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INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

TO

LEBANON

Beirut

27 September to 2 October 2009

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY

European Union

Conducted by the IAEA
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IAEA

INTEGRATED REGULATORY REVIEW SERVICE
IRRS

Under the terms of Article III of its statute, the International Atomic Energy Agency (IAEA) has the mandate to establish or adopt, in consultation and, where appropriate, in collaboration with competent organizations, standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards to its own operations as well as to assisted operations and, at the request of the parties, to operations under bilateral or multilateral arrangements or, at the request of a State, to any of that State's activities concerning peaceful nuclear and radiation activities. This includes the publication of a set of Safety Standards, whose effective implementation is essential for ensuring a high level of safety. As part of its providing for the application of safety standards, the IAEA provides Safety Review and Appraisal Services, at the request of Member States, which are directly based on its Safety Standards.

In the regulatory framework and activities of the regulatory bodies, the IAEA has been offering, for many years, several peer review and appraisal services. These include: (a) the International Regulatory Review Team (IRRT) programme that provides advice and assistance to Member States to strengthen and enhance the effectiveness of their legal and governmental infrastructure for nuclear safety; (b) the Radiation Safety and Security Infrastructure Appraisal (RaSSIA) that assesses the effectiveness of the national regulatory infrastructure for radiation safety including the safety and security of radioactive sources; (c) the Transport Safety Appraisal Service (TranSAS) that appraises the implementation of the IAEA's Transport Regulations; and (d) the Emergency Preparedness Review (EPREV) that is conducted to review both preparedness in the case of nuclear accidents and radiological emergencies and the appropriate legislation.

The IAEA recognized that these services and appraisals had many areas in common, particularly concerning the requirements on a State to establish a comprehensive regulatory framework within its legal and governmental infrastructure and on a State's regulatory activities. Consequently, the IAEA's Department of Nuclear Safety and Security has developed an integrated approach to the conduct of missions on legal and governmental infrastructure to improve their efficiency, effectiveness and consistency and to provide greater flexibility in defining the scope of the review, taking into account the regulatory technical and policy issues.

The new IAEA peer review and appraisal service is called the Integrated Regulatory Review Service (IRRS). The IRRS is intended to strengthen and enhance the effectiveness of the State's regulatory infrastructure in nuclear, radiation, radioactive waste and transport safety, whilst recognizing the ultimate responsibility of each State to ensure the safety of nuclear facilities, the protection against ionizing radiation, the safety and security of radioactive sources, the safe management of radioactive waste, and the safe transport of radioactive material. The IRRS is carried out by comparisons against IAEA regulatory safety standards with consideration of regulatory technical and policy issues.

The new regulatory service is structured in modules that cover general requirements for the establishment an effective regulatory framework, regulatory activities and management systems for the regulation and control in nuclear safety, radiation safety,

waste safety, transport safety, emergency preparedness and response and security. The aim is to make the IAEA services more consistent, to enable flexibility in defining the scope of the missions, to promote self-assessment and continuous self-improvement, and to improve the feedback on the use and application of the IAEA Safety Standards. The modular structure also enables tailoring the service to meet the needs and priorities of the Member State. The IRRS is neither an inspection nor an audit but is a mutual learning mechanism that accepts different approaches to the organization and practices of a national regulatory body, considering the regulatory technical and policy issues, and that contributes to ensuring a strong nuclear safety regime. In this context, considering the international regulatory issues, trends and challenges, and to support effective regulation, the IRRS missions provide:

- a balance between technical and policy discussions among senior regulators;
- sharing of regulatory experiences;
- harmonization of the regulatory approaches among Member States; and
- mutual learning opportunities among regulators.

Regulatory technical and policy discussions that are conducted during IRRS missions take into account the newly identified issues coming from the self-assessment made by the host organization, visits to installations to observe inspections and interviews with the counterparts.

Other legally non-binding instruments can also be included upon request of the Member States, such as the Code of Conduct (CoC) on the Safety and Security of Radioactive Sources, which was adopted by the IAEA Board of Governors in 2004 and for which more than eighty Member States have written to the Director General of the IAEA committing themselves to implementing its guidance, and the Code of Conduct on the Safety of Research Reactors, which was adopted by the IAEA Board of Governors in 2005.

The IRRS concept was developed at the IAEA Department of Nuclear Safety and Security and then discussed at the 3rd review meeting of the Contracting Parties of the Convention on Nuclear Safety in 2005. The meeting acknowledged the importance of the IAEA regulatory peer reviews as a good opportunity to exchange professional experience and to share lessons learned and good practices. The self-assessment performed prior to the IAEA peer review mission is an opportunity for Member States to assess their regulatory practices against the IAEA safety standards. These IAEA peer review benefits were further discussed at the International Conference on 'Effective Nuclear Regulatory Systems' in Moscow in 2006, at which note was taken of the value of IRRS support for the development of the global nuclear safety regime, by providing for the sharing of good regulatory practices and policies for the development and harmonization of safety standards, and by supporting the application of the continuous improvement process. All findings coming from the Convention on Nuclear Safety review meetings and from the Moscow conference are inputs for the IRRS to consider when reviewing the regulatory technical and policy issues.

In addition, the results of the IRRS missions will also be used as effective feedback for the improvement of existing safety standards and guidance and for the development of new ones, and to establish a knowledge base in the context of an integrated safety approach. Through the IRRS, the IAEA assists its Member States in strengthening an effective and sustainable national regulatory infrastructure thus

contributing towards achieving a strong and effective global nuclear safety and security regime.

The Global Nuclear Safety Regime has emerged over the last ten years, with international legal instruments such as safety Conventions and Codes of Conduct and significant work towards a suite of harmonized and internationally accepted IAEA safety standards. The IAEA will continue to support the promotion of the safety Conventions and Codes of Conduct, as well as the application of the IAEA safety standards in order to prevent serious accidents and continuously improve global levels of safety.

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

REPORT TO

THE GOVERNMENT OF LEBANON

Beirut

26 September to 2 October 2009

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

REPORT TO

THE GOVERNMENT OF LEBANON

Beirut

Mission date:	27 September to 2 October 2009
Regulatory body:	Lebanese Atomic Energy Commission (LAEC)
Location:	Beirut, Lebanon
Regulated facilities and activities:	Medical applications, industrial and research applications of radiation sources.
Organized by:	International Atomic Energy Agency (IAEA)

IAEA Review Team:

LACHAUME Jean Luc	(Team Leader)
CHERF Abdelmadjid	(Reviewer)
PACI Rustem	(Reviewer)
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The number of recommendations, suggestions and good practices is in not a measure of the status of the regulatory body. Comparisons of such numbers between IRRS reports from different countries should not be attempted.

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EXECUTIVE SUMMARY

At the request of the Government of Lebanon, an international team of experts visited the Lebanese Atomic Energy Commission – National Council for Scientific Research (LAEC - CNRS) to perform a peer review of Lebanon's statutory framework and national infrastructure for radiation safety, in accordance with the Guidelines of the IAEA Integrated Regulatory Review Service (IRRS).

The IRRS mission took place from 27 September to 2 October 2009.

The purpose of this IRRS was not only to facilitate regulatory improvements in safety but also to share knowledge gained and experiences amongst the LAEC staff and the reviewers through this evaluation of the effectiveness of Lebanon's regulatory body, its regulatory activities and organisational structure.

The activities and facilities regulated by the LAEC include medical, industrial and research facilities and activities, waste facilities and transport.

The IRRS Review Team consisted of senior experts from Member States supported by IAEA staff.

The IRRS team performed a review of the following relevant areas: legislative and governmental responsibilities; the authority, responsibilities and functions of the regulatory body; organization of the regulatory body; the authorization process; review and assessment; inspection and enforcement; the development of regulations and guides. In addition, at the request of the LAEC, the mission scope included review of regulatory oversight of the following thematic areas: occupational radiation exposure; control of medical exposures; education and training.

The mission included a series of interviews and discussions with key personnel at the LAEC, together with observation of inspections of several facilities. The LAEC supplied documentation and self-assessment material in advance of the mission (Advance Reference Material - ARM) and the team presented its findings based on the IAEA safety standards. Additionally, the IRRS team, the LAEC staff, the Legal Adviser of the Prime Minister, the representatives of CNRS and the Ministry of Public Health discussed a number of policy issues of particular interest to Lebanon and in the wider global context, relating to the legal and regulatory infrastructure for nuclear and radiation safety. The results of the discussions will serve as a useful basis for the evolution of future IRRS missions and will assist with continuous improvement in the regulation of nuclear and radiation safety.

The mission also included bilateral meetings with the Legal Adviser to the Prime Minister, the Director General of the Ministry of Public Health, the Director General of the Customs and the President of the syndicate of private hospitals in Lebanon. These meetings provided a good opportunity to explain the objectives of the mission, to raise awareness about the essential character of a sound national regulatory infrastructure to control facilities and activities dealing with ionizing radiation, and the need to strengthen it in due consideration of the existing situation and the latest IAEA standards and guidance.

The IRRS Review Team noted the open, transparent and learning attitude of the LAEC staff throughout this mission, and it was evident that significant effort had been put into the preparation of the mission. During the review, the administrative and logistical support was excellent and full cooperation was extended to the team in technical discussions with the LAEC personnel.

The IRRS Review Team appreciates and acknowledges the LAEC's participation in international cooperation activities and encourages the LAEC to continue its active role in the exchange of experience and expertise amongst regulators.

Although no good practice has been identified, the IRRS Review Team wants to acknowledge the large amount of very good quality work being carried out by the LAEC. It has to be recalled that the LAEC is quite young in the field of regulatory activities. It was only four years ago that it was formally included in the national regulatory infrastructure of Lebanon, being empowered by Decree 15512 dated 19 October 2005 to review and assess the applications for authorization, to conduct inspections and to discharge other regulatory functions. During these last four years, the LAEC has worked hard to fulfil these regulatory responsibilities. The result is quite impressive, and the IRRS Team recognize that the LAEC has succeeded to improve the regulatory control of sources in Lebanon. These efforts have to be pursued for all the activities of the LAEC.

The IRRS Review Team made recommendations and suggestions that indicate where improvements are necessary or desirable, to further strengthen the effectiveness of regulatory oversight. These recommendations and suggestions will support the LAEC in improving its regulatory performance, and some of these are related to areas in which the LAEC has already initiated actions to address them.

The IRRS Review Team believes that consideration of the following recommendations and suggestions should be given high priority, either because they were identified in several areas of review or because the experts considered they will contribute significantly to the enhancement of the overall performance of the regulatory system:

- Lebanon should revise its legal framework governing safety and establishing the regulatory body and its functions and responsibilities, in accordance with IAEA safety standards and guidance;
- the LAEC should make formal arrangements for cooperation and coordination with other national agencies;
- the LAEC should increase its technical and legal competences to fulfil its regulatory functions and should develop a regulatory training programme for its staff
- the LAEC, together with other interested parties, should develop a national strategy for education and training
- the LAEC should finalize and approve draft safety regulations
- the LAEC should ensure that the national register of sources is complete and that all facilities and activities are included in its authorization and inspection programmes.

The IRRS Review Team findings are detailed in Appendix V.

I. INTRODUCTION

At the request of the LAEC, an IAEA team consisting of five experts from four Member States and two staff members from the IAEA, visited the LAEC from 27 September to 2 October 2009 to conduct an Integrated Regulatory Review Service (IRRS) mission. A preparatory meeting had been conducted in November 2008 at the LAEC office in Beirut to determine the purpose, objectives, scope and schedule for the review, following which, a self-assessment workshop was arranged in Vienna in January 2009.

The purpose of the mission was to conduct a review of the Lebanese regulatory framework and the regulatory activities in all regulated activities, facilities and practices, to review the effectiveness of the LAEC and to exchange information and experience in the regulation of the areas considered by the IRRS. The areas reviewed included legislative and governmental responsibilities; authority, responsibilities and functions of the regulatory body; organization of the regulatory body; the authorization process; review and assessment process; inspection and enforcement process; the development of regulations and guides and the management system of the regulatory body. In addition, at the request of the LAEC, the mission scope included review of regulatory oversight of the following thematic areas: occupational radiation exposure; control of medical exposures; education and training of regulatory staff.

In addition, the regulatory technical and policy issues considered in this review provide a greater understanding of the regulatory issues that may have international implications and assist in addressing specific technical issues relevant to the regulation of nuclear and radiation safety. Regulatory technical and policy issues were identified after reviewing a broad spectrum of information including insights resulting from the conclusions of the review meetings of the Convention on Nuclear Safety, international conferences and forums and previous IAEA safety review services.

Before and during the mission, the LAEC made available various reference materials for the team to review. This material consisted of legal, regulatory and internal documents, in particular the report of the self-assessment made using the IAEA methodology and tools. During the mission the team performed a systematic review of all topics using the self-assessment report, the advance reference material (ARM) and related presentations, interviews with the LAEC staff and direct observation of their working practices during inspections carried out by the LAEC.

