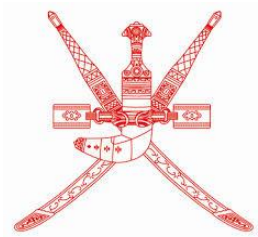

The Sultanate of Oman

THE CONVENTION ON NUCLEAR SAFETY

FIRST NATIONAL REPORT TO

SEVENTH REVIEW MEETING OF THE CONTRACTING PARTIES
(Vienna, 27 March – 7 April 2017)

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Ministry of Legal Affairs

Royal Oman Police

Public Authority for Civil Defence and Ambulance

Table of Contents

A- INTRODUCTION

The Sultanate of Oman deposited the instruments of accession to the Convention on Nuclear Safety (Royal Decree 30/2013) with the Director General of the International Atomic Energy Agency on 28 May 2013 and the Convention entered into force for the Sultanate of Oman on 26 August 2013. The Sixth Review Meeting of the Contracting Parties to the Convention was held in Vienna (Austria) from 24 March to 4 April 2014, after less than seven months of the entry into force of the Convention for the Sultanate of Oman. The Sultanate of Oman was not required, nor did it have enough time to prepare and submit its national report pursuant to Article 5 of the Convention. A delegation of the Sultanate of Oman participated however in the Sixth Review Meeting and made a presentation focusing on the basic information concerning nuclear and radiation safety as it relates to the relevant articles of the Convention. The present report that is being submitted for the 7th Review Meeting of the Contracting Parties to the Convention, which will be held in Vienna (Austria) from 27 March to 7 April 2017, is therefore the first National Report of the Sultanate of Oman.

This National Report of the Sultanate of Oman has been prepared in line with the guidelines contained in the Information Circular (INFCIRC/572/Rev. 5), dated 16 January 2015 on "Guideline Regarding National Reports under the Convention on Nuclear Safety". It demonstrates its commitment to all the provisions of the Convention and describes the implementation of each provision to the extent relevant to the Sultanate of Oman obligations.

With reference to the definition of a "nuclear installation" provided in Article 2 of the Convention[1], the Sultanate of Oman has no nuclear power plant or facilities used for activities directly related to the operation of a nuclear power plant. It has no intention currently either to embark on a nuclear power program and has no plan to build any nuclear research or test reactor, or a sub-critical assembly.

[1] "Nuclear Installation" means for each Contracting Party, any land-based civil nuclear power plant under its jurisdiction, including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant. Such a plant ceases to be a nuclear installation when all nuclear fuel elements have been removed permanently from the reactor core and have been stored. Safety in accordance with approved procedures and decommissioning program has been agreed to by the regulatory body.

The Sultanate of Oman makes extensive use of radiation sources for a variety of peaceful industrial, medical, educational and research purposes. There are two electron accelerators being used for cancer therapy at the Oncology Center of the Royal Hospital (Ministry of Health). The Sultanate of Oman has recently made the acquisition of a cyclotron for the production of short-lived radioisotopes used for Positron Emission Tomography/ Computer Tomography (PET/CT) by the Department of Nuclear Medicine of the Royal Hospital (Ministry of Health) and the Department of Radiology and Molecular Imaging of Sultan Qaboos University Hospital.

Radioactive sources are used in industrial applications mainly for the non-destructive testing of materials (NDT), well-logging and the control of industrial processes. Radioactive sources, sealed and unsealed, are used in medical applications for diagnostics and treatment by the Departments of Nuclear Medicine of the Royal Hospital and Sultan Qaboos University Hospital. Two universities (Sultan Qaboos University and University of Nizwa) and the research centers of the Directorate General of the Agricultural and Livestock Researches of the Ministry of Agriculture and Fisheries make use of radioactive sources.

Present users of radioactive sources, totaling 52 users, are distributed as follows:

1. Oil exploration (13 users)
2. Industrial radiography (13 users)
3. Petrochemical industries (6 users)
4. Cement and steel industries (3 users)
5. Medical applications (14 users)
6. Education and research (3 users)

The policy of the Sultanate of Oman with respect to all disused radioactive sources is to return them to their respective manufacturers in the country of origin. This suffers no exception and is strictly enforced by the regulatory authority.

The use of radiation sources bears with it risks of accidents and incidents of local nature which could give rise to potential radiation exposure of workers and public. The consequences arising from such

accidents or incidents must be minimized through the application of appropriate safety and security measures. In this respect, the Government of the Sultanate of Oman aims to develop and foster a safety culture in all organizations, institutions and companies dealing with radiation sources, either as users or as regulators.

