GREEK NATIONAL REPORT

under the

JOINT CONVENTION

ON THE SAFETY OF SPENT FUEL

AND ON THE SAFETY OF

RADIOACTIVE WASTE MANAGEMENT

October 2005

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SECTION A. INTRODUCTION

Greece has signed the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management on 5 September 1997. The Convention entered into force on 16 March 2000.

The present report is the National Report of Greece for the Second Review Meeting to the Convention, which will take place 15-26 May 2006 at the IAEA in Vienna. The report has been prepared in accordance with the Guidelines regarding the Form and Structure of National Reports (IINFCIRC/604, 1 July 2002), established by the Contracting Parties under Article 29 of the Convention.

Greece has no nuclear power plants. Spent fuel management is therefore relevant only in connection with the operation of the one research reactor GRR-1 of the National Centre of Scientific Research (NCSR) "Demokritos". The policy and practice for the spent fuel management for GRR-1 is, to temporary store the fuel elements in dedicated storage facilities after irradiation, awaiting transfer to USA's jurisdiction by May 2009, according to an agreement with the US Department of Energy.

Radioactive waste in Greece originates from medicine, research and industry; waste with Naturally Occurring Radioactive Materials (NORM) result from some industrial activities as well. The management of radioactive waste is carried out on the site of origin. The national policy for the radioactive waste produced in research and medical applications is the decay storage and/or discharge.

The Joint Ministerial Order 1014 (ΦΟΡ) 94, Official Gazette No 216/B/6-03-2001"Radiation Protection Regulations" (RPR), published in 2001, is the national legislation concerning the civilian applications of the ionizing radiation and implementing the IAEA BSS and EURATOM Directives 96/29 and 97/43. In particular for the specific issue, since 1990, according to Greek legislation, an import license for a radioactive sealed source is granted by the regulatory authority, the Greek Atomic Energy Commission (GAEC), under the condition that the foreign supplier certifies to take back the source when it is disused. Moreover, Greece is in the process of implementing the European Council Directive 2003/122 on the control of the high activity sealed radioactive sources and orphan sources. Since 2003 GAEC is running a program, with the scope to return all the unused and orphan sealed sources to a foreign waste management facility for recycling; the first part of the project that concerned all the old "historical" sources, has been completed in September 2005.

On the occasion of hosting in Athens the Olympic Games 2004, serious improvements have been achieved in the safety and security of radioactive and nuclear material in general (e.g. upgrading of the physical protection systems, upgrading of the emergency response, collection and exportation of the unused old radioactive sources, etc).

Greece attaches highest importance to international efforts to harmonise and increase all aspects of nuclear safety; In this aspect Greece has initiated projects and bilateral agreements with other countries and tries to participate and contribute to all relevant international and European activities, among which the Joint Convention on the Safety of the Spent Fuel Management and on the Safety of Radioactive Waste Management and the Convention on Nuclear Safety.

SECTION B. POLICIES AND PRACTICES

Article 32 (Reporting), paragraph 1

(a) Spent fuel management policy

According to an existing contract, spent fuel from the GRR-1 has been returned and will be returned in the future to the United States Department of Energy until 2009. This means that Greece has no obligations regarding the final disposal of spent fuel.

(b) Spent fuel management practices

Spent fuel from the research reactor is stored on site until the return shipment to the United States. Shipment follows applicable transport and safeguards legislation.

Interim wet storage of spent fuel of the GRR-1 research reactor of the NCSR "Demokritos", takes place in the reactor pool and in a separate pool inside the reactor's building. Spent fuel from the reactor has been returned to the United States in 1996 and a second shipment is in progress and is expected to be completed in the near future (until the end of 2005). The burn-up of the spent fuel is about 35%.

The spent fuel of the decommissioned sub-critical assembly of the National Technical University of Athens (NTUA) is under dry interim storage in NTUA premises, under the control and supervision of the Nuclear Technology laboratory of NTUA.

There is no interim storage of spent fuel of the sub-critical assembly of the Aristotle University of Thessaloniki, since it is used as a zero power assembly.

Storage of spent fuel follows applicable radiation protection and safeguards legislation. Regular inspections are performed by the regulatory authority and by EURATOM and IAEA inpectors.