IRRS activities took place mainly at the office of the LAEC. Discussions and observations were also conducted at remote locations as noted in Appendix III.

II. OBJECTIVE AND SCOPE

The purpose of the mission was to conduct an IRRS mission to review the Lebanese legal and governmental infrastructure for radiation safety, the effectiveness of the Lebanese regulatory body (LAEC) and to exchange information and experience among the LAEC and the IRRS team with a view to contributing to harmonizing regulatory approaches and creating mutual learning opportunities among regulators.

The key objectives of this mission were to enhance radiation safety by:

- ✓ Providing the host country (regulatory body and governmental authorities) with a review of the discussions of radiation safety regulatory technical and policy issues;
- ✓ providing the host country with an objective evaluation of its radiation safety regulatory practices with respect to IAEA safety standards;
- ✓ contributing to the harmonization of regulatory approaches among Member States;
- ✓ promoting sharing of experience and exchange of lessons learnt;
- ✓ providing key staff in the host country with an opportunity to discuss their practices with reviewers who have experience of other practices in the same field;
- ✓ providing the host country with recommendations and suggestions for improvement;
- ✓ in due course, providing other States with information regarding good practices identified during the review;
- ✓ providing reviewers from member States and IAEA staff with opportunities to broaden their experience and knowledge of their own field; and
- ✓ providing the host country, through completion of the IRRS questionnaire, with an opportunity for self-assessment of its activities against international safety standards.

The scope requested by the LAEC for this IRRS mission included:

- Legal and governmental infrastructure for radiation safety.
- Industrial uses of ionising radiation.
- Occupational radiation exposure.
- Control of medical exposure.
- Education and training.

III. BASIS FOR THE REVIEW

A) Preparatory Work and IAEA Review Team

The preparatory work for the mission was conducted by the IRRS Team Coordinator Mr Hilaire Mansoux, NSRW/IAEA. All external reviewers, including the IRRS Team Leader, Mr Jean Luc Lachaume, were drawn from Regulatory Bodies of IAEA Member States. In accordance with the request from LAEC, and taking into account the scope as indicated above, it was agreed that the IAEA review team would comprise of five international expert reviewers (see Appendix I) and two IAEA staff members. Due to the specific legal issues in Lebanon, the LAEC requested that the Office of Legal Affairs of IAEA participate in the mission. The working areas and the LAEC counterparts were distributed according to Appendix V.

During the preparatory period all advance reference material (ARM) was forwarded electronically by LAEC to the IAEA and distributed to the reviewers. All details and organizational aspects of the mission were defined with the nominated the LAEC Liaison Officer Mr Bilal Nsouli.

A significant amount of work was carried out by the Review Team and by IAEA staff before the mission in order to prepare the initial impressions about the ARM, to review the LAEC self-assessment report, to prepare for the interviews and direct observations at the sites and to identify additional relevant material necessary to review during the mission.

Review Team training was conducted on 27 September 2009 in Beirut, followed by a team briefing by the IRRS Team Leader and the IRRS Team Coordinator, during which the specifics of the mission were discussed, together with the basis for the review, background, context and objectives of the IRRS. Based on the advance reference material, the reviewers also reported their first impressions of the current status of all areas within the scope of the mission.

B) References for the Review

The main reference documents provided by the LAEC for the review mission are indicated in Appendix VII. The most relevant IAEA Safety Standards and other reference documents used for the review are indicated in Appendix VIII.

C. Conduct of the Review

During the mission, a systematic review was conducted for all review areas with the objective of providing the LAEC with recommendations and suggestions as well as of identifying good practices.

The review was conducted through meetings, interviews and discussions with the LAEC personnel; visits to relevant organizations; assessment of the ARM and direct observations regarding national practices and activities particularly in the context of inspections.

The team performed its activities based on the Mission Programme given in Appendix II. The entrance meeting was held on Monday 28 September 2009 with the participation of the LAEC senior management. Opening remarks were made by

Dr Hassan Cherif, representing the Secretary-General of CNRS, Mr Nsouli, Director, LAEC, and Mr Jean-Luc Lachaume, IRRS Team Leader.

During the mission, bilateral meetings were organized with the Legal Adviser to the Prime Minister, the Director General of the Ministry of Public Health, the Director General of the Customs and the President of the syndicate of private hospitals in Lebanon.

The exit meeting was held on Friday 02 October 2009 at the LAEC in the presence of Pr Mouïn Hamze, Secretary-General of CNRS, Mr Nasser Youcef, Legal Adviser to the Prime Minister, and all IRRS Reviewers and Counterparts.

Mr Jean-Luc Lachaume, IRRS Team Leader, presented the main conclusions of the mission, and closing remarks were made by the Director, Division of Radiation, Transport and Waste Safety, IAEA, Ms Eliana Amaral. A preliminary draft of the IRRS mission report was provided to the LAEC at the conclusion of the meeting.

1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES

1.1 LEGISLATIVE AND STATUTORY FRAMEWORK

The legislative and statutory framework to regulate radiation safety in Lebanon is established through:

- Decree Law no.105 of September 16, 1983 regulating the use of and protection against ionizing radiations issued 16 September 1983. The Decree Law 105 is addressing only the concepts of authorization of practices and enforcement of the legislative provisions;
- Decree no. 1048 of April 1, 1998 establishing the Lebanese Atomic Energy Commission (LAEC) as a centre within the Centre National de la Recherche Scientifique (CNRS).
- Decree 15512 of October 27, 2005 regulating the use and protection against ionizing radiations. The Decree 15512 clarifies the authorization regime and complements the Decree Law 105 by assigning some regulatory function to the LAEC.

The IRRS Team was informed that a draft Law establishing a new regulatory body was prepared in 2000 and is still pending review at the parliament. It is planned to withdraw this draft from the review process, in order to revise it extensively, with reference to the change of the situation in Lebanon, in particular with the experience gained by the LAEC in discharging regulatory functions and the international obligations of Lebanon resulting from the conventions to which it is party. It is also recommended to consider the latest IAEA standards and guidance published in the recent years to ensure the highest possible level of compliance with current international standards. In addition, during the discussions, the IRRS Team reported that many countries, including in the region, have already established a legal framework for the control of nuclear applications similar to those existing in Lebanon.

1.2 ESTABLISHMENT OF AN EFFECTIVELY INDEPENDENT REGULATORY BODY

The Decree Law no. 105 designates the Ministry of Public Health (MPH) as the body having the authority to grant authorizations and to enforce the regulatory requirements.

Decree 15512 clarifies the institutional framework and gives regulatory responsibilities to LAEC. It states that “The Minister of Public Health shall issue all authorizations pertaining to the use, utilization, import and export of such radiation sources and equipment as set forth in decree-Law no 105/83. Such authorizations shall be issued pursuant to a scientific examination and assessment of the relevant applications by the LAEC”.

Article 5 of decree 15512 states that “LAEC, in its capacity of national control authority, is entrusted with the following tasks:

1. To conduct regular control (inspection) of hospitals, clinics, medical, industrial, agricultural, educational, and research facilities with the purpose of verifying the implementation of radiation protection rules pertaining to the authorized practices.
2. To conduct mandatory and regular, individual control of workers directly or indirectly exposed to ionizing radiations within medical, industrial, agricultural, educational, and research facilities.
3. To issue and implement secure rules regarding the import, export, transport, use and disposal of radiation sources and the handling of accidents resulting thereof."

It results from these various legal provisions that both MPH and the LAEC have regulatory functions and responsibilities.

The fact that the MPH is part of the regulatory body in Lebanon, and at the same time is responsible for the promotion of the use of radiation sources for medical purposes may compromise the effective independence of the regulatory judgements due to potential conflict of interest.

In addition to its regulatory role, the LAEC is operating laboratories in charge of environmental and food monitoring (research and services) and services for radiation safety (personal dosimetry, calibration, quality control for medical equipment and workplace monitoring.) Although departments providing radiation safety services and performing regulatory activities are separated, there is no legislative provision to support this separation ensuring that there is no potential conflict of interest.

The effective independence of the regulatory body was discussed during the policy issue session. It appeared that the Lebanese representatives have a clear understanding of the various aspects of the regulatory body effective independence issue and agreed to identify the most appropriate means to improve the current situation. The discussion and exchange of experience among participants made it clear that it is continuous process and challenge for all regulatory bodies.

Authorization
Authorizations are issued by the MPH based on an assessment of the application by the LAEC. Article 6 of the decree 105 authorizes the MPH to withdraw authorization to any operator who violates the law. However, the two decrees do not address refusal, amendment or suspension of authorizations.

Regulatory Review and Assessment
The responsibility for review and assessment of applications for authorization is given to the LAEC by article 1 of Decree 15512.

Inspection
Decree Law 105 does not empower the MPH to conduct inspection of activities and facilities to verify their compliance with the regulatory requirements; however, Article 5 of Decree 15512 assigns this responsibility to the LAEC, but does not make a clear provision for the access right of the inspectors to facilities and sites to carry out inspections. The Lebanese legal framework does not provide for the statute of inspectors

Enforcement

Article 6 Paragraph 2 of the Decree Law states clearly that the MPH has the authority to enforce the legislative and regulatory provisions and as appropriate may notify the general prosecutor on offences committed by any person violating the law.

Establishing safety principles, criteria, regulations and guides

The LAEC is vested by Decree 15512 to "issue and implement rules governing the import, export, transport, utilization, use and disposal of sources and the handling of accidents resulting thereof". Meanwhile, the Ministry of Public Health is also responsible to propose to the Council of Ministers regulations on the prevention measures and authorizations terms.

These responsibilities given to the MPH and the LAEC by the two legal documents of different levels may overlap and affect the establishment of a sound regulatory system.

Except Decision no. 705/1 of the MPH, Lebanon has not issued implementing regulations in compliance with the IAEA standards. However, the IRRS team was provided with a draft regulation for radiation protection prepared by the LAEC. This draft is being finalized and is expected to be sent to the State Council for review.

1.3 OPERATOR RESPONSIBILITY

Decree law 105 and Decree 15512 do not make provision stating that the primary responsibility for safety must rest with the operator (the licensee).

1.4 LEGISLATIVE REQUIREMENTS

The existing legal framework does not provide adequately for the decommissioning, physical protection and civil liability for nuclear damage.

Article 8 of the Decree no.15512 assigns the responsibility to the LAEC to establish, in cooperation with the MPH, a mechanism for disposal of radioactive waste but does not provide adequately for the safe management of waste.

The Decree law provides succinctly for the transport of radioactive material. The LAEC has prepared draft regulations together with the safety regulations which need to be reviewed in order to ensure that it complies with the IAEA regulations on the safe transport of radioactive material.

The Decree 15512 makes provision for the responsibility of the LAEC regarding emergency preparedness and response in case of a radiological emergency. However, there is no national emergency plan in place. The IRRS team was informed that the LAEC intends to coordinate with national organizations which might be involved in national emergency and preparedness.

With reference to the IAEA safety standards "Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety" (GS-R-1), in particular § 2.4, the existing legal framework does not address the following aspects:

- clear objectives for protecting people and the environment,
- exemptions and exclusion concepts,
- process of removal of a facility or activity from the regulatory control,
- process of appeal against regulatory decisions,
- use of advisory bodies or consultants by the regulator,
- proper definition of offences and corresponding penalties,
- implementation of obligations under national treaties, conventions and agreements related to safety that Lebanon has already signed,
- Power of the regulatory body to communicate independently its requirements, decisions and opinions to the public.
- Liaison of the regulatory body with regulatory bodies of other countries and with international organizations to promote cooperation and the exchange of regulatory information

As a final note on this section, it clearly appears that the legislative framework currently in place in Lebanon is not adequate and not in compliance with the IAEA safety standards.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS:** GS-R-1 §2.4 – 2.6
R1.	**Recommendation:** The government of Lebanon should consider revising as soon as possible the current draft law submitted to the Parliament in 2000 or should consider its withdrawing by submitting a new law and to ensure that it takes into account the latest IAEA standards and guidance, the objectives of international harmonization of regulatory approaches and the new national circumstances, in particular the international obligations of Lebanon resulting from the international legal instruments to which it is party.
R2.	**Recommendation:** The government of Lebanon should prepare a new draft law covering safety, security, safeguards and nuclear liability. • The law should establish a regulatory body independent from any organization responsible for the promotion or the use of ionizing radiation, with clear functions and responsibilities. • The law should ensure that the regulatory body has its own budget and is adequately funded and staffed. • The law should provide for a coherent regulatory system including authorization, review and assessment, inspection and enforcement. • The law should cover but not be limited to radiation safety, radioactive waste management, transport of radioactive material, emergency preparedness and response, physical protection, import and export controls of radiation sources, safeguards, liability and domestic penal provisions.
(1)	**BASIS:** *SF-1 Principle 1: Responsibility for safety* states: *"The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks."*
(2)	**BASIS:** GS-R-1 §2.3 states "*The prime responsibility for safety shall be assigned to the operator."*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(3)	**BASIS:** *SF-1 Principle 7: Responsibility for safety* states: "*People and the environment, present and future, must be protected against radiation risks."*
R3.	**Recommendation** The draft law should provide for clear objectives and scope and should also make provisions for the prime responsibility for safety of the authorization holder.
S1.	**Suggestion:** Lebanon should take fully advantage of the IAEA legislative assistance to establish its legal framework.
R4.	**Recommendation:** Lebanon should consider completing the process of adherence to the relevant international instruments, specifically the Joint Convention on the Safety of Spent Fuel and the Safety of Radioactive Waste Management, and incorporate the relevant provisions into the domestic Law.

