, etc), while for radiation sources a qualified person in charge is appointed and is referred to the license. The license holder is also responsible for the overall management of the radioactive sources throughout their entire useful life, including accountability, security, recovery of lost sources or those gone out of control, final export after their useful life and reporting to GAEC for every incident and accident. Through licensing, the source registry that is maintained by GAEC is kept updated, while the threat of loss or sources gone out of control is minimized.
3. The Licensing and Inspection Department of GAEC (LID/GAEC) performs on-site (with or without prior notification) inspections on a regular basis to all facilities possessing radiation

sources. The LID/GAEC has been accredited by the Hellenic Accreditation System, ESYD in terms of ISO 17020 standard; the accreditation fields include inspection, import, export and transport of sources. Inspection covers both safety and security issues separately. Every year about 25 % of the facilities operating or using radioactive sources (most of them possessing a number of sources) are inspected, following a graded approach.

4. The import, export and transport of radiation sources follow the CoC supplementary guidance and EC directives. The ANNEX I or/and the respective consent must be submitted and approved by the competent authorities prior to shipment. The import, export and transport of radioactive sources are licensed by GAEC. Prior to import of radiation sources, a legal written declaration from the source manufacturer for accepting back the source after its useful life, is necessary, as well as a legal written declaration from the source user for undertaking all financial and administrative provisions to export the source back to manufacturer or other licensed storage/recycling facility abroad. More details are presented in section 8 of this report.
5. Installation and operation of radiation portal detectors at every metal processing factory for the detection of radiation sources or radioactive material in scrap metal. Installation and operation of radiation portal detectors at country borders, main ports and airport (Athens). Furthermore customs officers are trained to use portable dosimetry equipment (survey meters and spectrometers) for monitoring and radiation assessments.
6. The domestic threat from radioactive sources has been assessed, although is difficult to consider all practical and possible scenarios. High Activity Sealed Sources (HASS) of category 1 (e.g. teletherapy and blood irradiators) are difficult to be lost or stolen. Malicious acts on site (e.g. malicious explosion of the teletherapy head or blood irradiator unit) may cause local not-extended contamination. Industrial radiography sources are subjected to potential loss or theft. For this, the operation license prerequisites that the sources must return to their authorized safe-boxes after their use on-sites, while radiographers must attend the sources continuously. Industrial, research and educational sources have low potential hazards. For each radioactive source a Radiation Protection Officer (RPO) and/or a Safety Source Officer (SSO) has been assigned, the name of whom is referred to the operation license and has the overall responsibility of radiation protections and potential hazards. Following this, all category 1 sources (teletherapy, industrial irradiators and blood irradiators) countrywide are equipped with security alarm systems connected to a Security Agency, which holds a contract with GAEC. The security systems include motion detectors, infrared barriers, interlocks on external source device surface, door and window interlocks, audio and visual alarm sirens, lockers and entry keypad interlock. The security agency performs checks of the communication on-line system daily and reports GAEC on monthly basis and immediately in case of alarm.
7. Inhabitation of radioactive lighting rod installation and the dismantling and safe management of the existing. Greece has a large inventory of lightning rods containing radioactive sources ( $^{226}\text{Ra}$  and  $^{241}\text{Am}$ ). About 1000 are still erected on buildings. GAEC informs users for their replacement and performs occasionally on-site checks for their integrity as well as radiation leak tests and radiation protection measurement to the surrounding area.
8. GAEC has implemented a national project (2001 – 2005) for the identification, collection and export of disused and orphan sealed sources. About 3000 sources with total activity of 120 TBq (3500 Ci) for medical, industrial and research use, including about 700 old  $^{226}\text{Ra}$  brachytherapy sources, as well as 10  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  radiotherapy sources were collected from Greek facilities and exported for recycling to the Gamma Service Recycling facility, Germany. A similar project shall be conducted in the future.