(c) Radioactive waste management policy

Radioactive waste in Greece originates from medicine, research and industry (including industries generating waste with NORM). Only low level and intermediate level waste derives from those sources. For this purpose, the national policy for the waste produced is the decay storage and discharge. The management of radioactive waste is carried out on the site of origin. The producers of radioactive waste have to bear full costs of treatment, interim storage and final disposal.

As it concerns waste with NORM, up to now all the waste produced has been exported to a foreign country for recycling.

Regarding the sealed radioactive sources and since 1990, according to the national legislation, a radioactive source in order to be imported into the country must have the commitment of the supplier to take back the source when it is disused. Therefore, when the supplier makes an offer,

he takes into account that in a few years' time he will have to undertake the cost of taking the source back. Moreover, Greece is in the process of implementing the European Council Directive 2003/122 on the control of the high activity sealed radioactive sources and orphan sources. In case that the source user bankrupts, the government will cover the additional funds for the purpose. Up to now, all the old "historical" sources have been collected and exported.

In light of the above described situation and arrangements, there is no need to create a long-term storage or disposal facility. Consequently Greece strongly supports the idea that states operating nuclear power plants cooperate closely with non nuclear power countries to develop solutions of final disposal of radioactive waste.

Radioactive waste management follows the RPR specifications. Announced and unexpected inspections are performed by the regulatory authority (GAEC) at least once every two years, in order to verify compliance with RPR.

Greek national authorities are responsible for the availability of technical infrastructure and equipment related to the treatment of radioactive waste.

(d) Radioactive waste management practices

Radioactive waste in Greece originates from medicine, research and industry (including industries generating waste with NORM). Only low level and intermediate level waste derives from those sources.

As it concerns the waste produced in NCSR "Demokritos", on-site waste treatment includes a range of operations, such as waste segregation, characterization, conditioning and storage and discharge.

Regarding the nuclear medicine and other research laboratories, according to the provisions of the RPR and since the waste concerned is of short half-lives, it is preferable to be stored in an interim storage by the producers until it has decayed and can be released to the environment, to a waste disposal for non radioactive waste or to a waste treatment facility for infectious waste. Special retention tanks might be required in nuclear medicine laboratories using I-131.

GAEC in collaboration with the NCSR "Demokritos" and the Ministry for the Environment, started in 2002 an action aiming in the collection of unused radioactive sources in the country. More than 700 radioactive sources (Co-60, Cs-137, Sr-90, Am-241, Co-57, Kr-57 etc) used in research, medical or industrial laboratories of total activity of 1.4TBq and 10 radiotherapy sources (Co-60 and Cs-137) of total activity of 113TBq have been collected and then exported for recycling. This action is going to be repeated when a significant number of non-used sources will be collected. Until then, the sources remain in the interim storage facility built for the purpose in the campus of NCSR "Demokritos".

During the period 2003-2005, a project concerning the decommissioning of an abandoned fertilizers industry has been completed. This project resulted a considerable amount of waste with NORM, that has been exported for recyling.

Criteria to categorize radioactive waste**:** Low level waste is defined as having a dose rate of less than 100μSv/h at a distance of one meter from the unshielded material. Material producing higher dose rates is considered as intermediate level waste.

SECTION C. SCOPE OF APPLICATION

Article 3 (Scope of Application)

(a) As mentioned before in Section A and Section B, spent fuel management does not occur in Greece because Greece has no nuclear power programme and is operating only one research reactor. All spent fuel has or will be returned to the United States. Spent fuel is stored until exportation at an appropriate storage facility within the reactor building.

(b) Greece, as a contracting party to the Joint Convention, has not declared spent fuel or radioactive waste within military or defense programmes as spent fuel or radioactive waste for the purposes of the Convention.

According to Greek legislation, the GAEC is the competent authority for the safety of radioactive waste management. Even if GAEC is not responsible for the radioactive waste from the Greek military, this is handled by GAEC in the same way as described in this report, since this waste is covered by the legislative system described in Section E.

(c) Greek legislation declares waste that contains NORM as radioactive waste, only if the exposure to the general public exceeds legally binding limits when this material is released to the environment. The regulated activities inducing NORM waste include the agricultural applications of phosphogypsum, the decommissioning activities of abandoned industries, etc.

SECTION D. INVENTORIES AND LISTS

Article 32 (Reporting), paragraph 2

(a) Spent fuel management facilities

In Greece there are no spent fuel management facilities.