During the policy issue discussion, the IRRS Team emphasized the necessity to clearly distinguish the respective responsibilities of the regulator and the promoter of any nuclear technology. The new draft law should include in its scope all uses of radiation sources and radioactive and nuclear materials: hospitals and clinics, industries, research centers, agriculture, education and any nuclear facility planned for the future including nuclear research reactor.

2. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

2.1 REGULATORY BODY - FULFILLING STATUTORY OBLIGATIONS

Within the limited and incomplete legislative framework described in section 1, both MPH and the LAEC are discharging their responsibilities.

The process of technical review and assessment of applications for authorization by the LAEC is established.

Following this review, and upon compliance with the relevant requirements, LAEC established a certificate for authorization, which is sent to MPH for the issuance of the authorization (see further details in section 4).

Some regulations and guidance to the users are given.

2.2 REGULATORY BODY – COOPERATION WITH OTHER RELEVANT AUTHORITIES

The Decree law 105 does not provide for a systematic cooperation and coordination between LAEC and other agencies however, article 11 of the Decree 15512 makes provision for the collaboration between the LAEC and the ministries, public and private institutions in the area of radiation protection and safety. The LAEC has not made formal arrangements for cooperation and coordination but cooperates on a regular basis with the Customs, the MPH, the security forces and various professional associations.

2.3 REGULATORY BODY – ADDITIONAL FUNCTIONS

In addition to its regulatory role, LAEC has additional functions:

- Radiological environment and food monitoring (research and services),
- quality control measurements for medical equipments,
- personal dosimetry service,
- calibration,
- Research in the domain of environment, medical and material sciences.

These services are carried out by specific departments of the LAEC, outside of the department for authorization, inspection and regulations. Fees charged by the LAEC for these services are sent to the public treasury.

The fact that the LAEC has these additional functions does not contradict the IAEA standards and is actually a common practice in many countries where there is limited resources and competences to offer radiation protection services. However, it is important that all appropriate legal and technical measures be taken to avoid any conflict of interest.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS:** GS-R-1 § 3.5 states *"The regulatory body may also have additional functions. When such functions are undertaken, care shall be taken by the regulatory body to ensure that any conflict with its main regulatory functions is avoided and that the prime responsibility of the operator for safety is not diminished"*
S2.	**Suggestion:** LAEC should take all appropriate administrative measures to avoid any conflict of interest between its regulatory function and its research and service provider activities.
(1)	**BASIS:** GS-R-1 §3.4 states: *"The regulatory body shall co-operate with other relevant authorities, advise them and provide them with information on safety matters."*
S3.	**Suggestion:** LAEC should make formal arrangements for cooperation and coordination with the national agencies, specifically with the customs for the import and export of radioactive sources.

3. ORGANIZATION OF THE REGULATORY BODY

3.1 GENERAL

Organizational structure and size

LAEC is one of the four research institutes of CNRS. The director of the LAEC reports to the secretary-general of CNRS, who then reports to the Board of Directors, and when necessary to the trusteeship authority (i.e. the Prime Minister). The LAEC is then submitted to all administrative and organizational rules of CNRS, in particular for its budget and staffing.

There is no formal organizational structure of the LAEC. However, the LAEC is internally organized as follows (see appendix VIII the organizational chart):

Under the office of the director, there are two management offices (administration and quality management) and two major divisions (Regulatory and Radiation Control division and Scientific Research and Services Division), the department for authorization, inspection and regulations, in charge of regulatory activities is one department under the first division which contains also the department of nuclear security, safeguards and emergency and the department of medical, worker and public exposure. The Scientific Research and Services Division includes medical, material sciences, environmental sciences department as well as the department of scientific services.

The total staff of the LAEC is around 70 persons, with the following distribution of education levels: 13 Ph.D holders, 41 Engineers, Regulators, Inspectors, Laboratory Assistants and Technicians and 13 Support staff.

The Department for authorization, inspection and regulations of the LAEC consists of two sections, according to the major types of activities to be regulated in Lebanon: diagnostic and dental radiology in one section, radiotherapy, nuclear medicine and non medical uses in the other section. The total staff of the department is 8 professionals.

From the information available at the LAEC, the numbers of facilities and activities to be regulated are:

- 3600 dental radiology centers
- 200 diagnostic radiology centers
- 22 nuclear medicine facilities
- 24 radiotherapy centers (accelerators, sources)
- 13 industrial facilities
-

About 50 percent of these facilities have satisfied the licensing requirements of the Decree 15512 and thus have received a new licence since 2005.

Budget
The funding mechanism of the regulatory activities of the LAEC is governed by the rules of CNRS. The LAEC receives an annual budget through CNRS. All expenses of the LAEC have to be endorsed by CNRS.

3.2 STAFFING AND TRAINING OF THE REGULATORY BODY

There are three senior and experienced staff, and five junior inspectors in the department for authorization, inspection and regulations of the LAEC.

There is no formal and sustainable training programme for the regulatory staff of the LAEC. Staff is trained through IAEA and the Arabic Atomic Energy Agency (AAEA) programmes. As described in section 7, there is a new training programme being developed by the Arab university of Beirut in cooperation with the LAEC. Staff from the Department of Authorization, Inspection and Regulations of the LAEC benefit from this training. In addition, informal tutorial is provided by senior staff.

Education and training is a high priority issue for the LAEC, as demonstrated by the request to include the education and training thematic module in this IRRS (see section 7)

The IRRS Team was informed that the LAEC is understaffed by about 50%. To discharge all of its responsibilities, and to regulate al facilities, the LAEC would need additional technical and legal expertise.

It appears that the majority of the staff is in a fragile position which may affect in the future the sustainability and regulatory stability. Actually, given the national constraints and the current decision making process for human resources laying with CNRS, the LAEC could not have its own recruitment strategy.

3.3 ADVISORY BODIES TO THE REGULATORY BODY

The LAEC has no contractual arrangements with any consultants, contractors or advisory bodies. On a case by case basis, the LAEC may require assistance from regulators in neighbouring countries, for reviewing new types of applications.

3.4 RELATIONS BETWEEN REGULATORY BODY, OPERATORS AND THE PUBLIC

Decree 15512 requesting all users to submit a new application to the LAEC is the starting point of the relations between the LAEC and the operators. Before 2005, authorizations were given with no time limit by MPH, without the involvement of the LAEC, and no inspections were conducted. Therefore the LAEC decided to adopt a cooperative approach to explain the new requirements to the users, to ensure that they would be well understood and complied with. Actually, the LAEC maintains good relations with users.

There are no legislative provisions for the LAEC to communicate with the public. On this basis, the LAEC explained during the policy issue discussion that it did not develop a strong programme to raise awareness of the population on safety issues.

3.5 INTERNATIONAL CO-OPERATION

The LAEC is involved in IAEA and AAEC activities.

LAEC has currently five national projects in the technical cooperation programme of IAEA, including the establishment of a National Safe Temporary Storage Site at the Lebanese Atomic Energy Commission for Orphan Sources and Radioactive Waste.

The LAEC in involved in several regional projects, including the six projects dealing with the thematic safety areas of radiation safety.

Currently, Lebanon is party to the multilateral agreements listed in the following table.

Multilateral Agreement	**In Force**	**Status**
Convention on the Physical Protection of Nuclear Material	1998-01-15	accession: 1997-12-16
Vienna Convention on Civil Liability for Nuclear Damage	1997-07-17	Signature: 1995-09-19 ratification: 1997-04-17
Convention on Early Notification of a Nuclear Accident	1997-05-18	Signature: 1986-09-26 ratification: 1997-04-17
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1997-05-18	Signature: 1986-09-26 ratification: 1997-04-17
Convention on Nuclear Safety	1996-10-24	Signature: 1995-03-07 ratification: 1996-06-05
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management		Signature: 1997-09-30
Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage		Signature: 1997-09-30
Convention on Supplementary Compensation for Nuclear Damage		Signature: 1997-09-30
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	1981-03-09	Signature: 1981-03-09
Co-operative Agreement for Arab States in Asia for Research, Development and Training Related to Nuclear Science and Technology (ARASIA)	2002-07-29	acceptance: 2002-07-29

Regarding regulatory infrastructure for safety, the LAEC has not established arrangements with regulatory bodies of neighbouring states and other states, but does have some informal contacts with some of them, especially for staff training purposes.

Lebanon has expressed political support to the Code of Conduct on the Safety and Security of Radioactive Sources and to the Guidance on import and export of radioactive sources.

3.6 MANAGEMENT SYSTEMS FOR THE REGULATORY BODY

There is currently no management system in place for the regulatory activities of LAEC. There are plans to develop a systematic approach for the quality management to all activities of the commission, including the department for authorization, inspection and regulations.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS**: GS-R-1 §4.1 states: *"The regulatory body shall have an organizational structure and size commensurate withy the extent and nature of the facilities and activities it must regulate, and it shall be provided with adequate resources and the necessary authority to discharge its responsibilities."*
(2)	**BASIS**: Preamble to the BSS under "the regulatory authority" states: *"Such a regulatory authority must be provided with sufficient powers and resources for effective regulation…"*
(3*)*	**BASIS**: GS-R-1 §4.6 states*:" The regulatory body shall employ a sufficient number of personnel with the necessary qualifications, expertise and experience to undertake its functions and responsibilities."*
R5.	**Recommendation**: LAEC should make a clear assessment of its staffing needs to discharge its regulatory responsibilities and ask for the associated resources.
(1)	**BASIS**: GS-R-1 §4.7 states*: "in order to ensure that the proper skills are acquired and that adequate levels of competence are achieved and maintained, the regulatory body shall ensure that its staff members participate in well defined training programmes. This training should ensure that staff are aware of technological development and new safety principles and concepts."*
R6.	**Recommendation**: LAEC should establish a formal training programme for its staff, to ensure adequate initial training and continuous professional development.
R7.	**Recommendation**: LAEC should increase its technical and legal competences to fulfill its regulatory responsibilities.
(1)	**BASIS:** GS R 1 §4.11 states: *"National authorities, with the assistance of the regulatory body, as appropriate, shall establish arrangements for the exchange of safety related information, bilaterally or regionally, with neighbouring States and other interested States, and with relevant intergovernmental organizations, both to fulfil safety obligations and to promote co-operation."*
S4.	**Suggestion:** LAEC should establish formal arrangements with other regulatory bodies, to strengthen cooperation on radiation safety and regulatory infrastructure.
(1)	**BASIS**: GS-R-1 §4.5 states*: "The regulatory body shall establish and implement appropriate arrangements for a systematic approach to quality management which extend throughout the range of responsibilities and functions undertaken."*
R8.	**Recommendation:** LAEC should establish a comprehensive management system covering all its activities, including the regulation of all facilities and activities using radiation sources.

4. ACTIVITIES OF THE REGULATORY BODY

4.1 NOTIFICATION

The LAEC has a system of notification in place but it is not based on a formalized notification form.

After receiving an informal notification from an applicant or a licensee, the LAEC ensures that the application process starts in accordance with the established procedure. This procedure requires that the application form is given to the user within the week following the notification.

The existing register of sources is separated between different files per type of practice: mainly medical and industrial. The LAEC does not use the notification process for maintaining the national source register but the data included in the application file submitted later in the process.

The LAEC is in the process of entering all available data into the Regulatory Authority Information System (RAIS - SQL version).

As requested by Decree 15512, LAEC communicates twice a year to the MPH the information contained in the register.

4.2 AUTHORIZATION

The LAEC has developed different application forms for authorization taking into account the nature and magnitude of the risks associated to the facilities and activities.

Some support is provided to applicants in the application form on how to complete and understand some terms of the application. The LAEC provides also specific advices upon request.

Before the publication of decree 15512, authorizations where issued by the MPH, with no time limit for the validity of the authorization.

Since 2006, the LAEC has issued 96 “certificates for authorization” (CFA) with specific time limit for the validity of the CFA. Based on those CFA, the MPH issues the formal authorization, usually with the same time limit, and sends a copy to the LAEC. There is currently no mechanism in place to ensure that all users are relicensed under decree 15512.