The Sultanate of Oman is committed to the achievement of the objectives of the Convention on Nuclear Safety and has, for its part, adopted policies and taken measures to achieve these objectives, mainly:

- To achieve and maintain a high level of nuclear safety worldwide through the enhancement of national measures and international co-operation including, where appropriate, safety-related technical cooperation; and
- To prevent accidents with radiological consequences and mitigate such consequences, should they occur.

The Sultanate of Oman attaches great importance to the dispositions contained in Chapter 2 of the Convention, mainly Articles 16 and 17, which call for appropriate steps to be taken by Contracting Parties having a nuclear power program to provide information to States in the vicinity in order to enable them to prepare emergency plans and make their own assessment of any possible safety impact of their territory.

The presentation of the Sultanate of Oman at the 6th Review Meeting of the Contracting Parties outlined some of the challenges it is facing in the radiological safety area. This report provides an account on the approach adopted to address these challenges and describes any changes in the radiological safety infrastructure that has taken place since then. As the Sultanate of Oman is a Contracting Party to the Convention without a nuclear installation and currently with no plans to embark on a nuclear power program, this report presents information on activities covered by Articles 7, 8, 9, 10, 15 and 16 of the Convention. All the information relates exclusively to radiological safety.

B- SUMMARY

The Sultanate of Oman became a Contracting Party to the Nuclear Safety Convention on 26 August 2013, that is after the Organizational Meeting for the 6th Review Meeting of the Contracting Parties. Consequently the Sultanate of Oman did not submit a National Report. It participated however in the 6th Review Meeting and made a presentation. This report is therefore the First National Report submitted for the review of the Contracting Parties.

The Sultanate of Oman has **no** nuclear power plant or facilities used for activities directly related to the operation of a nuclear power plant. Currently it has **no** intention to embark on a nuclear power program and has **no** plan to build any research or test reactor or a sub-critical assembly. The National Report therefore contains information on safety aspects related to the utilization of radiation sources in a variety of industrial, medical, educational and research applications. The Sultanate of Oman has recently made an acquisition of a cyclotron for the production of short-lived radioisotopes used for Positron Emission Tomography/ Computer Tomography (PET/CT) by the Department of Nuclear Medicine of the Royal Hospital (Ministry of Health) and the Department of Radiology and Molecular Imaging of Sultan Qaboos University Hospital.

Legislative and Regulatory Framework

The Sultanate of Oman does not have a dedicated nuclear law to govern all nuclear energy activities and substances within the Sultanate. There are however ten laws, issued by Royal Decrees of His Majesty Sultan Qaboos, that contain provisions relating to nuclear installations, radioactive materials and radiation sources.

The Sultanate of Oman is also party to nineteen international conventions and treaties relating to the peaceful uses of nuclear and radiation energy, and the safety and security of nuclear and radiation sources. The Sultanate of Oman is in particular party to the Joint Convention on the Safety of Spent Fuel and on the Safety of Radioactive Waste Management (ratified by Royal Decree 27/2013).

A set of five regulations, issued by Ministerial Decisions issued by the respective Ministers responsible for the implementation of the corresponding laws, are in place and provide the requirements and the rules that must be applied in dealing with radioactive materials. The most relevant ones are the "Regulations for the Control and Management of Radioactive Materials" issued by the Minister in charge of Environment (Ministerial Decision No. 249/97) and the "Regulations for the Management of Hazardous Waste, issued by the Minister in charge of Environment (Ministerial Decision No.18/93).

As indicated by the presentation made by the delegation of the Sultanate of Oman attending the 6th Review Meeting of the Contracting Parties of the Nuclear Safety Convention, the Sultanate of Oman is concentrating its efforts on strengthening its radiation safety infrastructure, particularly the legislative and regulatory framework, through bilateral and international cooperation. Several staff from the Ministry of Environment and Climate Affairs, the Ministry of Legal Affairs and the Ministry of Foreign Affairs attended the Nuclear Law Institute sessions organized by the International Atomic Energy Agency and are in the process of drafting the nuclear and radiation law and completing the corresponding regulations, which shall be based on relevant IAEA Safety Standards requirements and guides.

Regulatory Body

The main roles and responsibilities of a nuclear and radiation regulatory body have been assigned since the year 2001 to the Minister in charge of the Environment (presently the Ministry of Environment and Climate Affairs) in application of the "Law on the Conservation of the Environment and Prevention of Pollution" enacted by the Royal Decree No. 114/2001.