## **WEAKNESSES**

1. Greece has not established a disposal facility. An interim storage facility in NCSR "Demokritos", Attiki is available, where radioactive sources could be collected, temporarily stored and then exported to recycling facilities abroad. The facility should be upgraded and the operational procedures should be improved according to a quality management system. Furthermore, the technical specifications for the licensing of the storage facility have not been officially issued.
2. There is not pre-defined and clear national policy and strategy for the up-to-end management of the radioactive disused sources and material. Currently, the only solution for sources remains export for recycling and re-use. This option has been implemented successfully in Greece using the services recycling facilities abroad (Gamma Service Recycling, Germany) during a 5-year project for the export of disused source in 2001. Although this strategy should continue when it is financially viable and possible, does not provide a sustainable solution for all radioactive sources and waste.

## **OPPORTUNITIES**

1. Transposition and implementation of the EC Council Directive 2011/70/EURATOM of 19 July 2011 for establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.
2. A national policy on the disposal of radioactive material and sources should be improved with the consent of all stakeholders, including public.
3. The establishment and operation of a disposal facility in Greece should be considered.
4. The existing interim storage facility should be upgraded.
5. New technologies on the disposal and management of radioactive source may be introduced.
6. The penal procedures should be revised and approved, in order GAEC to implement its role more effectively.
7. Improvement of the safety and security culture (as discrete issues) in the country.
8. Better cooperation between GAEC and Ministry of Industry on the exchange of information of bankrupt industries and emergency situations (e.g. fire, earthquake, etc) at industries using radioactive sources.

## **THREATS**

1. The existing interim storage facility, including its human, structural and financial resources, does not provide efficient services in source management. Potential risks arising from physical disasters and emergency situations (e.g. fire, floods, etc) exist.
2. Decommissioning of bankrupt industrial facilities using radioactive sources may introduce potential radiation risks coming from disused or orphan sources. Improvement of the safety and security culture in the country will minimize this threat.

## **GOOD PRACTICES**

1. Installation of portal detectors in custom offices and melting industries.
2. GAEC is immediately informed for every alarm or radiation source event and acts accordingly.
3. Transport of Category 1 sources within Greek territory is conducted under police escort. Sources of all categories are transported under the supervision of the radiation protection adviser / officer / person in charge.
4. The Greek legislation sets prime responsibility of the safe management of all radiation sources - irrespective of the activity, type and isotope - on the holder / licensee (facility, laboratory, etc) through the respective license.

5. GAEC maintains the national registry of radiation sources.
6. GAEC performs on-site (with or without prior notifications) inspections on a regular basis to all facilities possessing radiation sources irrespective of their activity, type and isotope.
7. GAEC is responsible for the recovery of orphan and unattended sources the emergency preparedness, planning and response for situation involving unattended / orphan sources.
8. The emergency response for radiation sources incidents or accidents is included in the General Civil Protection Plan ("Xenokritis" part "R") and the "National Emergency Plan for Nuclear, Radiological, Biological and Chemical Threats (CBRN)", where the General Secretariat for Civil Protection, GAEC, first responders, police, fire department, first aid, etc. participate.

## **5. National Inventory of Sources**

GAEC maintains the national inventory of all radioactive sources, with the following information:

- License holder : facility / laboratory / organization
- Person in charge : Radiation protection officer / advisor or source officer
- License : expiration - conditions
- Location within the facility
- Source device : manufacturer, type, etc
- Source isotope, type – form, s/n
- Source activity and reference date
- Other available information from the licensee

By the end of 2012, there were in use:

Category 1: 9 Co-60 teletherapy of activities between 5 kCi to 10 kCi, 14 Cs-137 in blood irradiators, and 1 sterilization Co60 source(s) of 300 kCi total activity

Category 2: 11 high dose rate brachytherapy Ir-192 sources, 2 medium dose rate brachytherapy Cs-137 sources, 36 industrial radiography Ir-192 and Se-75 sources

Category 3: 97 radioactive sources for well logging gauges – devices

Category 4 and 5: 742 radioactive sources for industrial applications

Category 5: 1147 sources for research and educational applications

Additionally to the interim storage facility at NCSR "Demokritos" the following radioactive sources are stored.