The procedure for authorization is defined and approved as “procedure for authorization coded DAIR-QP-001 on June 25, 2009”. It appears to be in compliance with IAEA standards and guidance. For the moment there is a time frame for issuing the CFA and authorization, and authorizations have different duration going from 2 to 5 years. The validity of the authorization is mainly based on the nature and magnitude of the risks. Fees coming from the process of authorization go in the State budget. In case of several stages for authorization, the LAEC issues CFA for different stages up to the final, but MPH issues at the end only one authorization.

At the LAEC, a graded approach for reviewing the applications is used. Some applications go through simple registration (Dental X ray), other applications go through more complex review process. However, MPH authorizes all facilities and activities with no consideration for the nature and magnitude of risks associated to the facilities and activities.

There is no clear provision for imposing conditions and limitations on the activities of the users in the authorization signed by the MPH. Nevertheless, clear conditions and limitations do appear in the CFA issued by the LAEC.

The LAEC has established a national record system for all CFA which have been issued since 2006. The LAEC keeps records of its authorization process and deliver clear information to the user in case of refusing to issue a certificate for authorization. The LAEC has not established a formal procedure for suggesting to MPH the suspension or revocation of an authorization.

4.3 REVIEW AND ASSESSMENT

The LAEC has established a formal procedure for review and assessment of an application DAIR-QP-001. The process consists on going through a pre-defined check list and is based on the good practice established by the LAEC. The review and assessment are performed in accordance with the graded approach based on risks associated to the facility and activity.

The LAEC has not developed its own safety criteria on which its decisions are based.

Applicants must demonstrate clearly all safety elements of their facility or proposed activity or practice. The LAEC cares about accuracy and confirmation of compliance with regulatory requirements contained in the existing draft regulations.

The review process includes the following steps:

- Acceptance of application,
- Technical assessment of the file,
- Site inspection,
- Technical report to record and summarize its conclusions,
- Preparation of the CFA, including the conditions and limitations or
- Letter to the user in case the LAEC considers that the certificate for authorization cannot be granted.

Prior of any modification made on the site which comprise safety concerns, users are required to present immediately at the LAEC the modification for further assessment and possible preparation of a new CFA.

4.4 INSPECTION AND ENFORCEMENT

The system of inspection, procedure and check list are operating, they are approved under the procedure n°DAIR-QP-002.

The LAEC carries out inspection, both announced and unannounced, for all facilities and activities mentioned in article 5 of Decree 15512. An initial inspection is conducted during the review and assessment phase of the application, for preparing the report and issuing the CFA. Regular inspections are carried out based on an inspection programme. The LAEC outlined that it is currently running inspection to all facilities which requested authorization under Decree 15512. In addition, and on a case by case base, the LAEC visits the facilities that have not yet complied with Decree 15512 and, through explanation, tries to convince them to apply for authorization, as required by the Decree 15512.

Before going on site, inspectors have to review all previous findings and documents related to the facility and have to be prepared in line with the objective of inspection. The LAEC ensures implementation of necessary requirements through different inspections for different practices with different checklists. In general, during inspection, the LAEC checks all requirements of article 2 of decree 15512.

The LAEC records non compliances but it does not have responsibility to enforce. After the inspection the LAEC send a follow-up letter to the user including if any, the non compliances and specifying a limited time frame to remedy. Remedial actions are always verified through a new inspection. There is no written procedure for the LAEC if the operator does not rectify non compliances with requirements, as well as for the reoccurrence. In principle the LAEC could prepare an official letter reporting violations to MPH for enforcement. However, so far this mechanism has never been used. An indirect enforcement power for the LAEC is to refuse issuing a certificate for authorization for import to a facility that does not comply with the Decree 15512.

The IRRS team was informed that inspections usually do not include on site radiation measurement. The main aim of the inspection is to ensure that users maintain at all the time the safety level in place when the authorization was given. The system of inspection has not been fully implemented. Due to a new system of authorization being implemented since 2006, the inspection programme has been oriented mostly towards verifying the conditions for authorization. A few inspections have been conducted with the objective of verifying the maintenance of an appropriate level of safety. Counterparts mentioned that the programme of inspection for the coming years will include more and more regular inspections.

The IRRS team observed two inspections conducted by the LAEC, one in an industrial facility and one in a medical facility. It appears that LAEC inspectors complied with the section of GS-R-1 relative to Inspection and enforcement activities. They verified and ensured compliance with all requirements. The inspectors informed the operator's counterpart at the end of the inspections of any identified good practices and corrections required for detected deficiencies and deviations. The IRRS team observed that the inspection activities could overlap some quality control measurements requirement (see appendix III).

In case of abnormal events at a facility, the LAEC shall be notified immediately and would investigate through an inspection. Nevertheless, there are provisions in the application for authorization concerning immediate investigation by users of any occurrence and immediate measures that must be undertaken.

4.5 REGULATIONS AND GUIDES

The LAEC has developed a comprehensive draft regulation. During the mission the review team made a preliminary review and identified some gaps and weaknesses. For instance, exemptions and clearance levels are not introduced by the regulations and there is some confusion introduced between regulatory inspection and technical services such as quality control.

The LAEC has developed some explanatory documents which go with the application for authorization and has published already two guides in “code of practice” format, one for panoramic dental X ray users and one for intra oral dental X ray users.

There is no involvement of stakeholders in the process of reviewing or amending regulation and guidance document.

4.6 CONCLUSIONS

A formalized notification system is not established. The existing register of sources is separated in different files. Efforts are made for upgrading to SQL RAIS version as the future register completed.

The LAEC has a procedure on assessment of application for authorization which takes into account requirements for applications, assessment of application, inspection on site, preparation of reports, (DAIR-QP-001 on June 25, 2009).

Not all ionizing sources users are licensed under the new authorization system set by the decree 15512.

The LAEC has not established written criteria and performance indicators for review and assessment of an application for authorization. The system of review and assessment is functioning always referring to international criteria and standards.

Users must demonstrate clearly all safety requirements to the LAEC. A reviewing inspection is a key element in the process of preparing the final report for the delivering or not the CFA.

Inspection is regulated by the decree 15512 article 5 and the LAEC is in charge for carrying out all activities referred to article 2 of the Law 105 related to the control of ionizing sources. There are procedures in place for implementing inspections, which can be announced or unannounced, but there are no written criteria for the preparation of the inspection report. An inspection programme is not fully established and implemented because of a lack of staff and logistic.

There are no written procedures and criteria for the enforcement action. Inspectors have no power to deliver enforcement actions and also they cannot stop unsafe operation on spot.

The LAEC has developed draft regulations, which are in general in line with international Basic Safety Standards, but incomplete. There is currently a limited number of guides.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS:** Code of Conduct on the Safety and Security of Radioactive Sources §11 states: *"Every State should establish a national register of radioactive sources."*
R9.	**Recommendation:** LAEC should give the highest priority to the completion of the national register of sources

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS:** GS-R-1 §5.14 states*: " regarding establishment of an inspection programme: "The regulatory body shall establish a planned and systematic inspection programme."*
(2)	**BASIS:** GS-R-1 §5.15 states*: ""regarding the different types of inspections: "Inspections by the regulatory body, both announced and unannounced, shall be a continuing activity."*
R10.	**Recommendation:** LAEC should implement the authorization and inspection regime to all users in Lebanon, including the services providers using radiation sources in LAEC.
R11.	**Recommendation:** LAEC should implement the authorization and inspection regime to all users in Lebanon, including the services providers using radiation sources in LAEC.
R12.	**Recommendation:** LAEC should establish criteria and performance indicators for preparing an inspection report.
R13.	**Recommendation:** LAEC staff should be formally empowered to conduct inspections.
R14.	**Recommendation:** LAEC inspectors should be provided with appropriate equipments and logistics to carry out inspections.
R15.	**Recommendation:** LAEC should ensure that inspection activities are clearly delineated and do not overlap with quality control measurements.
(1)	**BASIS:** GS-R-1 §5.18 states*: "Enforcement actions are designed to respond to non-compliance with specified conditions and requirements."*
R16.	**Recommendation:** LAEC should provide guidance and criteria to the inspection staff on how to determine the seriousness or significance of non-compliances, so that an appropriate and consistent level of enforcement action can be applied by MPH
(1)	**BASIS:** GS-R-1 §5.27 **states:** *"Guides, of a non-mandatory nature, on how to comply with the regulations shall be prepared, as necessary. These guides may also provide information on data and methods to be used in assessing the adequacy of the design and on analyses and documentation to be submitted to the regulatory body by the operator."*
R17.	**Recommendation:** LAEC should finalize and approve as soon as possible the draft regulations.
S5.	**Suggestion:** LAEC should make efforts to involve stakeholders when drafting regulations and

	guides
S6.	**<u>Suggestion</u>:** LAEC may consider issuing separated sets of regulations addressing the various topics related to safety with specific provisions and charts mentioning limits, values threshold, and guidance levels on a more specific basis.

5. OCCUPATIONAL RADIATION EXPOSURE

5.1 GENERAL

As mention above, there are currently no regulations in place for occupational radiation exposure control but only the draft prepared by the LAEC. These draft regulations include administrative and technical requirements that are commensurate with the nature and extent of existing facilities and activities. The drafted regulations are in general compatible with the BSS and other radiation safety standards and guides, but not complete. These regulations, when published, will enable the regulatory staff of the LAEC to discharge their responsibilities effectively.

5.2 RESPONSIBILITIES FOR REGISTRANTS, LICENSEES AND EMPLOYERS

The responsibilities of the licensees and employers for the protection of the workers in activities involving normal occupational exposures are committed by the applicant during the authorization process. The certificate for authorization is not issued unless the commitment document is signed and submitted to the LAEC.

The LAEC has issued a policy and procedure document that clearly defines the duties and responsibilities of the licensee (limitation of exposure, optimization of protection, dose monitoring, training of workers) and of the Radiation Protection Officer (RPO). This document is in compliance with BBS and other safety guides and IAEA TECDOCS. However, there are no clear and formal procedures and organizational arrangements to ensure that the regulatory requirements for the protection and safety of workers are implemented through technical measures by the users.

Responsibilities of licensees regarding recording of the occupational safety measures are included in the commitment document. The LAEC requires the applicant to ensure the suitability of the facilities and the adequacy of the equipments and services for protection and safety.

Medical examination is required by the LAEC during the review and assessment of the application, according to application requirements (DAIR-AURS 01). The health surveillance programme is verified during the inspection.

An adequate numbers of appropriately trained staff in radiation protection and safety is also one application requirement established by the LAEC. The qualification and skills of radiation worker are reviewed by the LAEC. The LAEC requires radiation users to provide appropriate training programme and periodic retraining and updating (once a year) to ensure their competency level to carry out their responsibilities with regard to radiation protection and safety. However, there are currently no well defined training programme requirements available and no evaluation criteria to assess the adequacy of the training courses (see section 7).

All elements listed above are being reviewed during the authorization process and verified through inspection.

Conclusions:

Despite the current lack of formal regulations, the LAEC has developed different forms for application for authorization and procedures that take into account the responsibilities of the licensees and employers in occupational radiation protection. Authorization procedures and inspections are the mechanisms used by the LAEC to ensure the implementation of these requirements by the users.

5.3 RESPONSIBILITIES FOR WORKERS

The LAEC requires that licensees provide rules and procedures for protection and safety to all workers involved with ionizing radiation. The LAEC inspectors do verify compliances with this requirement and verify that workers co-operate with the employer and follow rules and procedures, in particular for the proper use of radiation monitoring devices, protective equipments and clothing. In case of non-compliance detected, the LAEC notifies the employers to remedy.

According to the draft regulations, if a Female worker is pregnant, she has to notify her employer. Subsequently, her working conditions should be modified if necessary and accordingly. The LAEC inspectors verify the compliance during inspection visits. The LAEC has issued instructions and guides for the radiation workers (women) that defines the terms and conditions and responsibilities of the employers and workers (Document No. DAIR 22/10/2008).

Conclusions:

The responsibilities of the worker regarding the occupational protection are defined in the draft regulations and are made available to the workers through the application process and its associated documentation, as well as through direct communication from the LAEC inspectors.

5.4 RADIATION PROTECTION PROGRAMMES

The draft regulations provide for the establishment of a radiation protection programme by each applicant. The conditions attached to the Certificate for Authorization prepared by the LAEC repeat this requirement and its main components, commented below.

An accountability system including records of location and details of each source has to be established. A periodic inventory of sources confirming that they are in their assigned locations and are secured, has to be conducted. The licensees should provide a security clearance issued by the LAEC before applying for any further authorization.

Controlled areas and supervised area have to be defined, together with the associated protective measures, safety provisions, labelling with proper warring signs. During inspection, the LAEC verifies compliance with these requirements. The LAEC distributes radiation warring signs for free to all who need them.