(b) Inventory of spent fuel

In the GRR-1 of the NCSR “Demokritos” 46 spent fuel elements are in interim storage (October 2005). The table in Section L (a) shows the relevant details.

(c) Radioactive waste management facilities

The radioactive waste management facility at NCSR “Demokritos includes:

1. Central retention tanks for aqueous waste
2. Sorting box for the segregation of solid waste
3. High force compactor
4. Equipment for cementation
5. Facilities for interim storage

A new interim storage facility for sealed sources and other radioactive waste has been constructed in the campus of NCSR "Demokritos", as it was reported in the first national report under the joint convention in May 2003.

(d) Inventory of radioactive waste

Excluding the spent and disused sealed sources, the most significant production of radioactive waste takes place in NCSR "Demokritos". From 2003 to 2005, 10 m^3 of solid waste and 60 m^3 of liquid waste have been produced. Only 20% of solid waste is stored after treatment and conditioning in interim storage. The remaining solid waste and the liquid waste are discharged after up to 2 years storage. The table in Section L (b) shows the radionuclide inventory and the activities of the waste generated annually and in average in the NCSR "Demokritos".

The table in Section L (c) shows the radionuclides used in nuclear medicine laboratories all over the country.

SECTION E. LEGISLATIVE AND REGULATORY SYSTEM

Article 18 (Implementing measures)

Greece has fully implemented the Joint Convention on the Safety of Spent Fuel and on the Safety of Radioactive Waste Management.

Article 19 (Legislative and Regulatory Framework)

(a) Greece has no nuclear power programme. The legislative framework establishing a system of licensing g with regard to nuclear installations exists since 1971:

- Decree Law No 854, Official Gazette No 54/A/18-03-1971
  "Terms to Establish and Operate Nuclear Installations"
- Presidential Decree No 610, Official Gazette No 130/A/23-08-1978
  "Establishing Terms and Procedures in Licensing P.P.C. to Construct a Nuclear Power Plan on a Specific Site or change of the Site."

(b) According to the existing legislation, the Greek Atomic Energy Commission is the regulatory body responsible for the implementation of the nuclear safety and radiation protection regulations.

- Decree Law No 1733 (Article 28), Official Gazette No 171/A/22-09-1987
  "Establishing the Greek Atomic Energy Commission"
- Law No 181, Official Gazette No 347/A/20-11-1974
  "Protection Against Ionizing Radiation"
- Joint Ministerial Order 1014 (ΦΟΡ) 94, Official Gazette No 216/B/6-03-2001
  "Radiation Protection Regulations"
- Ministerial Order No 2739, Official Gazette No 165/B/15-03-1994
  "Regulation on Informing the General Public about Health Protection Measures to be Applied and Steps to be Taken in the Event of a Radiological Emergency"

- Presidential Decree No 22, Official Gazette No 20/A/26-02-1997
  "Supervision and Control of Shipments of Radioactive Waste between Greece and the other Member States of the E.U. and Into and Out of the E.U."
- Organization of Civil Protection, Ministerial Order No 2344, Official Gazette No 212/A/11-10-1995.

(c) Greece has ratified the International Conventions related to nuclear safety.

- Law No 1758, Official Gazette No 44/A/10-03-1988
  "Ratification of the Protocol Amending the Convention on Third Party Liability on the field of Nuclear Energy of 29 July 1960, as it was modified by the Additional Protocol of the 28 January 1964"
- Law No 1937, Official Gazette No 35/A/13-03-1991
  "Ratification of the International Convention in Case of a Nuclear Accident or Radiological Emergencies"
- Law No 1938, Official Gazette No 36/A/13-03-1991
  "Ratification of the International Treaty on Early Notification in Case of a Nuclear Accident"
- Law No 2480, Official Gazette No 70/A/14-03-1997
  "Ratification of the Nuclear Safety Convention"

(d) The Greek legislative framework related to safeguards and non-proliferation is the following.