- Spent fuel from reactor (pool) repatriate by 2016
- Sources at reactor in storage including Pu-Be (hot cell)
- Contaminated items (store room)
- Beryllium blocks
- Decommissioning waste from reactor
- Liquid Waste in tanks
- Radioactive Waste Stores
- Resins in drums
- Contaminated biological waste in concrete
- Pu contaminated soil.
- Disused sealed radioactive sources in gauges
- Lightning rods and sources
- Contaminated metal objects
- Smoke detectors
- Neutron source
- Industrial sources
- Depleted uranium



*Lightning Rods* - Greece has a large inventory of lightning rods containing radioactive sources ( $^{226}\text{Ra}$  and  $^{241}\text{Am}$ ). Well over 1000 are still erected on buildings and it appears that these sources cannot be exported outside the country for recycling because they are technically not sealed sources. These sources need to be removed from buildings, conditioned and stored for future disposal in a repository.

## **6. Actions for gaining or regaining control over orphan sources**

1. At country borders, main ports and airport (Athens) radiation detection systems - portals have been installed and operate for the control of illicit trafficking and illegal import of radioactive materials, as well as for the detection of orphan sources. Customs officers use portable dosimetry equipment (survey meters and spectrometers) for further monitoring and assessments. GAEC is immediately informed for every alarm or radiation source event and acts accordingly. Furthermore, according to legislation (Ministerial Decision for Control of high-activity sealed radioactive sources and orphan sources and Ministerial Decision for metal processing factory operation), every metal processing factory has installed and operates radiation portals for the detection of radiation sources or radioactive material in scrap metal. Metal products from these factories are also checked for contamination by the installed portals. GAEC is immediately informed for every alarm or radiation source event and acts accordingly. There are many innocent alarms every year, concerning usually NORM or objects and old consumer products that contain small amount of radioactive material, e.g. luminance material in old vehicle's speed meters.
2. GAEC has taken provisions for the safe and secure interim storage of orphan sources or sources that cannot be exported to manufacturer or other source management facility (e.g. in case of bankrupt, facility closure, etc). These provisions include an interim storage facility in NCSR "Demokritos", where these sources could be collected, temporarily stored and then exported to a disposal or recycling facility abroad. Furthermore, financial resources (100,000 Euros) to cover intervention costs relating to the recovery and management of orphan or disused sources are provided to GAEC by the Greek Government.
3. GAEC is the competent authority for the recovery of orphan sources and for the dealing with radiological emergencies due to orphan sources as well as for the drawing up of appropriate response plans and measures. Radioactive sources (material) that have been detected in scrap metal concerning objects with small amount of radioactive materials, are collected and temporarily stored to the interim storage facility of the NCSR of "Demokritos", Attiki. In such cases, GAEC announced the events to the IAEA information incident databes (former illicit trafficking database).
4. On the basis of the emergency plans, GAEC shall be responsible for the organization of campaigns to recover orphan sources left behind from past activities. A leaflet has been produced and disseminated widely.
5. The costs of recovering, managing and disposing of the sources shall be borne by GAEC and, as appropriate, by state agencies involved in emergency plans, and by holders of sources or facilities where shipments are made. In the context of such shipments, GAEC may also include surveys of historical records of authorities, such as customs, and of holders, such as research institutes, material testing institutes or hospitals.
6. Following the successful implementation of the national project for the identification, collection and export of disused and orphan sealed sources in 2001-2005, where the gross majority of the disused sources in the country were exported for recycling, GAEC shall conduct similar project in the near future.

## **7. Management of radioactive sources at the end of their life cycles**

1. At the moment, the only solution for sources remains export for recycling and re-use. This option has been implemented successfully in Greece using the Gamma Services Recycling, Germany during the respective project. This strategy should continue whenever needed.