The radiation protection programme has to describe all personal and collective protection equipments such as protective clothing, aprons, gloves, organ shields.

Individual monitoring must be provided for all workers who are working in controlled area. All monitoring result must be recorded, copy of the result kept at LAEC. For

persons working occasionally in controlled area, the occupational exposure must be assessed by means of the area monitoring. These requirements are controlled by inspectors, and also verified via Quality Management and accreditation programme in some facilities. The dose limits are set up by the LAEC in the draft regulations and the conditions of the CFA (based on the BSS recommendations). Moreover, the dose constraint guide is also introduced, the dose of 6mSv per year is chosen.

Conclusions:

The requirement for a radiation protection programme is in place and in accordance with the international standards. The LAEC compensates the lack of enforced regulations by documents and procedures that are made available to the users.

5.5 INTERVENTION IN EMERGENCIES

The written procedures for assessment of application for licence takes into account requirements for emergency plan CFA require that an emergency plan is in place. The plan must include defining onsite/ offsite responsibilities.

Conclusions:

The requirement for a radiation protection programme is in place and in accordance with the international standards.

5.6 MONITORING PROGRAMME

The individual dosimetry service (external dosimetry by means of TLD) is operated by the LAEC. The equipments and qualified personnel required with adequate knowledge and skills are available. The individual monitoring is obligatory for all radiation workers, readings of the personal dosimeters are obtained each two months. The LAEC provide workplace monitoring services also. Currently, the LAEC is the only provider for this service in the country. In case other service providers would offer the dosimetry services, they have to be accredited by the LAEC. Based on the information provided by counterparts, the LAEC is equipped with appropriate facilities, equipments and required personnel. Moreover, the LAEC is running calibration facilities (SSDL) and provide the calibration services in this regard. All conditions related to the monitoring programme that applicants have to put in place are listed in the authorization procedure (Doc. No. DAIR-AUR 01) and in the guidance documents provided to users.

For the nuclear medicine facilities, there are requirements for internal exposure control in the guidance documents and draft regulations, but there are no facilities for running internal exposure surveillance in the country.

Conclusions:

The radiation monitoring programme for external dosimetry is operational and works properly. There are currently requirements for internal exposure control but there is no facility to evaluate the internal exposure. Therefore, the internal exposure control programme is not operational.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS:***" RS-G-1.1: para. 2. 33 (a-k), "Employers, registrants and licensees shall ensure, for all workers engaged in activities that involve or could involve occupational exposure, that: (a-k)…" and 2.36(a-f), "Workers shall:…", para.5.16…*
R18.	**Recommendation:** LAEC should take steps for issuing the current draft regulations and additional procedures and guides, as appropriate to address occupational radiation protection issues such as: • Responsibilities of licensees, employers, and workers; • Radiation protection programmes; • Intervention in emergencies; • Radiation monitoring. • Dose limits
S7.	**Suggestion:** The draft Regulations for Radiation Protection in Lebanon which are in compliance with the BSS and international safety guides for occupational exposure control might be revised and updated as appropriate.
S8.	**Suggestion:** The drafted regulations might be use by LAEC staff and users as guides while waiting for their endorsement.

6. CONTROL OF MEDICAL EXPOSURES

6.1 RESPONSIBILITIES FOR MEDICAL EXPOSURE

Draft regulations contain provisions to ensure patient protection in all exposure circumstances and define responsibilities. Medical practices that involve medical exposure in diagnostic or therapeutic procedures have to be restricted unless prescribed by medical practitioner. The LAEC verifies compliance with regulatory requirements before issuing the certificate for authorization, and during inspection. The inspectors verify the availability of overall patient protection measures as appropriate and required. During inspection, the LAEC checks if the use of radiation for diagnostic purposes is conducted with consideration for the image quality and quality assurance requirements. For therapeutic uses (including teletherapy and brachytherapy), the LAEC checks that calibration, dosimetry and quality assurance requirements are fulfilled by a qualified expert in radiotherapy physics. The LAEC inspectors verify the availability of radio-diagnostic physics, quality control expert, or nuclear medicine physics, as appropriate, the users responsible to provide and maintain requirements.

The LAEC provide the quality control services for all diagnostic and nuclear Medicine facilities through DRS. The QA programmes are defined according to international standards such as IEC, and ISO. Radiotherapy facilities are running QC programmes on their own. The LAEC verify that programmes are in compliance with international standards.

Conclusion:

The protection of patients, quality of radiation beam, and images quality and its related responsibilities is bearing to licensees. Meanwhile, the LAEC provide and conduct quality control services through DRS. The programmes are defined according to international standards.

6.2 JUSTIFICATION OF MEDICAL EXPOSURES

Medical exposures have to be justified upon their diagnostic or therapeutic benefits and according to a medical opinion. This includes medical examination for occupational and health insurance purposes. During inspection, the LAEC verifies all operational considerations for medical exposure in diagnostic radiology, nuclear medicine and radiotherapy.

Conclusion:

Generally, the LAEC maintains a proper control of medical exposure regarding justification. Operational considerations regarding medical exposure is taken into account.

6.3 OPTIMIZATION OF PROTECTION FOR MEDICAL EXPOSURES

Regarding medical exposure optimization, the LAEC checks that:

- the licensees use appropriate equipment,
- the exposure of patients is the minimum necessary to achieve diagnostic goals,
- the exposure of patients is minimum for normal tissue in therapeutic procedures, though consistent with the dose to be delivered to the target.

The LAEC inspectors also verify the calibration, clinical dosimetry and quality of radiation beam through review of licensees' records and procedures.

Conclusion:

Optimization of medical exposure is required by regulations and verified by means of regulatory control of the LEAC.

6.4 MAXIMUM ACTIVITY FOR PATIENTS IN THERAPY ON DISCHARGE OF HOSPITAL

According to the regulations, it is not allowed to discharge the patient who undergone therapeutic procedures with sealed or unsealed radionuclide unless the source been removed or the activity of radioactive substances in body falls below the level of 1100 Mbq for the patient treated by Iodine-131, or the dose rate is less than 50 □Sv at 1m.

Moreover, the LAEC issued instruction for patients during hospitalization and after discharge from hospital to avoid unnecessary exposure of any member of the household and public (Document defined as instruction for the patient treated by I-131). During the inspection, inspectors verify and examine records in this respect.

Conclusion:

Decision of discharge of patient undergoing therapeutic procedures with unsealed source is subject to the LAEC controlling. The instruction which is issued is in compliance with BSS. Any deficiency is subject to the regulatory questioning and follow-ups.

6.5 INVESTIGATION OF ACCIDENTAL MEDICAL EXPOSURES

The LAEC investigate and obligate the licensees to promptly notify and investigate any therapeutic treatment delivered wrong or any diagnostic exposure greater than intended, any equipment failure, or accident. The LAEC inspectors verify and examine the records and procedures to ensure the licensees' compliances.

Conclusion:

The LAEC has set up procedures for investigation of accidental medical exposure, and the LAEC inspectors verify and examine compliances with regulatory requirements during inspections.

6.6 RECORDS

The LAEC requires users who are involved in medical exposures to maintain records regarding medical exposure. The LAEC inspectors verify and examine records during inspection. The records include record of the diagnostic radiography parameters such KVp, mAs, patient information, date and time, number of exposures and duration of examinations, and patient dose measurements. as well as, nuclear medicine records such as activity and type of radiopharmaceutical, calibration and quality control, also, record of radiotherapy includes planning target volume, delivered dose, dose to other normal organs, QC tests. The availability and maintenance of these records is verified by the LAEC inspectors.

Conclusion:

The LAEC has set up the requirements and procedures for establishing and maintaining record for medical exposure. The LAEC requirements in this respect are checked and verified by inspectors.

6.7 GUIDANCE LEVEL

BBS guidance levels for medical exposure are adopted by the LAEC. Subsequently, the LAEC requires licensees to provide / maintain a patient dose measurement system. The LAEC requires medical diagnostic facilities to be equipped with dosimetry system (DAP: Dose area product). Doses of patients are recorded. The LAEC inspectors check and verify the records of patient doses, and request corrective actions to be taken accordingly.

Conclusion:

Guidance levels for medical exposure from BSS have been adopted by the LAEC. Licensees are required to record patient doses and to maintain them as low as possible.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS*:*** BSS sections II.1, II.2 II.3, II.4, II.9 , II.16(d), II.17, II.18 (b,c), II.10 to II.27, II.28, II.29 II.30, II.31.
R19.	**Recommendation:** LAEC should take steps for issuing the current draft regulations and additional procedures and guides, as appropriate to address patient protection issues such as: • Responsibilities of users and medical practitioners; • Justification of Medical Exposures; • Optimization of protection for Medical exposures; • Investigation of Accidental Medical Exposure. • Records
S9.	**Suggestion:** The drafted Regulations for Radiation Protection in Lebanon which are in compliance with BBS and international safety guides on medical exposure control might be revised and updated as appropriate.
S10.	**Suggestion:** The drafted regulations might be use by LAEC staff and users as guides while waiting for their endorsement.

7. EDUCATION AND TRAINING

7.1 INTRODUCTION

Education and training in radiation protection is one of the mechanisms through which the IAEA assists its Member States in the application of the BSS and the other relevant safety documents established by the Requirements on Legal and Regulatory Infrastructure GS-R-1.

To meet the above requirement, the Agency established the Safety Guide RS-G-1.4 on Building Competence in Radiation Protection and the Safe Use of Radiation Sources which gives guidance on the responsibilities for building competence, categories of people to be trained and the minimum of qualifications required.

In this connection, the Agency has adopted a 10- year Strategy Plan (2001-10) for Education (the strategy) and training in view of attaining sustainability in Member States by the General Conference Resolution GC (45)/RES/10C in 2001.

To ensure the implementation of this strategy the Agency intensifies Post-Graduate Educational Course activities and systematically develops syllabi and training material for specific groups and specific uses of radiation sources.

In addition, the Agency provides assistance to its Member States to build competence in education and training. To effectively provide assistance to its member states and design effective training activities, it is essential to evaluate the training needs in a systematic manner and to assess their education and training infrastructure.

For this purpose, the Education and Training Appraisal (EduTA) protocol was developed. The document provides systematic guidance and procedures on organization and execution of the EduTA mission. Three main parameters are used in this assessment:

- Education and training Regulatory requirement,
- National needs for building strategy competence,
- Education and training infrastructure.

In response to a request from Lebanon, the questionnaire of EduTA was included in documentation provided to the counterparts during the preparatory phase of IRRS Mission to complete APPENDIX 1 of the EduTA protocol.

It was agreed, during the mission, that the pre-appraisal phase of EduTa would be completed and used as one of the basis for the review.

7.2 TERMS OF REFERENCE OF THE APPRAISAL

The terms of reference were to assist the LAEC in completing the preliminary questionnaire of EduTA (APPENDIX 1) related to the pre-appraisal information and in evaluating :

- The regulatory and legal basis for education and training
- Education and Training of regulatory staff

- Education and training provided to users

The Principal Agency standards used as a basis for the Education and Training appraisal were:

- Education and Training Appraisal in Radiation Protection and Safety Radiation Sources (Eduta) (Working Material July 2005)
- International Basic Safety Standards for Protection against Ionizing Radiation and the Safety Radiation Sources (SS No. 115)
- Safety Guide, Building Competence in Radiation Protection and the Safe Use of Radioactive Sources (RS-G-1.4)
- Safety Report, Training in Radiation Protection and the Safe Use of Radioactive Sources (SRS-20)
- Standard Syllabus Postgraduate Educational Course in Radiation Protection and Radiation Safety Sources
- Standard Syllabus for the Training of Radiation Protection Officer.

7.3 CONDUCT OF THE PRE-APPRAISAL

The first step was the presentation by the reviewer of the pertinent standards and the methodology of EduTA.

The second steep, was the completion of the preliminary questionnaire of EduTA and evaluation of all the information requested, in particular on:

- Legislation, regulation and guidance associated with Education and Training.
- The number of persons working with ionizing radiation and employed as qualified personnel was estimated on the basis of the number of facilities and devices for all the practices.
- The provisions for Education and Training related the regulatory requirement, the national strategy for building competences and education and training infrastructure.

The EduTA pre-Appraisal information mentioned above can be found in ***Appendix IX.*** In particular, the LAEC presents a post graduate course in radiation protection organized by the Beirut Arab University in collaboration with the LAEC.

During the mission, various documents related to the education and training activities attended by regulatory staff or provided by the LAEC to the users were given to the reviewer. A list of these documents can be found in ***Appendix X.***

7.4 REGULATIONS & LEGAL BASIS FOR EDUCATION AND TRAINING

The National Legal and Regulatory Framework governing the safe use and control of radiation sources specifies, through Decree 15512, article 2, a general condition related to the requirement of education and training. It is stated in term of: "Authorizations shall be issued upon fulfillment of the followings terms: Presentation of statement detailing the technical skills and degrees of facility staff." This is the unique regulatory requirement for education and training stated in the available regulation.