- Decree Law No 437, Official Gazette 49/A/26-02-1970
  "Ratification of the Non Proliferation Treaty Signed on the 1 July 1968"
- Safeguards Agreement between Greece and IEAE signed on 17-11-1972
- Law No 1636, Official Gazette No 106/A/18-07-1986
  "Ratification of the Physical Protection of Nuclear Material Treaty"
- Ministerial Order No 5408 /E3/2362/ Φ. NSG, Official Gazette No 730/B/21-09-1993
  "Control on Transfer of Nuclear Materials, Armament and Technologies Affecting National Defence and Security"
- Law No 2805, Official Gazette 50/A/3-3-2000, "Ratification of the Additional Protocol."

(e) Greece is in the process of implementing the European Council Directive 2003/122 on the control of the high activity sealed radioactive sources and orphan sources

Article 20 (Regulatory Body)

The Greek Atomic Energy Commission (GAEC) was first established in 1958 as the authority responsible for planning, application and supervision of radiation protection measures, and as the competent authority for nuclear energy & technology and radiation protection.

The GAEC was re-established in 1987 as an independent civil service under the Minister of Development, and is the competent authority for nuclear energy & technology and radiation protection of workers, the general public and the environment against the dangers of ionizing and non ionizing radiation. In order to accomplish its duties, GAEC has specialized staff and accredited laboratories with state of the art equipment. GAEC has evolved over the past few

years by increasing its personnel, upgrading its infrastructure, improving the services provided, and by establishing regular education and training programmes.

The main responsibilities of GAEC in the field of radiation protection are the introduction of regulations and the monitoring of their implementation, as well as the introduction and implementation of radiation protection measures. The main functions of GAEC related to ionizing radiation, are:

- Licensing (import, export, transport, storage, use, disposal of radioactive and fissionable materials, research and training applications, import and use of radiation producing equipment, non-medical applications)
- Safety evaluation and inspections for all installations using or producing radiation
- Individual monitoring (external and internal) for all occupationally exposed workers in the country
- Secondary standard dosimetry
- National radiation protection data base
- Environmental radioactivity monitoring (telemetric network) and laboratory measurements of environmental samples (air filters, water, soil, food, etc)
- Emergency planning and response
- Education and training in radiation protection

GAEC's personnel is composed of 60 persons: 40 scientists, 7 technicians and 13 administrative staff. Among the scientists there are 12 with M.Sc. degree and 21 with Ph.D.

SECTION F. OTHER GENERAL SAFETY PROVISIONS

Article 21 (Responsibility of the license holder)

According to the RPR every practice with ionizing radiation is subjected to license. The RPR describe in extent and clearly the responsibilities of the license holder (e.g. safe storage, radiation protection of workers and the surrounding, quality assurance, reporting, etc), as well as of any other person involved in the radiation protection of the practice. The waste management concept and all relevant actions undertaken by a facility are always evaluated before the licensing of a practice which involves waste. The licensee has to implement all RPR in respect to waste management and to perform quality assurance and regular quality controls on these matters. Furthermore, the competent authority inspects at a regular basis the facility's waste management programme as well as the licensee responsibilities.

Article 22 (Human and financial resources)

The RPR describes the human resources which are part of the licensing demands. The verification of the adequacy and the training of the personnel is a part of the licensing process.

Also, in case of the import of sealed radioactive sources the licensing impose that all financial provision is undertaken by the facility for the waste management and the return of the sealed

sources to manufacturers. In case that the collected funds are insufficient for the real costs of final disposal, the government will cover the difference.

The GRR-1 is a public owned research reactor. The government assures the responsibility to cover any cost of its future decommissioning.

Article 23 (Quality assurance)

The RPR include the concept of Quality Assurance (QA) in all practices. The existence of a QA programme is obligatory for every facility and is subjected to the competent authority inspection and evaluation.
As a kind of example, GAEC's specialised laboratories have been accredited by the National Accreditation Council according to the ISO 17025 requirements.

Article 24 (Operational radiation protection)

All activities with ionizing radiation in the country are performed in accordance with the RPR, which implement the IAEA BSS and EURATOM Directives 96/29 and 97/43, where the radiation protection demands for each practice are described in details. All radiation protection measures for the public, the occupationally exposed workers, the patients and the environment, are subjected to competent authority inspection, control and evaluation.

As it concerns the activities and the relevant laboratories covered by the Joint Convention (eg waste management facilities, interim storage, environmental radioactivity lab., etc), NCSR and the GRR-1 apply their own radiation protection programme assured by the Health Physics Service, that is controlled by GAEC on a regular basis in the framework of the licensing procedure of the laboratories concerned.