This law gives the authority to the Minister in charge of the Environment to issue regulations for the management and control of radioactive material and nuclear establishments. Within the Ministry of Environment and Climate Affairs, and under the authority of the Minister, the Department of Radiation Protection has been entrusted with tasks for the implementation of the laws and regulations governing radioactive materials.

The Department of Radiation Protection is constituted of three sections: i) the Permits Section; ii) the Inspection and Control Section; and iii) the Radiation Monitoring Section. An extensive training program for all staff of the Department of Radiation Protection has been developed and is being implemented through bilateral and IAEA technical cooperation.

The training of the staff of the Department of Radiation Protection is another part of the radiation safety infrastructure that needs attention as a priority, particularly for the licensing, inspection and safety assessment of radiation sources, such as cyclotron and accelerators.

The Ministry of Environment and Climate Affairs neither uses nor possesses radiation sources, nor does it promote their utilization. It is therefore an independent regulatory body. The Minister in charge of the Environment addresses the reports on the protection of the environment, the public and the workers from all forms of pollution sources, including radiation hazards, to the Council of Ministers and the two houses of Parliament (the State Council and Majlis A'Shura). The annual reports of the Ministry are available for consultation by the public on its website as well as in hard copies.

Radiation Protection

Radiation safety and radiation protection in particular have been given priority in all activities relating to radiation sources and radioactive materials. Radiation exposure of workers and workplaces are required to be monitored and reports submitted to the regulatory body on a regular basis. Procedures have been established for the review of the license applications in order to ensure that the license holders have taken necessary measures to minimize radiation exposure and implement the "As Low As Reasonably Achievable" (ALARA) principle. Technical capabilities for the monitoring of radiation exposure of all workers and workplaces need to be strengthened.

The prime responsibility for safety is assigned to the license holders through dispositions contained in the laws and regulations. This responsibility will be more explicitly spelled out in the nuclear and radiation law that is in preparation.

Emergency Preparedness

As a new development since the presentation made by the Delegation of the Sultanate of Oman to the 6th Review Meeting of the Contracting Parties of the Nuclear Safety Convention, a National and Radiological Emergency Preparedness and Response Plan has been developed with the technical assistance of the International Atomic Energy Agency through a Technical Cooperation Project. The plan has been developed taking into consideration the requirements of GSR-Part 7 (IAEA General Safety Requirements – Preparedness and Response for a Nuclear or Radiological Emergency). An implementation strategy has also been developed with the aim to establish the necessary capabilities and infrastructure for operationalizing the plan. Standard Operating Procedures are yet to be developed. Training of the First Responder Team and providing the members of the team with the necessary equipment and instruments is being undertaken.

The Sultanate of Oman participated in the preparation of the Gulf Cooperation Council (GCC) Regional Radiological and Nuclear Emergency Preparedness and Response Plan which was approved by the Council of Ministers of the GCC in 25 November 2014, after review by the International Atomic Energy Agency. The Sultanate of Oman is actively participating in the activities of the GCC Emergency Management Center based in Kuwait City, particularly in the regional emergency exercises.

It should be noted also that since the presentation made by the Sultanate of Oman at the 6th Review Meeting, the eight environmental radiation monitoring stations installed in 2004 are now in operation after their upgrade and repair. These stations are part of an early warning network that is being designed. The sites for additional radiation monitoring stations have been selected. Action for the construction and installation of the additional stations is being launched.

C- REPORTING ARTICLE BY ARTICLE

Article 7: Legislative and Regulatory Framework

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.

2. The legislative and regulatory framework shall provide for:

(i) the establishment of applicable national safety requirements and regulations;

(ii) a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;

(iii) a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;

(iv) the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.

Article 7 (1) Establishing and maintaining a legislative and legal framework

The Sultanate of Oman does not have a dedicated nuclear law to govern all nuclear energy activities and substances within the Sultanate. There are however several laws that have been developed in the Sultanate, each one of them covering partially issues related to nuclear energy and technology. The Relevant National Laws that have promulgated are:

L1. "The Basic Statute of the State" issued by Royal Decree No. 101/1996: The basic statute stipulates that the state is responsible for public health and workers for the conservation of the environment, its protection and the prevention of pollution.