The guidance developed by the LAEC concerns the procedures for issuing the authorization for each practice. It requires from the applicant to provide a detailed education and training programme of their occupationally exposed personnel.

The existing national legal and regulatory framework does not meet the requirements on Education and Training in compliance with the BSS, GS-R-1, related safety standards and support documents. Moreover, there is no guidance which specifies the requirements to establish and recognize the professional job categories and personnel qualifications.

There is need for regulatory requirement to set up a rule that compels all occupationally exposed personnel to be suitably trained and qualified. (BSS para.2.28 c) and (RS-G-1.4 par.2.1 and 2.13)

No requirement states that the employers, registrants or licensees have the primary responsibility for the provision of training to workers. (Ref: BSS par.I.4) and (RS-G-1.4 par 2.1)

7.5 EDUCATION & TRAINING OF REGULATORY STAFF

The regulatory staff consists of less than 10 persons with university graduate, including five inspectors. This staff has occasionally attended a number of IAEA specialized training courses organized in the Asia region. ***(Appendix X).***

The content of courses covers some regulatory activities. As to the post graduate course attended by the regulatory staff, two persons have attended the Radiation Protection in during the academic year 2008-09 and at least one staff member will be designated for the present academic year.

With reference to Safety Requirements publication N°GS-R-1.par 4.6, which states that "…the regulatory body shall ensure that its staff members participate in well defined training programmes", the Education and Training activities attended by the regulatory staff are very general and not necessary related to their real needs.

In fact, there is no training programme established on a systematic approach that requires first the evaluation of needs, the aims of the training, the learning objectives and training syllabus as stated in the Safety Reports Series N°20: Training in Radiation Protection and the use of Radiations Sources.

7.6 EDUCATION & TRAINING OF WORKERS

A preliminary estimation of existing professional personnel and other radiation workers currently employed in different activities using ionizing radiations in the country is around 3200 persons with 80% in medical sector. (refer to ***table A.1.3 in Appendix X.)***

This table indicates that the existing training needs concern essentially the Radioprotection Officers for medical practices (around 200 to 250 persons) and some dozens of qualified experts. These figures should be confirmed during a second phase of EduTA Mission.

The training events organized by the LAEC to different users deal with various items related the radiation protection in medical and industrial practices, security, emergency response and the role of Radiation Protection Officer.

As shown in ***Appendix XI,*** one hundred users, licensees, public institutions, stakeholders, have participated in these training sessions.

The training action carried out by the LAEC, acting as regulatory body, could be considered outside its responsibilities. However, local circumstances may warrant its direct participation in training and qualification of the licensee's personnel in protection and safety. This provision is recommended in the Safety Guide N°RS-G-1.4.sections 4.3 and 4.4.

7.7 RADIATION PROTECTION DIPLOMA

The LAEC informed the reviewer about the creation of the "Radiation Protection Diploma" considered as a post-graduate course held by Beirut Arab University, since the academic year 2008-09. This course has been designed on the basis of the standard syllabus of the IAEA Post-graduate Educational Course in Radiation Protection and the safe Use of Radiation Sources. The aim is "to meet the needs of professionals at the graduate level…"

This course is organized with collaboration of the LAEC in order to organize the practical training in their laboratories. The LAEC staff also participate in the theoretical sessions. A draft agreement between the two institutions is in the process of signature.

Eight participants attended this course last year: 4 Professionals (2 from LAEC) and 4 students. It is planned that this training course will be converted into a Master Degree.

This post graduate course is the main academic and professional training in radiation protection in Lebanon. It is under academic and administrative supervision of the Beirut Arab University and is supported by the specialized infrastructure of the LAEC.

It could be the principal element for the development and implementation of a national training programme specific to the high level and specialist professionals in radiation protection and safety.

The course could also be regarded as an opportunity for both the users and the LAEC to cover their needs at the qualified expert level.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS*:*** BSS §2.30(a) states: *"All personnel on whom protection and safety depend be appropriately trained and qualified so that they understand their responsibility and perform their duties with appropriate judgment and according to defined procedures."*
(2)	**BASIS*:*** RS-G-1.4 §2.1 states: *"The government should ensure that an adequate legislative framework is established which requires appropriate training of all personnel engaged in activities relating to nuclear, radiation, radioactive waste and transport safety. The legislation should assign*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	responsibilities for the provision of training. The government should, where appropriate, specify which persons should have particular qualifications and the process to be employed for the recognition of such qualifications."
R20.	**Recommendation:** LAEC should introduce in the new regulatory framework the provisions listed below related to the education and training: • All personal on whom protection and safety depend on be appropriately trained and qualified" • Responsibilities for the provision of training shall be assigned • Employers, registrants and licensees shall ensure for all workers that suitable and adequate human resources and appropriate training in protection and safety be provided, as well as periodic retraining and updating as required in order to ensure the necessary level of competence.
R21.	**Recommendation:** LAEC should establish the regulatory requirements for the radiation safety qualification of the different categories of persons engaged in activities involving ionizing radiation, when appropriate.
(1)	**BASIS*:*** RS-G-1.4 sections 2.1, 2.2, 2.6, 2.7, 3.1
R22.	**Recommendation**: **LAE**C should establish guidance to specify the minimum education level, training, work experience related to the specific professional or job categories (such as qualified expert in the medical area, Radiation protection officer) and on the process to be employed for the recognition of such qualifications
R23.	**Recommendation:** LAEC should prepare guidance on RPO training for medical and industrial sectors
R24.	**Recommendation:** LAEC should prepare guidance on qualified expert training for medical and industrial sectors
R25.	**Recommendation:** LAEC should develop an annually regulatory training programme for its own staff dealing with regulatory activities.
S11.	**Suggestion**: LAEC should establish a knowledge management system of the human resources through the identification of the job description, analysis of the needs and assessment of the personal qualification.
R26.	**Recommendation:** LAEC, with others interested parties, should develop a national strategy for education and training in radiation safety.
S12.	**Suggestion:** In order to ensure the compliance of the newly developed radiation protection diploma with the IAEA/PGEC requirements, LAEC should ask the IAEA to introduce the assessment of this course in the EDuTa Mission agenda and to organize scientifically visits of training centers performing the PGEC.

APPENDIX I – LIST OF PARTICIPANTS

INTERNATIONAL EXPERTS:		
1. Jean Luc LACHAUME	Autorité de Sureté Nucléaire(ASN), France	jean-luc.lachaume@asn.fr
2. Rustem PACI	Radiation Protection Commission, Albania	rpaci@moh.gov.al
3. Claude de GALASSUS	Autorité de Sureté Nucléaire (ASN), France	claude.de-galassus@asn.fr
4. Mustafa MAJALI	Jordan Nuclear Regulatory Commission, Jordan	mustafamajali@hotmail.com
5. Abdelmadjid CAOUI	Centre national de l'énergie, des sciences et des techniques nucléaires (CNESTEN), Morocco	sg@cnesten.org.ma
IAEA STAFF MEMBERS		
1. Abdelmadjid CHERF	Office of Legal Affairs	a.cherf@iaea.org
2. Hilaire MANSOUX	Division of Radiation, Transport and Waste Safety	h.mansoux@iaea.org
LAEC LIAISON OFFICER:		
1. Bilal Nsouli	LAEC	bnsouli@cnrs.edu.lb

APPENDIX II – MISSION PROGRAMME

Sunday Sept 27	Monday Sept 28	Tuesday Sept 29	Wednesday Sept 30	Thursday Oct 1	Friday Oct 2
10:00- 16:00 Initial IRRS Review Team Meeting (Hotel)	**09:00- 12:00** Entrance meeting (LAEC premises) • Welcome and introduction • Opening remarks • Introduction of IRRS Review Team • Briefing for IRRS Team • Introduction and working arrangements • Detailed presentation on each areas to be covered by the review Presentation by IRRS team member Attendees: All concerned LAEC staff and Lebanese counterparts	**09:00 – 12:00** Interviews with LAEC staff by areas **11:00 – 12:00** Meeting with MoPH General Director Dr. W. Ammar + Dr. S. Haroun	**09:00 – 11:00** Policy issues **09:00 – 14: 00** Inspections of medical and industrial facilities. Visit to: - Hammoud Hospital and Sibline Industry (Mrs. El Nachef, Mr. Bsat + 2 inspectors + IRRS team 1)	**09:00 – 11:00** Drafting of Report (IRRS team-1) **10:00 – 11:00** Meeting with DG of Customs Directorate Mr. A. Ghanem (IRRS team 2 - Dr. Nsouli , Dr. M. Roumie, Eng.A. Reslan)	**09:00 – 10:00** Plenary to discuss the report **10:00 – 12:00** Revision of the draft report (IRRS team)
	12:00 – 14:00: Opening Lunch	**12:00 – 13:00: Lunch**	**12:00 – 13:00: Lunch**	**11:00 – 13:00** Discussion of report sections with counterparts	**12:00 – 13:00** Exit Meeting - Official closing
	14:00 – 17:00 Interviews with LAEC staff by areas.	**13:00 – 17:00** Interviews with LAEC staff by areas (con't) Drafting of report (IRRS team)	**13:00 – 17:00** Drafting of report (IRRS team) **16:00 – 17:00** (tentative) Meeting with Syndicate of Hospitals (IRRS team - Dr. Nsouli	**14:00 – 16:00** Drafting of report (IRRS team) **16:00 – 17:00** Draft Report handover to LAEC	
	17:00 – 18:00 Daily IRRS Review Team Meeting				

APPENDIX III – SITE VISITS

The IRRS team joined as observer two inspections conducted by LAEC inspectors. The first inspection was performed in Cement de Sibline factory in Siblin, and the second at the radiology service and Nuclear Medicine in Hammoud Hospital in Saïda.

1. The first inspection was conducted in the Cement factory in Siblin , that is using ^{252}Cf radioactive sources for measuring the quantities of various raw materials for cement production passing through, and X ray machines for analytical measurements.
The inspection started with an entrance meeting with RPO to precise the object and the steps of the inspection. This facility had been previously authorized by LAEC and the following justification documents were requested by the inspectors:

- Authorizations
- Inventories of sources
- Sources certificates
- Qualification certificate of RPO
- Personal dosimetry records
- Emergency arrangements
- Local rules and procedures
- Calibration certificates of radiation monitors were not asked.

The necessity for the licensee to obtain the regulatory authorization for changes in the authorization for one new X ray device received under import license was addressed.
Then the team continued with site inspection. No technical measurement has been made.
The inspection was concluded by an exit meeting (with RPO) in which the main deficiencies were addressed by inspectors.
The inspectors kept records, they behaved professionally, the inspection was announced before, staff was invited for questions, there was not given technical comments on the spot.
LAEC inspectors followed clearly the requirements for the inspection.

2.The second inspection was conducted at Hammoud Hospital in Saïda.
The opening meeting was run with the RPO and the owner of the hospital. LAEC presented the IRRS team and the inspection. The owner of the hospital expressed the high opinion he has about the LAEC activities since 2006 which helped a lot in improving the radiation protection in his hospital.
The team splitted in two: one went to the service of radiology diagnostic, the other one to the nuclear medicine department.
2.1. Service of radiology diagnostic
The object of the inspection was a service of radiology diagnostic (Scanners, diagnostic X rays, mammography, lithotripsy, panoramic X ray,.). The inspectors

checked if there was any modification since the authorization was issued by checking for instance the plan of the installation as compared to the site, verification of the devices, administrative verification on the employees, dosimetric records.
The inspectors verified all individual or collective protections for patients and operators such as lead protection for the thyroid, full body lead protection, lead gloves, and leaded glass wall. They verified the procedure of entrance for patient, how they check on possible pregnancy for women. They also verified the limit of validity of the films as well as their appropriate or inappropriate storage. They also checked on the record for assessing the periodic change of the developers which is one of the quality process issue already addressed by the periodic quality control done by one service provider department of LAEC.
2.2 Nuclear medicine department
Administrative and technical information was properly collected, the status of individual radiation monitoring of workers verified. No technical measurement has been made. The inspectors checked out the records of the discharge of patients who were under therapy procedure and other related documents and records.
The inspection was carried out in a very professional manner, in accordance with the previous discussion with RPO and in agreement with LAEC procedure for inspection.

The inspection in Hammoud hospital was concluded by an exit meeting in which the main deficiencies were addressed.
A few points for improvement of the process and sharing of experience were discussed with the LAEC inspectors.
The inspectors keep records, they behaved professionally, the inspection was announced before, staff was invited for questions, there was not given technical comments on the spot.