GAEC provides the individual monitoring of all occupationally exposed workers and keeps the national records. The workers take part in a medical surveillance programme. It has to be mentioned that GAEC laboratories have been accredited by the Hellenic Accreditation Council according to ISO 17025 requirements.

The liquid or air discharges are monitored by the licensee holders and surveyed by GAEC. Moreover, GAEC performs intecomparison and intercalibration exercises with the environmental monitoring, waste and research reactor measurement laboratories of the NCSR. During the most recent (September 2005) inspection performed under the EURATOM Article 35, it has been deduced that Greece is in full compliance with the article 35 of the EURATOM Treaty.

Article 25 (Emergency preparedness)

According to RPR, in each facility there is an internal emergency preparedness plan in case of a radiological or nuclear accident or event, which is subjected to the competent authority inspection and evaluation.

According to its statutory role, GAEC is responsible for the coordination of the national environmental radioactivity monitoring programme. In this aspect:

- GAEC coordinates a network of 10 authorised research and University laboratories providing environmental radioactivity measurements, performs intercomparison exercises and harmonises the measurement procedures.
- GAEC operates a telemetric network containing 24 stations for total gamma dose rate measurements, 4 stations for the radioactivity measurements in the water of the main rivers and 3 stations for aerosol measurements all over the country.
- GAEC and NCSR perform air filters measurements from different locations in the country.
- GAEC and NCSR perform measurements in soil, water and food samples.
- the water reservoirs of the Greek capital are monitored on a monthly basis by GAEC. NCSR measures the Athens tab water monthly.

According to its statutory role, GAEC is responsible for emergency preparedness, advices the Government on the measures and interventions necessary to protect the public and acts as contact point for receiving and communicating information to the emergency response systems.

Since its establishment, GAEC participates in the National Emergency Plan for Civil Protection "Xenokratis". This plan, that also concerns the accident in a NPP of a neighboring country, participate a lot of national organizations. GAEC is responsible to activate the annex R, related to radioactivity issues.

For this purpose GAEC has its internal emergency plan, the necessary personnel and infrastructure. On the occasion of the Olympic Games Athens 2004 and in order to be able to cope with the new issue of the emergency response in case of a Nuclear-Radiological-Biological-Chemical threat, GAEC's emergency response system has been significantly upgraded.

Actually, GAEC's relevant infrastructure contains measuring and detection systems (detectors, surveys, dosemeters, contamination monitors, portable spectrometers, pagers, etc), protective equipment, independent communication system, mobile laboratory fully equipped with a series of detectors, spectrometers, protective equipment and a radiochemical laboratory, specialized vehicle to collect radioactive sources, scientific library containing all recent publication relevant to the nuclear and radiological safety and security, calculation codes (Lasair, Hotspot, Hysplit, etc) and a detailed documentation of all the procedures step by step, followed in case of an emergency.

In addition to that, all GEAC's specialized laboratories (environmental radioactivity lab, telemetric network, individual monitoring laboratories, etc) and the network of the collaborating laboratories already mentioned assist in case of an emergency.

Staff training, emergency exercises, intecalibration and intercomparison exercises are performed on a regular basis.

GAEC participates in Emergency Response Systems and Data Bases (ECURIE, IAEA Illicit trafficking data base, ENATOM, etc).

Article 26 (Decommissioning)

Decommissioning of the GRR-1 is not considered for the foreseeable future. However, a study of the research reactor's decommissioning is in progress and GRR-1 has the qualified staff for this job. Since GRR-1 is a public owned research reactor, the government assures the responsibility to cover any cost of its future decommissioning.

SECTION G. SAFETY OF SPENT FUEL MANAGEMENT

Article 4 (General safety requirements)

As explained in Section B, Greece has only one research reactor (GRR-1) and has no plans for nuclear power programme either for further research reactors.

All spent fuel will be returned to the U.S. Department of Energy by May 2009. Therefore Greece has only to take care of the on-site interim storage.