L2. "The Law on the Conservation of the Environment and Prevention of Pollution" issued by Royal Decree No. 114/2001: This law assigns tasks to the Ministry of Environment and Climate Affairs relating to the control of radioactive substances and dangerous wastes.

L3. "The Civil Defence Law" issued by Royal Decree No. 76/91 (amended by Royal Decree75/99 and 27/2008): This law assigns a variety of tasks to the National Committee for Civil Defence and

the Public Authority for Civil Defence and Ambulance to ensure that the Sultanate of Oman has plans and measures set in place to deal with any public disaster whether man-made or naturally occurring that causes or is expected to cause severe losses in lives or property. It is understood in the Sultanate of Oman that nuclear and radiological accidents fall under the definition of a public disaster provided for in the Civil Defence Law.

L4. "The Labour Law" issued by Royal Decree No. 35/2003 (amended several times, latest by Royal Decree 113/2011): This law provides for the protection of radiation workers in different practices.

L5. "The Law on Civil Aviation" issued by Royal Decree No. 93/2004: This law addresses the air transport of goods in general, including nuclear and radioactive materials. The air transport of such goods is prohibited unless permission from the Civil Aviation Authority is obtained.

Other related national laws include:

L6. "The State of Emergency Law" issued by Royal Decree No. 75/2008: This law stipulates the procedure for declaring the state of emergency for any incident that affects society including public disasters such as nuclear incidents. The law also provides the National Security Council with the power to undertake a number of measures and procedures to protect public order and security (such as restricting the movement of people and goods) and imposes a number of obligations on the Royal Oman Police to carry out the measures set in accordance with this law.

L7. "The Law on the Protection of Drinking Water Sources from Pollution" issued by Royal Decree No. 115/2001: This law penalizes the pollution of water sources and places an obligation on the polluters to remove such pollution and provides compensation for any damage caused.

L8. "The Law on Combatting Terrorism" issued by Royal Decree No. 8/2007: This law lists the penalties for participation in terrorist activities and organizations, including terrorism by use of nuclear or radioactive materials.

L9. "The Omani Penal Code" issued by Royal Decree No. 7/1974: This law lays down the penalties for acts criminalized by the various relevant laws and regulations.

L10. "The Unified Customs Law of the Gulf Cooperation Council" issued by Royal Decree No. 67/2003: This law governs the import and exports of goods in and out of the Sultanate of Oman. It has provisions regarding banned and restricted goods, and smuggling.

In addition to the "Convention on Nuclear Safety" (ratified by Royal Decree No. 30/2013), the Sultanate of Oman is party to the following international conventions relating to nuclear and technology:

IC1. Treaty on the Non-Proliferation of Nuclear Weapons (Ratified by Royal Decree 91/1996).

IC2. The Convention on the Physical Protection of Nuclear Material (Ratified by Royal Decree 33/2003).

IC3. The Comprehensive Nuclear-Test-Ban Treaty (Ratified by Royal Decree 43/2003)

IC4. The Convention on Early Notification of a Nuclear Accident (Ratified by Royal Decree 32/2009)

IC5. The Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (Ratified by Royal Decree 33/2009)

IC6. The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Ratified by Royal Decree 27/2013)

Other international instruments include:

IC7. The Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation (Ratified by Royal Decree 41/1976)

IC8. The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Ratified by Royal Decree 26/81)

IC9. The Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (Ratified by Royal Decree 66/1990)

IC10. The Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (Ratified by Royal Decree 66/1990)

IC11. The Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation (Ratified by Royal Decree 74/1992)

IC12. The Agreement with the International Atomic Energy Agency for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons with a Small Quantities Protocol (Ratified by Royal Decree 32/2006)

IC13. The Arab Agreement to Combat Terrorism (Ratified by Royal Decree 90/99)

IC14. The Amendment of the Arab Agreement to Combat Terrorism (Ratified by Royal Decree 22/2002)

IC15. The Convention of the Cooperation Council for the Arab Gulf States to Combat Terrorism (Ratified by Royal Decree 105/2005)

IC16. The Statute and Membership of the International Atomic Energy Agency (Ratified by Royal Decree 135/2008)

IC17. The Regional Cooperative Agreement of Research, Developing and Training Related to Science and Technology for Asia and the Pacific (RCA) (Ratified by Royal Decree 68/2010)

IC18. Basic Statute of the GCC Center for the Management of Cases of Emergency (Ratified by Royal Decree 57/2013)

Article 7 (2) (i) National Safety Requirements and Regulations

A series of regulations define the safety and control requirements of radiation sources in the Sultanate of Oman. These regulations include:

R1. "The Regulations for Civil Defence" issued by the Inspector General for Police and Customs by Decision No. 21/93: Establishes rules applied at all facilities where radioactive substances are used.