APPENDIX IV – MISSION COUNTERPARTS

item	Subject Area	IRRS Experts	Lead Counterparts
I	LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES	• J.L. LACHAUME • A. CHERF • H. MANSOUX	• Youssef Nasr • Bilal Nsouli
II	RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY		
III	ORGANIZATION OF THE REGULATORY BODY		
IV	AUTHORIZATION	• R. PACI • C. DE GALASSUS	• Ms Nachef • Mr Bsat • Mr Obeid • Mr Othman • Mr Nemer • Mr El-Helou
V	REVIEW AND ASSESSMENT		
VI	INSPECTION AND ENFORCEMENT		
VII	REGULATIONS AND GUIDES		
IX	OCCUPATIONAL RADIATION PROTECTION	• M. MAJALI	• Ms Nachef • Mr Bsat • Mr Assafin • Mr Balaa
X	CONTROL OF MEDICAL EXPOSURE		

item	Subject Area	IRRS Experts	Lead Counterparts
XI	**EDUCATION AND TRAINING**	• A. CAOUI	• Mr El-Samad • Ms Bou Khozam • Mr Koreik

APPENDIX V – RECOMMENDATIONS / SUGGESTIONS / GOOD PRACTICES

Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
Legislative and Governmental Responsibilities	R1	**Recommendation:** The government of Lebanon should consider revising as soon as possible the current draft law submitted to the Parliament in 2000 or should consider its withdrawing by submitting a new law and to ensure that it takes into account the latest IAEA standards and guidance, the objectives of international harmonization of regulatory approaches and the new national circumstances, in particular the international obligations of Lebanon resulting from the international legal instruments to which it is party.
	R2	**Recommendation:** The government of Lebanon should prepare a new draft law covering safety, security, safeguards and nuclear liability. • The law should establish a regulatory body independent from any organization responsible for the promotion or the use of ionizing radiation, with clear functions and responsibilities. • The law should ensure that the regulatory body has its own budget and is adequately funded and staffed. • The law should provide for a coherent regulatory system including authorization, review and assessment, inspection and enforcement. The law should cover but not be limited to radiation safety, radioactive waste management, transport of radioactive material, emergency preparedness and response, physical protection, import and export controls of radiation sources, safeguards, liability and domestic penal provisions.
	R3	**Recommendation** The draft law should provide for clear objectives and scope and should also make provisions for the prime responsibility for safety of the authorization holder.
	S1	**Suggestion:** Lebanon should take fully advantage of the IAEA legislative assistance to establish its legal framework.

	Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
		R4	**Recommendation:** Lebanon should consider completing the process of adherence to the relevant international instruments, specifically the Joint Convention on the Safety of Spent Fuel and the Safety of Radioactive Waste Management, and incorporate the relevant provisions into the domestic Law.
	Responsibilities and Functions of the Regulatory Body	S2	**Suggestion:** LAEC should take all appropriate administrative measures to avoid any conflict of interest between its regulatory function and its research and service provider activities
		S3	**Suggestion:** LAEC should make formal arrangements for cooperation and coordination with the national agencies, specifically with the customs for the import and export of radioactive sources.
	Organization of the Regulatory Body	R5	**Recommendation**: LAEC should make a clear assessment of its staffing needs to discharge its regulatory responsibilities and ask for the associated resources.
		R6	**Recommendation**: LAEC should establish a formal training programme for its staff, to ensure adequate initial training and continuous professional development.
		S4	**Suggestion:** LAEC should establish formal arrangements with other regulatory bodies, to strengthen cooperation on radiation safety and regulatory infrastructure.
		R8	**Recommendation:** LAEC should establish a comprehensive management system covering all its activities, including the regulation of all facilities and activities using radiation sources.
	Activities of the Regulatory Body	R9	**Recommendation:** LAEC should give the highest priority to the completion of the national register of sources.
		R10	**Recommendation:** LAEC should implement the authorization and inspection regime to all users in Lebanon, including the services providers using radiation sources in LAEC.

	Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
		R11	**Recommendation:** LAEC should implement the authorization and inspection regime to all users in Lebanon, including the services providers using radiation sources in LAEC.
		R12	**Recommendation:** LAEC should establish criteria and performance indicators for preparing an inspection report.
		R13	**Recommendation:** LAEC staff should be formally empowered to conduct inspections.
		R14	**Recommendation:** LAEC inspectors should be provided with appropriate equipments and logistics to carry out inspections.
		R15	**Recommendation:** LAEC should ensure that inspection activities are clearly delineated and do not overlap with quality control measurements.
		R16	**Recommendation:** LAEC should provide guidance and criteria to the inspection staff on how to determine the seriousness or significance of non-compliances, so that an appropriate and consistent level of enforcement action can be applied by MPH
		R17	**Recommendation:** LAEC should finalize and approve as soon as possible the draft regulations.
		S5	**Suggestion:** LAEC should make efforts to involve stakeholders when drafting regulations and guides
		S6	**Suggestion:** LAEC may consider issuing separated sets of regulations addressing the various topics related to safety with specific provisions and charts mentioning limits, values threshold, and guidance levels on a more specific basis.

	Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
	Occupational Radiation Exposure	R18	**Recommendation:** LAEC should take steps for issuing the current draft regulations and additional procedures and guides, as appropriate to address occupational radiation protection issues such as: • Responsibilities of licensees, employers, and workers; • Radiation protection programmes; • Intervention in emergencies; • Radiation monitoring. • Dose limits
		S7	**Suggestion:** The draft Regulations for Radiation Protection in Lebanon which are in compliance with the BSS and international safety guides for occupational exposure control might be revised and updated as appropriate.
		S8	**Suggestion:** The drafted regulations might be use by LAEC staff and users as guides while waiting for their endorsement
	Control of Medical Exposures	R19	**Recommendation:** LAEC should take steps for issuing the current draft regulations and additional procedures and guides, as appropriate to address patient protection issues such as: • Responsibilities of users and medical practitioners; • Justification of Medical Exposures; • Optimization of protection for Medical exposures; • Investigation of Accidental Medical Exposure. • Records
		S9	**Suggestion:** The drafted Regulations for Radiation Protection in Lebanon which are in compliance with BSS and international safety guides on medical exposure control might be revised and updated as appropriate.
		S10	**Suggestion:** The drafted regulations might be use by LAEC staff and users as guides while waiting for their endorsement

	Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
Education and Training		R20	**Recommendation:** LAEC should introduce in the new regulatory framework the provisions listed below related to the education and training: • All personal on whom protection and safety depend on be appropriately trained and qualified" • Responsibilities for the provision of training shall be assigned Employers, registrants and licensees shall ensure for all workers that suitable and adequate human resources and appropriate training in protection and safety be provided, as well as periodic retraining and updating as required in order to ensure the necessary level of competence.
		R21	**Recommendation:** LAEC should establish the regulatory requirements for the radiation safety qualification of the different categories of persons engaged in activities involving ionizing radiation, when appropriate
		R22	**Recommendation**: **LAE**C should establish guidance to specify the minimum education level, training, work experience related to the specific professional or job categories (such as qualified expert in the medical area, Radiation protection officer) and on the process to be employed for the recognition of such qualifications
		R23	**Recommendation:** LAEC should prepare guidance on RPO training for medical and industrial sectors
		R24	**Recommendation:** LAEC should prepare guidance on qualified expert training for medical and industrial sectors
		R25	**Recommendation:** LAEC should develop an annually regulatory training programme for its own staff dealing with regulatory activities
		S11	**Suggestion**: LAEC should establish a knowledge management system of the human resources through the identification of the job description, analysis of the needs and assessment of the personal qualification.

	Areas	IAEA Comment No R: Recommendations, S: Suggestions, G: Good practices	Recommendations, Suggestions or Good Practices
		R26	**Recommendation:** LAEC, with others interested parties, should develop a national strategy for education and training in radiation safety.
		S12	**Suggestion:** In order to ensure the compliance of the newly developed radiation protection diploma with the IAEA/PGEC requirements, LAEC should ask the IAEA to introduce the assessment of this course in the EDuTa Mission agenda and to organize scientifically visits of training centers performing the PGEC.

APPENDIX VI – REFERENCE MATERIAL PROVIDED BY LAEC

Decree Law N° 105, issued on September 6, 1983, regulating the use of and protection against ionizing radiation

Decree 15512, Regulatory Decree of Decree Law N° 105, issued on October 19, 2005, regulating the use of and protection against ionizing radiation

Ministry of Public Health's Decision n°705/1 regulating applications for import of radiation devices and radioactive materials and licensing of facilities dealing with such products

Regulations for radiation protection in Lebanon (DRAFT)

Examples of authorization applications

Examples of Certificate of Authorization

Code of practice for radiological protection in dentistry using panoramic equipments

Code of practice for radiological protection in dentistry using intra-oral equipments

LAEC Procedure for dealing with applications

LAEC inspection check list

APPENDIX VII – IAEA REFERENCE MATERIAL USED FOR THE REVIEW

[1.] **IAEA SAFETY STANDARDS SERIES GS-R-1 -** *Legislative and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety*

[2.] **IAEA SAFETY STANDARDS SERIES GS-G-1.5 -** *Regulatory Control of Radiation Sources*

[3.] **IAEA SAFETY STANDARDS SERIES GS-R-3 -** *Management System for Facilities and Activities*

[4.] **IAEA SAFETY STANDARDS SERIES SS115 -** *International Basic Safety standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources*

[5.] **IAEA SAFETY STANDARDS SERIES RS-G-1.7 -** *Application of the Concepts of Exclusion, Exemption and Clearance*

[6.] **IAEA SAFETY STANDARDS SERIES RS-G-1.8 -** *Environmental and Source monitoring for Purpose of Radiation Protection*

[7.] **IAEA SAFETY STANDARDS SERIES RS-G-1.9 –** *Categorization of Radioactive Sources,*

[8.] **IAEA CODE OF CONDUCT** *on the Safety and Security of Radioactive Sources*

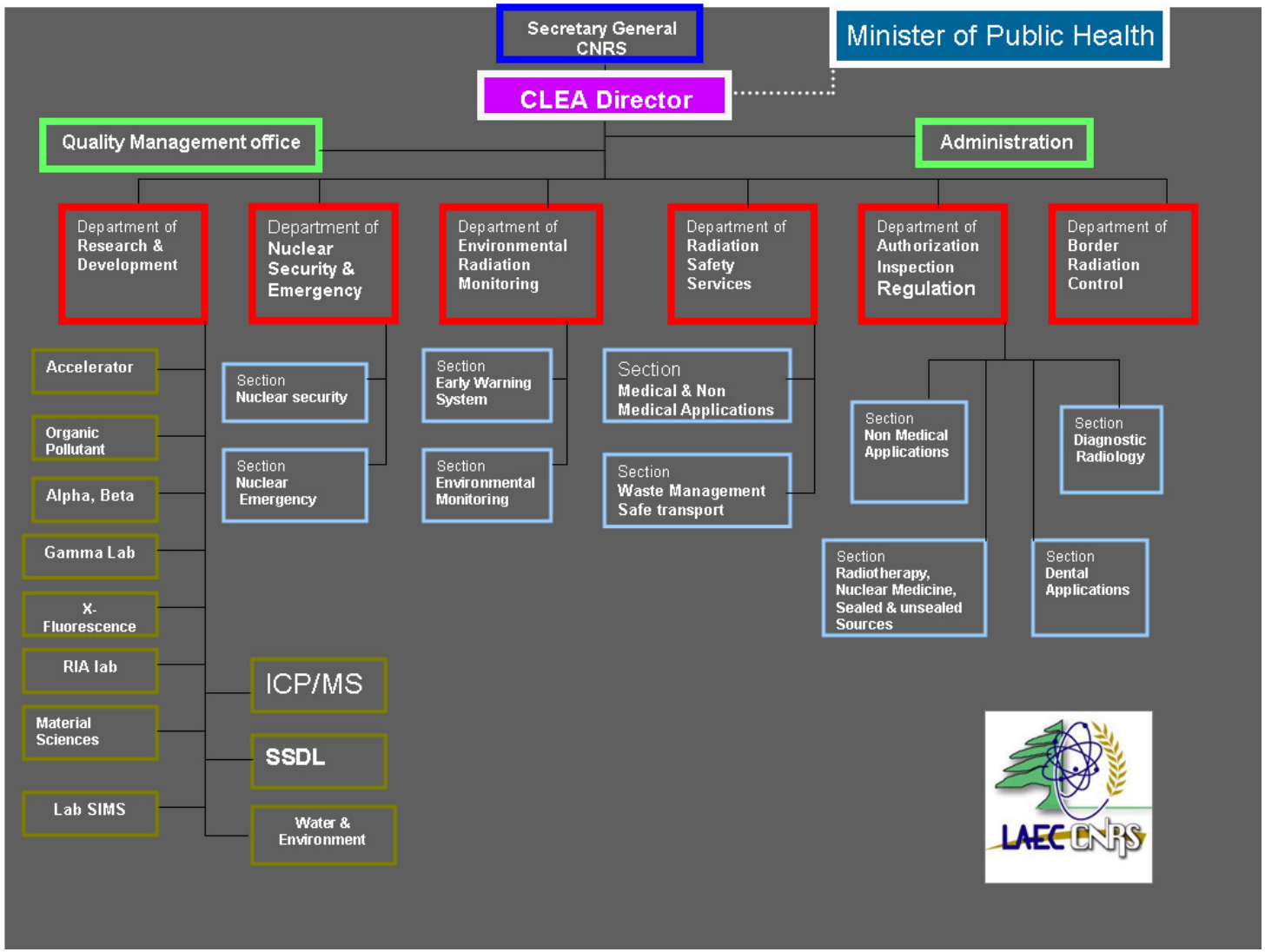
[9.] **IAEA GUIDANCE** *on the Import and Export of Radioactive Sources*

[10.] **INSAG SERIES NO. 17 -** *Independence in Regulatory Decision Making*

[11.] **INSAG SERIES NO. 20 -** *Stakeholder Involvement in Nuclear Issues*

[12.] **INSAG SERIES NO. 21 -** *Strengthening the Global Nuclear Safety Regime*

APPENDIX VIII - LAEC ORGANISATIONAL CHART



APPENDIX IX - EDUCATION AND TRAINING PRE-APPRAISAL INFORMATION

INFORMATION TO BE PROVIDED TO AND ANALYSED BY THE APPRAISAL TEAM PRIOR TO THE MISSION

It is recommended that the documentary information be sent to the appraisal team Preferably two months prior to the commencement of the Eduta appraisal.