Article 5 (Existing facilities)

NCSR "Demokritos" operates GRR-1, since July 1961. GRR-1 is an open-pool, light water moderated and cooled reactor, with a nominal power of 5MW (thermal). GRR-1 uses MTR, plate-type fuel elements. Until the beginning fo July 2004, GRR-1 used a mixed core icluding high (HEU 93%) and low (LEU 19.75%) enriched fuel elements. GRR-1 is expected to convert to LEU core during year 2006, whilst the existing 46 HEU spent fuel assemblies are expected to be shipped to the USA (Savannah River Site) by the end of 2005. GRR-1 has a spent fuel interim wet storage pool with capacity of 57 assemblies inside the reactor building. Another 48 spent fuel assemblies may be stored inside the reactor pool.

Article 6-8 (Siting of proposed facilities, Design and construction of facilities, Assessment of safety of facilities)

It is not foreseen to design or construct new facilities.

Article 9 (Operation of facilities)

The interim storage facility is within GRR-1 building and operates under the responsibility of GRR-1 and NCSR "Demokritos" and under the supervision of GAEC.

Article 10 (Disposal of spent fuel)

Not applicable

SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Article 11 (General safety requirements)

Criticality and removal of residual heat is not a concern for the LILW waste in the interim storage of NCSR "Demokritos".

The management of radioactive waste is covered by the RPR and is based on the following general principles:

- Avoid the generation of radioactive waste or limit the waste generated to short half-life radionuclides
- Provide for effective protection of individuals, society and the environment, taking into account the biological, chemical and other hazards
- Take into account interdependences between stages of radioactive waste management

Article 12 (Existing facilities and past practices)

In the past, aqueous waste from the radioisotope production plant in NCSR "Demokritos", was either released after monitoring or transferred to the waste treatment plant for concentration by evaporation, then solidified by addition of portland cement and vermiculide in steel drums. The evaporator was of steam-heated type. This practice is not used today.

In the current NCSR "Demokritos" waste management plant, there is a sorting box equipped with a ventilation system providing segregation of solid waste under pressure. Also, there is a high force compactor and a cementation device.

Aqueous waste is collected in retention tanks, located close to the place where it is produced, then released after decay and monitoring.

The concentrated and solidified aqueous waste is kept in the interim storage facility of NCSR under monitoring and control.

Since 1991, Greece has a well-established regulatory system for controlling waste from nuclear medicine labs, so that disposing such solid or liquid waste does no harm to the environment. 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 1 GBq/m^3.
- Under no circumstances the daily disposed quantity should exceed 18 MBq for in vitro labs, 37 MBq for in vivo diagnostic labs, and 110 MBq for in vivo diagnostic and therapeutic labs.
- H-3 and C-14 used as organic solvents in liquid scintillators can be disposed if they contain less than 3 GBq and 0.3 GBq per day, respectively.

Solid:

- Solid radioactive waste is permitted to be thrown away as normal waste if it does not contain reusable objects and its concentration is below the clearance levels for each radionuclide.
- Short-lived (half-life < 60 days) solid waste that cannot be disposed according to the regulations is stored in vaults inside the labs until their radioactivity falls below the limits. All the other solid waste is returned to its supplier abroad.

Article 13 -15 (Siting of proposed facilities, Design and construction of facilities, Assessment of safety of facilities)

It is not foreseen to design or construct new facilities.

Article 16 (Operation of facilities)

The facilities operate under the responsibility of NCSR "Demokritos" and the supervision of GAEC. The operation of the facilities are subjected to the radiation protection requirements of RPR and the control of the effluents of the facilities is subjected to the EURATOM Treaty Article 35 and 36 requirements.

Article 17 (Institutional measures after closure)

There are currently no plans for closure of the existing facilities.

SECTION I. TRANSBOUNDARY MOVEMENT

Article 27 (Transboundary movement)

The transboundary movement of radioactive waste is presented in extent in the Greek RPR, which takes into account the Council Directive 93/3/EURATOM/3.2.1992 "On the supervision and Control of Shipment of Radioactive Waste between Member States and into and out of the Community". Also all other safety series and guidelines (e.g. IAEA etc) are taken into account.

On the occasion of the Olympic Games Athens 2004, and aiming to prevent that radioactive materials are smuggled into the country, GAEC in collaboration with the IAEA and the Greek Customs Office and under the US Second Line of Defense Programme, applied state-of-the-art technology at borders to detect illicit trafficking of radioactive or nuclear materials. Specifically, 57 portal monitors and 456 pieces of handheld equipment were provided in 32 cargo and passengers entry points of the country, covering 7 airports, 12 seaports, and 13 land-borders. The fixed systems contain gamma and neutrons detectors. The hand held equipment is used for the secondary control in case that fixed systems are installed, or for the primary control in the smaller entry points. These sets of equipment are composed by radiation pagers indicating the presence of radiation, by gamma detectors in order to determine the radioactive source location and intensity and spectrometers specifying additionally the radionuclide.