R2. "The Regulations for the Control and Management of Radioactive Materials" issued by the Minister of Environment by Ministerial Decision No. 249/97 (amended by Ministerial Decision No. 281/2003): These regulations impose obligations on the licensees such as:

a. Notifying the Ministry of Environment and Climate Affairs prior to dealing with radioactive materials.

b. Providing the Ministry of Environment and Climate Affairs and the Public Authority for Civil Defence and Ambulance with information, maps, and plans indicating the locations where radioactive materials are used or stored,

c. Establishing an internal management system with staff structure, well defined responsibilities, quality assurance procedures, staff training and emergency procedures, and

These regulations regulate the transport and storage of radioactive materials, and allow the introduction into the country of any radioactive materials only by air, and prohibit their transport within the Sultanate of Oman by any means other than by land. They require the return of radioactive sealed sources to the manufacturer.

R3. "The Regulations for the Management of Hazardous Waste", issued by Ministerial Decision No.18/93. The regulations defines hazardous waste, which includes radioactive substances, and conditions for the conditioning, transport, storage and disposal of hazardous waste.

R4. "The Civil Aviation Regulations" issued by the Minister of Transport and Communication by Ministerial Decision No. 44/N/2007: which describes the requirements and procedures to be adhered to prior to the air transport of dangerous goods, including radioactive substances.

R5. "The Regulations on Safety Measures and Occupational Health in Facilities Subject to the Omani Labour Law" issued by the Minister of Manpower by Ministerial Decision No. 286/2008.

Article 7 (2) (ii) System of Licensing

The present licensing system of the Sultanate of Oman covers licensing of the use, transport and storage of radioactive sources as well as the licensing of the disposal of radioactive waste. The licensing system for handling radioactive material includes:

- The requirements for registration of parties handling radioactive material

- Permits for the import and use of radioactive sources in the industrial and economic sectors
- The permits for the import and use of radioactive sources in the medical practices
- Permits for the return (re-export) of disused radioactive sources to their manufacturers
- Permits for the operation of radioactive sources storage facilities

All permits issued by the Department of Radiation Protection of the Ministry of Environment and Climate Affairs are valid for one year, except for the return of disused radioactive sources to their manufacturer for which the permit is valid forty five days; while the permit for the operation of a storage facility has, in general, no limit of validity.

The licensing process is described in *Article 2* of "The Regulations for the Control and Management of Radioactive Materials" is as follows: "*It is not permissible to any person to import, transport, store or use radioactive materials, or equipment containing radioactive materials unless the required permit is obtained. In order to obtain the permit, it is conditional for the person to submit the duly filled prescribed application form to the concerned department with the supporting documents. The permit shall be valid for one renewable year and shall not contain more than four radioactive sources. The permit for the use shall be renewed within a maximum period of one month from the date of expiry and in the event of radioactive materials use after the expiry of this period, a fine of R.O. 200 shall be imposed and shall be doubled every three months provided that it shall not exceed in total R.O. 1000.*" Requirement for licensing of the transport of radioactive material is spelled out in *Article 17* of these regulations: "*Vehicles used for the transport of radioactive materials within the Sultanate of Oman must obtain approval of the Directorate General of Civil Defence (Royal Oman Police) before being used*". Requirement for a permit for the storage of radioactive material is mentioned in *Article 22* of the same regulations: "*Permanent storage of radioactive materials shall be permitted only at locations approved by the Ministry. The Organization using these locations should have written procedures of operations, security facilities, dose rate limitations, notice and labels as per the enclosed design model*".

Article 7 (2) (iii) System of Regulatory Inspection and Assessment

The objectives of the inspection strategy aim to ensure:

- The commitment of the radioactive material users to the full implementation of the Regulations for the Control and Management of Radioactive Materials
- The existence of radiological emergency plans and capability of radioactive material users to implement the plans
- Conformity with the allowed radiation exposure limits, through the monitoring of radiation exposure
- Use of personal dosimeters by radiation workers
- Undertake leak test for of sealed radioactive sources
- Maintain a log book of the movement of radioactive sources
- Undertake work place monitoring for any radioactive contamination

The above objectives of the inspection strategy are achieved through: i) the submission by radioactive material users of semi annual reports that include results of personal dose monitoring of workers, leakage test of radioactive sources, results of measurement instruments calibration, workplace radiation monitoring results and movement of radioactive sources; ii) in-situ inspections in accordance with a predefined program.