2. Disposal facility does not exist. GAEC recognizing that this option cannot apply to all cases, has initiated actions to deal with this issue. These actions are in accordance to the implementation of the EC Council Directive 2011/70/EURATOM of 19 July 2011 for establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.
3. The possible waste streams are being identified, based on the GAEC radioactive source inventory, as well as on the potential disused sealed radioactive sources (DSRS) and waste arising from activities in Greece. A committee has been formed at GAEC to draft and document the national program for the management of the spent fuel and radioactive waste.
4. GAEC participates to the IAEA TC project INT/9/176 "Strengthening Cradle-to-Grave Control of Disused Sealed Radioactive Sources in the Mediterranean Region". The aim of the project is to assist the participating countries from the Mediterranean region in setting adequate and permanent control over radioactive sources at State level, benefiting from the use of a harmonized regional approach consistent with IAEA safety standards and other international best practices. Furthermore, technical assistance by means of IAEA expert missions, scientific visits and fellowships is provided.

### **8. Import - Export and Transport of radioactive sources**

1. The import and export of radioactive material and sources is licensed by GAEC. All appropriate communication with the export / import EU country authorities are in place through ANNEX 1 for all radiation sources irrespective of their type and activity. For non EU countries the "Request for Consent" for import / export of HASS is applied.
2. Prior to import of every radiation source manufacturer declares in written to take back the source after its useful life. Also, the source user declares in written to undertake all financial and administrative provisions for the export of the source.
3. The import of the radiation sources, is permitted only if the source recipient is authorized and licensed to possess, use and manage radiation sources. The suppliers of radioactive sources are not being involved to the radiation protection system, so they do not request for a source import and they do not apply for an import license; the end user does it. In this respect the source destination and end-user is always known to GAEC (except for radioactive smoke detectors), who must fulfill the RPR requirements.
4. For the export to an EU country of radiation source ANNEX 1 should be filled and submitted to the competent authorities of the involved countries (origin - destination). For non-EU countries, for the HASS, the "Consent for the Import of Source" should be submitted to the competent authorities. The approved and signed documents (ANNEX 1 and/or Consent) should be submitted to GAEC by the source holder / end user at the time the export license is requested. In the absence of them, the export license is not issued by GAEC and the export cannot be initiated. In this respect, the authorization, liability and adequacy of the source recipient are examined, assessed and approved by the competent authorities of the destination country, which signed and approved the ANNEX 1 and/or the Consent. The up-to-date practice does not include any additional evaluation or examination of the source recipient status, since all recipients are recognized facilities which have been approved - by the host competent authorities - to receive and manage radiation sources.
5. Greece has exported disused sources for recycling. There are no waste of radioactive sources in Greece, other those from nuclear medicine applications, which are managed in situ. The export of any source takes place only to its manufacturers or an authorized recycling facility, which (in both cases) has declared in written the receipt of the source.
6. The import and export of radiation sources cannot take place if the paragraphs 24 and 25 of the CoC and the national RPR are not fully satisfied. Up-to-now GAEC has not received a request where the CoC is not satisfied. If happens, it will be examined ad-hoc. GAEC Chairman will be informed by the GAEC officials, in order to approve such an import or export. In case of a source import under the exceptional conditions, GAEC can assure the

safe and secure management of it. However, in case of an export under the exceptional conditions, GAEC will communicate with the competent authorities of the importing country.

7. For the transport or transit of radioactive material and source through Greek territory, a transport -transit license is issued by GAEC. A pre-requisite is the approval of the shipment and the consent grant from the competent authorities of all countries involved in the transport (from origin country to the destination country). For the transport in the Greek territory, an RPO or SSO must be appointed, who is responsible against GAEC and acts as the contact person for any incident or accident during the transport.
8. For the transport or transit of HASS through Greek territory, a police escort is pre-requisite.

## **CONCLUSION**

Greece has implemented and applies the Code of Conduct and its Supplementary Guidance on the Import and Export of Radioactive Sources in a satisfactory manner. The IAEA IRRS mission (2012) did not identify important drawbacks of the Greek system related to the CoC field of interest; good practices have been acknowledged. GAEC has identified areas for improvement and has initiated actions which will be considered to the on-coming revision of the Radiation Protection Regulations. The most important include the implementation of the national policy and strategy on the disposal of radioactive sources and material after the end of their life cycles, as well as the upgrade of the existing interim storage facility. These actions have been initiated in the framework of the transposition and implementation of the EC Council Directive 2011/70/EURATOM of 19 July 2011 for establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.