SECTION J. DISUSED SEALED SOURCES

Article 28 (Disused Sealed Sources)

Since 1990, there is a law in Greece, according to which a radioactive source in order to be imported into the country must have the commitment of the supplier to take back the source when it is disused.

In Greece there are no manufacturers or suppliers of sealed sources that export sealed sources.

A programme exists for collecting all spent and disused sources, imported into the country before 1990. The first part has been completed and this action is going to be repeated when a significant number of non-used sources will be collected. In the mean time, the collected sources (bankrupt source user, scrapyards, foundries, etc) are waiting for exportation in the upgraded interim storage facility located in the campus of NCSR "Demokritos".

In addition to the provision taken in order prevent the smuggling of radioactive sources or nuclear material in the country (section J, art. 27), in the scrapyards and foundries have been installed radioactivity detectors (portals) in order to monitor the scrap entering these facilities. In case of a finding the persons in charge communicate immediately with GAEC, so as to perform a secondary control and collect the object, if needed.

SECTION K. PLANNED ACTIVITIES TO IMPROVE SAFETY

1. Implementation of the European Council Directive 2003/122 on the control of the high activity sealed radioactive sources and orphan sources.
2. Investigation of the need to install retention tanks in all nuclear medicine laboratories using I-131 for therapeutic purposes.

SECTION L. ANNEXES

(a) Inventory of spent fuel

List of spent fuel elements in interim storage in the reactor building

Assembly No	U-235 (g)	Burn-up (%)	
520	111,66	38,33	
526	111,95	38,21	
5C01	60,50	39,83	
519	111,85	38,07	
428	120,45	33,54	
431	119,16	34,11	
4C05	67,40	32,88	
4C06	68,10	32,23	
501	113,67	37,04	
502	116,73	35,12	
503	118,18	34,52	
504	117,00	35,45	
505	118,74	34,37	
506	118,86	34,35	
507	118,47	34,55	
508	117,04	35,55	
509	119,26	34,54	
510	117,61	35,24	
511	111,66	38,37	
512	115,62	36,33	
513	119,48	34,10	
514	122,66	32,07	
515	118,04	34,61	
516	113,69	36,86	
517	113,44	37,29	
518	114,19	36,77	
5C02	66,19	34,26	
5C03	62,49	38,02	
5C04	66,25	33,97	
5C05	63,38	36,72	
5C06	64,09	36,04	

(b) Radionuclide inventory and the activities of the waste generated in the National Centre of Scientific Research (NCSR) "Demokritos"

Radioisotope	Radioactivity/ y in solid waste (MBq)	Radioactivity/ y in liquid waste (MBq)	Activity
Eu-152, Ag110m, Mn-54, Zn-65, Co-60	1.2	200	Operation of the experimental reactor
H-3	30	300	Biology and Radio-pharmacy and in vitro radio-diagnostic
C14	30	300	Biology Radio-pharmacy and in vitro radio-diagnostic
P-32	300	30	Biology and Radio-pharmacy and in vitro radio-diagnostic
I-125	450	260	Radio-pharmacy and in vitro radio-diagnostic
S-35	18	180	Biology and Radio-pharmacy and in vitro radio-diagnostic

(c) Inventory of radionuclides used in nuclear medicine for 2004

Radioisotope	Radioactivity/Year (GBq)	Use
Mo/Tc-99m	77,565	Diagnosis in vivo
Tl-201	3,3190	Diagnosis in vivo
In-111	425	Diagnosis & Therapy in vivo
I-123	145	Diagnosis in vivo
I-131	5,644	Diagnosis & Therapy in vivo
I-125	15,5	In vitro
Y-90	82	Therapy in vivo
Ga-67	296	Diagnosis in vivo
Re-186	402	Therapy in vivo
Sm-153	160	Therapy in vivo
Sr-89	17	Therapy in vivo
H-3	25	In vitro
C-14	0.162	In vitro
P-32	15	In vitro
P-33	0.2	In vitro
S-35	4	In vitro