TABLE OF CONTENTS

A1.1. Country Information

Table A1.1. *Country Information*

Name of the country:	Lebanon	
Names of persons and organizations providing the information in this Appendix:-		
Name	***Organization***	***Position***
Mr. Omar El Samad	Lebanese Atomic Energy Commission	Dept. Head - Radiation Environmental

		Monitoring
Mr. Hanna El Balaa	Lebanese Atomic Energy Commission	Dept. Head - Radiation Safety Services
Ms. Rola Bou Khozam	Lebanese Atomic Energy Commission	Training Officer
Mr. Mahmoud El Korek	Beirut Arab University	Professor

A1.2. List of documentary information

The host country to be appraised under Eduta is requested to provide the appraisal team with the documents listed in the following table. Please tick the last column in the following table if the respective document is being provided.

Table A1.2. *List of documentary information*

Number	Document/material	Please ✔
1	Legislation (laws, mandates and regulations, including drafts) governing the safe use and control of radiation sources, with particular reference to education and training;	X
2	Guidance material (regulatory or otherwise) relevant to education and training (including drafts);	X
3	Training plan for Regulatory Body staff (qualifications, training received to date and planned for future);	X
4	Copy of the national training programme in radiation safety or similar document;	X
5	Inventory of sources and practices	X
6	Lists of approved /accredited training course providers /centers and /accredited training courses, if approval/accreditation procedures exist;	
7	Annual reports from accredited training course providers/centers, if these exist; (previous 2 years)	
8	Examples of training course programmes, for a range of target audiences;	X
9	Approval/accreditation procedures for training providers and training centres;	

10	List of training courses held in the past calendar year (or similar period for which records are available) and the number of participants attending.	X
11	Provide details of the educational courses in which radiation safety is included in the curriculum (for example –medical doctors)	X PGEC
12	Other (please specify): Painflet for training announcement	

Comments. *Please add any further information that you think might assist in making reference to useful sources of information relating to education and training-*

- The requirements of training are listed within the request for of licensing and authorization

- The Radiology Technicians are graduated from 4 technical professional centre

A1.3. Number of persons working with ionizing radiation

Instructions for completing Table A1.3.

For each of the different activities using ionizing radiations, make the best estimate of the number of persons currently employed as (see ref. [3] for categories of persons to be trained):

— Qualified Experts

— Radiation Protection Officers (RPO)

— Qualified Operators

— Radiation Health Professionals

— Other Radiation workers

The source of this information is most likely to be the regulatory body, the personal monitoring services and, possibly, some of the professional bodies. When filling in the table, the specific situation prevailing in the country may have to be considered (e.g. the qualified RPO may have different designation in different countries). Several cells may have to be left blank while filling in.

Table A1.3: *Information on the existing qualified personnel and other radiation workers*

Practices using radiation sources	Number of facilities			Qualified Expert	RPO	Qualified operators	Radiation health professionals	Other Radiation workers
	Existing	Foreseen (next 5 yrs)	Total					
INDUSTRIAL and RESEARCH								
Industrial radiography *	2	2	4		6	17		
Industrial irradiator facilities (industrial and research)								
Industrial gauges and well logging *	10	5	15		10	25		
Research activities: use of sealed and unsealed sources	23	7	30	1	23	60		
Mineral extraction and processing companies (NORM)								
MEDICAL								
Dental radiology (alone)	1500	200	1700				*1500 Dentists	
Diagnostic and interventional radiology *	207	50	257		*200 acting as RPO	3079	*400 Radiologist	
Radiotherapy and brachytherapy	9	2	11	7	9	84		
Nuclear medicine	23	3	26	6	23	75		
NUCLEAR AND RELATED INDUSTRY								
Research accelerators or reactors	1			2		2		
Power reactors								
Fuel cycle facilities including enrichment, fuel fabrication and reprocessing facilities								
Isotope production operations and source manufacturing	1	1	2	2	1	5	Cyclotron, radioisotopes production	
Uranium mines								
REGULATORY ACTIVITIES								
Inspectors				7	1			
OTHER PRACTICES								
Waste management facility	0		0					
Veterinary Radiology		5	5					
Security equipment (e.g. baggage x-ray, container inspection, etc)	15	30	45		15	40		
Peripheral personnel (customs, security forces, carriers …etc)	6	2	8					

* number of devices

A1.4. Provisions for Education and Training

Table A1.4: *Provisions for Education and Training*

1. Regulatory requirements for education and training			
1.1 Are there regulations in place that require all persons associated with work with ionizing radiation to be suitably trained and qualified?			***No***
1.2 Do these regulations place the primary responsibility on employers, registrants and licensees for the provision of training for Radiation workers?			***No***
1.3 Do the regulations provide guidelines on the type of training required, the course content, the duration and level of training, and the assessment of trainees?			***No***
1.4 Is regulatory guidance available that specifies the minimum educational level, training, work experience and personal attributes that should be demonstrated by specific professional or job categories? If so, do the specified professional or job categories include:			***Yes***
• Qualified experts?	***Yes/No***	• Radiation health professionals (they may be radiologists or nuclear medicine specialists)	***No***
• RPO?	***Yes/No***	• Staff of regulatory authorities?	***No***
• Radiation workers?	***Yes***	• Emergency response personnel?	***No***
• Qualified operators?	***Yes***	• Medical physicists	***No***
• Peripheral users (customs, security staff..)	***Yes***	• Others [Specify]	***No***
1.5 Is there a regulation requiring the recognition of the qualification and/or authorization of individuals by national authorities and/or professional bodies? **Only for Radiologist and Radiology Technicians** If so, does this regulation define the conditions for recognition? If so, briefly describe these conditions : Diploma or Degree is the tool to recognize the qualification of Radiologists and Radiology Technician			***Yes*** ***Yes*** ***Yes***

2. National strategy for building competence			
2.1 Is there a national strategy for building competence in radiation safety? If so, does the national strategy include: • Analysis of training needs? • Design of a national training programme in a realistic time frame? • Development and implementation of a national training programme? • Evaluation of the effectiveness of the national strategy and its individual components?			***No*** ***No*** ***No*** ***No*** ***No***
2.2 Are the existing training needs known for all job categories on the basis of the types and number of practices?			***Yes***
2.3 Does the national training programme include courses specifically targeted at:			
• Qualified experts?	***Yes/No***	• Radiation health professionals?	***No***
• RPO?	***Yes***	• Staff of regulatory authorities?	***Yes/No***
• Radiation workers?	***Yes***	• Emergency response personnel?	***Yes/No***
• Qualified operators?	***Yes***	• Medical Physicists	***No***
• Peripheral users of radiation (customs, security staff..)	***Yes***	• Others [Specify]	***Yes/No***
2.4 Is there a system in place for the accreditation of training centers and training courses? If so, are records maintained of such accreditation by the regulatory body?			***No*** ***Yes/No***
2.5 To implement the national training programme, is it necessary to seek support from other countries and/or international organizations?			***Yes***
3. Education and training infrastructure			
3.1 Which methods of training are available: • Classroom based training? • Distance learning or e-Learning? • On the job training?			 ***Yes*** ***No*** ***Yes***
3.2 Are there training centres/training organizations in the country that provide radiation safety courses? If so, do these centres have: • Adequate administrative structures? • Adequate training facilities? • Adequate training material and equipment? • A system for a systematic assessment of the competence of the participants? **Written Examination**			***Yes*** ***Yes*** ***Yes*** ***Yes*** ***Yes***
3.3 Types of training existing in the country. Are the following types of courses organized: **this courses are included in the cursus of**			

Technician of Radiology or Radiologist • Long duration training courses or PGEC • Specialized short training courses • Train-the-trainer courses • On-the-job training • *Refresher* courses	***Yes*** ***Yes*** ***No*** ***Yes*** ***Yes***
3.4 Are there academic institutions offering academic education in radiation safety? Who are the targeted audiences?: **Student , Diploma Programme in Radiation Protection and Safety of Radioactive Sources**	***Yes***
4. Other information	
4.1 Please provide any other relevant information on the provisions of training in place to ensure radiation workers are suitably trained and qualified? - Training Centres graduating Radiology Technicians - Nominate participants to training courses organized by the IAEA from the users depends from the prospectus of the training	

APPENDIX X

List of training topics to which the LAEC Regulatory body staff have participated (2007- 2009)

Title	Organized by	Period	Number of participants
Organization and Implementation of a National Regulatory Programme for the Control of Radiation Sources	IAEA	1 week	2
Radiation protection in Nuclear Medicine and Radiotherapy Centres	AAEA	1 week	2
Medical Response of radiation accidents & Recycling of Nuclear Medicine waste	AAEA	1 week	2
Radiation Protection in Medicine	IAEA	1 week	2
Radiation Protection	LAEA	1 week	
Radiation Protection (Authorization and Inspection of X-RAY Sources).	IAEA	2 months	1
The Safe Transport of Radioactive Material	IAEA	2 weeks	1
Regulatory Authorization and Inspection of Medical Practices	IAEA	2 weeks	2
radiation protection in diagnostic and interventional radiology	IAEA	2 weeks	1
Dosimetry and calibration of Radiation Sources	IAEA	1 week	2
Basic Professional training in radiation protection	IAEA	1 month	1

Environmental radiation Measurements	IAEA	2 weeks	1
Regulatory Authority information System RAIS	IAEA	1 week	1
Physical Protection of Nuclear Facilities and Materials	AAEA	I week	2
Radiation Protection, Registration, Licensing, Q.C and Q.A in Medical Field	IAEA	1 month	1
Transport and Shielding Calculation of Radioactive Sources	IAEA	1 month	1
Production and Quality Control of radio-pharmaceutical Products	IAEA	2 weeks	2
Radiation Protection, Quality Assurance and Waste Managements in Nuclear Medicine	AAEA	2 weeks	1
Demonstration on Predisposal Waste Management Methods and Procedures	IAEA	2 weeks	1
I Strengthening National Capabilities for Response to Radiological Emergencies in Countries of the West Asia Region	IAEA	1 week	1
Organization and Implementation of a National Regulatory Authority Programme for the Control of the Radiation Sources:	IAEA-LAEC	2 weeks	8
Safety of Radioactive Waste Managements	IAEA	1 week	1
Train the Trainers Course on Practical Response to a Radiological Emergency	IAEA	2 weeks	1
Industrial Radiation Dosimetry	AAEA	1 week	1
Regulatory Authority Information System (RAIS-3).	IAEA	1 week	2

Self Assessment of National regulatory infrastructure by member states using RaSSIA Protocol	IAEA	1 week	1

APPENDIX XI

List of Training Activities events provided by the LAEC for users (2007-2009)

Title	Audience	Duration	Nb of participants
Radiation Protection in the medical field	Radiology Technician	2 sessions of 1 day 30- Oct. 2007 25 April 2008	 21 29
Basic course on Radiation Protection for Industrial Sector	Technician in industrial sector	1 day 3 July 2007	8
Awareness course in Radiation Protection for First Responders	Civil Defence and LAEC staff	30 hrs course March 16 to May 4 2005	21
Radiation Protection and the Safety of Radiation Sources in industrial Applications (Advance)	Technician in industrial sector	2 days 23-24 June 2009	8 38
Presentation of the role of the Radiation Protection Officers by the LAEC Officers	RPO in all sectors	17 April 2008	