The inspection program of the regulatory authority includes routine inspections as well as unannounced inspections.

Article 7 (2) (iv) Enforcement of applicable regulations and terms of licenses

Enforcement of applicable regulations is done by the inspectors of the regulatory authority. Permits may be extended, suspended, modified or revoked. The permits for the use of radioactive sources are renewed within a maximum period of one month from the date of the expiry of the permit. In the event that a radioactive source is used beyond the permit date limit without the radioactive source user applying for a renewal, a fine is imposed by the regulatory authority.

It is clearly set in *Article 42* of "The Law on the Conservation of the Environment and Prevention of Pollution" that "*without any prejudice to any severer penalty provided for in any other law, whoever disposes of nuclear waste in the Omani environment shall be punished with imprisonment for life and with fine not less than Omani Royal (OR) 100,000 (OR is equivalent to US $2.56) and not exceeding OR 1 million or with any of the two penalties. The violator undertakes to remove causes of the violation and reinstate the environmental status at his own expense in addition to payment of the compensation specified in this regard*".

To this date there have been no violations of the laws and regulations governing radioactive sources that ought to be mentioned in this respect.

Article 8 Regulatory Body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

Article 8 (1) Establishment of the Regulatory Body

In the framework of implementing the national strategy for the protection of the public, the workers and the environment from radiation hazards, the main rules and responsibilities of a nuclear and radiation regulatory body have been assigned to the Ministry in charge of Environment since 2001 (presently the Ministry of Environment and Climate Affairs).

In accordance with *Article 18* of "The Law on Conservation of the Environment and Prevention of Pollution" (Royal Decree No. 114/2001), "*the owner of any nuclear establishment or any establishment dealing*

with radioactive material, whether through transportation, storage or usage, shall obtain a prior consent of the Ministry and shall submit for the Ministry's approval, a contingency plan to deal with risks of radioactive pollution. The Ministry shall monitor nuclear radiation in coordination with regional and international centers as per the procedures to be specified by the Minister". This law gives the authority to the Minister in charge of the Environment to issue regulations for the management and control of radioactive material and for nuclear establishments.

Within the Ministry of Environment and Climate Affairs, and under the authority of the Minister, the Department of Radiation Protection has been entrusted with tasks to implement of laws and regulations governing radiation materials. The Department of Radiation Protection registers and issues licenses for entities and individuals dealing with transport, import, use, storage and export of radioactive materials. Any radioactive material with radioactivity concentration of 100 Becquerel per gram and above requires a license. Any single license cannot be given for more than four different radioactive substances. It should be noted that the licenses of vehicles for the transport of any radioactive material are granted by the Public Authority for Civil Defence and Ambulance.

The Department of Radiation Protection is constituted of three sections: i) the Permits Section, ii) the Inspection and Control Section, iii) the Radiation Monitoring Section. The number of staff in the Department has steadily increased in the last five years to reach fifteen staff members. An extensive training program for all staff of the Department of Radiation Protection has been developed and is being implemented through bilateral and IAEA technical cooperation.

The financial resources to adequately cover the activities of the Department of Radiation Protection come in part from the budget of the Ministry of Environment and Climate Affairs and in part from fees paid by licensees.

Article 8 (2) Status of the Regulatory Body

The Department of Radiation Protection is under the authority of the Ministry of Environment and Climate Affairs which is part of the government of the Sultanate of Oman. The Minister addresses its reports to the Council of Ministers, the State Council and Majlis A'Shura (the last two constitute the Parliament or Majlis Oman) on its work and its plans for the protection of the environment and the public from all forms of pollution sources, including radiation hazards.

Annual Reports of the Ministry are available in hard copies for consultation by the public. They will be displayed in the future on the new website which is under development.

In terms of independence and separation between the functions of the regulatory body and those of any other body or organization in the Sultanate of Oman concerned with the promotion or utilization of nuclear energy or radioactive material, the Ministry of Environment and Climate Affairs neither uses nor possesses any radioactive sources nor promotes their utilization.

Article 9 Responsibility of the License Holder

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

"The Regulations for the Control and Management of Radioactive Materials" and "The Regulations for the Management of Hazardous Waste" define in great detail the responsibilities of the license holder with regards to the safety of radioactive sources management. The license holder has in particular the responsibility to provide qualified persons to monitor and control radioactive sources and ensure that the provisions of these regulations are complied with.

The license holder has the responsibility to provide the Ministry of Environment and Climate Affairs, Public Authority for Civil Defence and Ambulance and other concerned authorities with information, maps and plans indicating locations where radioactive sources are stored.

The license holder also has to identify the “controlled” and “supervised” areas within which dose levels, as indicated in the permit, or as per the terms of the Guidelines, are complied with.

Any organization dealing with radioactive materials or radioactive waste is required to establish an internal management system, including staff structure with well-defined responsibilities, written procedures of work, quality assurance procedures, staff training and emergency procedures so as to meet the Ministry of Environment and Climate Affairs’ requirements.

The present laws and regulations do not explicitly assign the prime responsibility for safety to the license holder. This is however inferred by responsibilities attributed the license holder, as described in the previous paragraphs. It is intended to include an explicit statement about the responsibilities of the license holder for safety in the next amendment that will be brought to the laws and regulations or the new law on nuclear and radiation safety.

All classified workers must receive adequate training in their field of work and be issued personal dosimetry badges (TLD) before dealing with radioactive materials, including radioactive waste. The Department of Radiation Protection receives on a regular basis, in periods not exceeding six months, reports on doses received by workers. These reports are analyzed and whenever necessary followed up by the Department of Radiation Protection, particularly in cases of over-exposure of workers.

The regulations also stipulate that the Department of Radiation Protection shall be notified and shall issue immediately thereafter authorizations for the return of disused sealed sources to the country of origin.

The Department of Radiation Protection ensures that the license holder discharges its responsibilities, as defined in the laws and regulations relating to radioactive material and radioactive waste, by reviewing the periodic reports it receives from the license holder and implementing an inspection program that includes routine and unannounced inspections. Any shortcoming identified is subject to the penalties specified by the law, including the revocation of the license.

Article 10 Priority to Safety

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

The Long Term Development 1996-2020 of the Sultanate of Oman and all Five Year Development Plans assign a clear priority to safety and the protection of the public, the workers and the environment from ionizing radiation and any source of pollution. In this respect *Article 18* of the "The Law on the Conservation of the Environment and Prevention of Pollution" (Royal Decree No. 114/2001) imposes a strict-control on radioactive material and nuclear establishments for safety and security purposes, as it clearly states that "*The owner of any nuclear establishment or any establishment dealing with radioactive material, whether through transportation, storage or usage, shall obtain a prior consent of the Ministry and shall submit for the Ministry's approval, a contingency plan to deal with risks of radioactive pollution. The Ministry shall monitor nuclear radiation in coordination with regional and international centers as per the procedures to be specified by the Minister*".

The safety culture is reinforced by the implementation of a training program for any persons dealing with radioactive material. This is spelled out in *Article 10* of "The Regulations for the Control and Management of Radioactive Materials" (Ministerial Decision No. 249/97): "*all classified workers must receive adequate training on their field of work, before dealing with radiation materials. This should be suitably recorded*".

Article 8 of these regulations require that "*any organization dealing with radioactive materials shall establish an internal management system including: staff structure with well defined responsibilities, written procedures of work, quality assurance procedures, staff training and emergency procedures so as to meet the Ministry's requirements*". All these requirements are part of the policy for the establishment and development of a radiation safety culture. In addition, these regulations require that the "*organizations' internal rules be written and made available to all workers in the "Controlled" and "Supervised" areas and users of radioactive materials covering the*

working procedures and practices that shall be followed by workers in the area, including:

- *A full description of the controlled and supervised areas and any associated restrictions;*
- *Ordering and receipt of radioactive material;*
- *Dealing with radioactive material;*
- *Disposal of radioactive material;*
- *Record keeping;*
- *Procedure for contractor and visitors;*
- *Actions to be taken in the event of accidents and emergencies;*
- *Training*." (Article 9)

The Department of Radiation Protection ensures that the above measures are effectively part of a quality assurance program of the organizations dealing with radioactive material. Verification of the existence of these quality assurance measures is carried out as part of the licensing process.

A systematic safety assessment and an environmental assessment are part of the reports that need to be presented to the Department of Radiation Protection of the Ministry of Environment and Climate Affairs before any permit or license is issued. These reports are required by the existing regulations promulgated by the Ministry of Environment and Climate Affairs. The safety assessment is required for the renewal of permits or licenses as well.

Article 15 Radiation Protection

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

Radiation Protection has always been the focus of attention by the authorities of the Sultanate of Oman for all activities dealing with radioactive materials, including radioactive waste. The external radiation exposure of radiation workers is monitored using thermoluminescent dosimetry badges (TLD). Currently, there are about 2200 radiation workers in the country, mostly in the health sector and the oil and gas industries. The personal dosimeters of approximately half of these radiation workers are serviced by the Medical Physics Unit of the College of Medicine and Health Science of Sultan Qaboos University. Personal dosimetry services for some 1000 radiation workers, mostly in the economic sector are contracted to overseas service providers. Plans are being implemented to expand the personal dosimetry services of Sultan Qaboos University to cover all radiation workers in the country.

The Department of Radiation Protection has established procedures for the review of the licence applications in order to ensure that all the licence holders have taken the necessary measures to minimize radiation exposure and implement the “As Law As Reasonably Achievable” (ALARA) principle. In addition, the license holders are required to submit bi-annual reports containing:

- Personal dosimetry (TLD) readings of the radiation workers.
- Wipe or leak tests for equipment and containers of sealed sources.
- Survey meter calibration results
- Radiation monitoring data in the workplace and around the storage area of radioactive sources.

With respect to the storage of radioactive material, "The Regulations for the Control and Management of Radioactive Materials" (Ministerial Decision No. 249/97) require, in *Article 23*, that “*the dose rate outside the storage facility shall not exceed 2.5 µSv* hr^{-1}*” and that “Regular measurements shall be recorded. The dose figures shall be compiled and recorded for a trial period at the beginning of any period of work. All sealed sources storage facilities shall be regularly wipe-tested and the results to be communicated to the Ministry [in charge of the Environment]*”.

These regulations also require, in *Article 3*, for radiation protection purposes, that “*The organization shall, after the ministry’s*

approval, provide qualified persons to monitor and control radioactive materials and ensure that the provisions of these regulations are complied with". It is also required by the existing regulations (*Article 5*) that "*The organization shall identify the "Controlled" and "Supervised" areas within which dose levels as indicated in the permit or as per the terms of the Guidelines are complied with*". In accordance with *Article 6* of these Regulations, "*A person under the age of 18 is not allowed to be a classified worker. Female workers should be subject to additional restraints in accordance with the terms and Guidelines set by the Ministry*". Radiation protection measures are also enforced in light of the requirement contained in *Article 7* of the Regulations that "*The organization shall notify the Ministry [in charge of the Environment] in the following cases:*

A- Before the import and use of radioactive materials, or any other relevant work in the Sultanate

B- If there is any release of radioactive material in excess of that specified in the permit

C- *If anyone or worker has received a radiation dose in excess of the level indicated in the permit*."

The only release to the environment in the Sultanate of Oman of radioactive substances is the disposal of low level liquid radioactive waste generated by the use of radiopharmaceuticals in nuclear medicine for diagnostic and treatment purposes, after allowing the radioactive waste to decay in delay tanks to permissible levels in accordance with the regulations and under strict control by the operator and the regulatory body. Any incident in this respect is significant in terms of safety must be reported and investigated. No such incident has occurred since the nuclear medicine facilities in two hospitals (the Royal Hospital and the Sultan Qaboos University Hospital) started operations.

Article 16 Emergency Preparedness

1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency.

For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.

2. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation arc provided with appropriate information for emergency planning and response.

3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.

Article 16 (3) Emergency Preparedness for Contracting Parties without Nuclear Installations

In the Sultanate of Oman, the National Committee for Civil Defence is responsible for the development, at the national level, of policies, strategies and plans for all types of emergencies, including nuclear and radiation emergencies. The National Committee is chaired by the Inspector General of the Royal Oman Police and its members are senior and high officials from the relevant ministries and organizations. The National Committee has an Executive Office that is permanently staffed and performs all administrative and support functions needed for its operations.

The Public Authority for Civil Defence and Ambulance was established in 2013 as a financially and administratively independent body linked to the Royal Oman Police. The Public Authority is responsible for setting civil defence plans and following up on their implementation. It also initiates national response to radiological threats of categories III, IV and V, upon request from the National Committee for Civil Defence. The Ministry of Environment and Climate Affairs, because of its regulatory functions, has an important role before, during and after nuclear and radiological accidents.

A National Radiological and Nuclear Emergency Preparedness and Response Plan and a strategy for its implementation have recently been developed with the assistance of the International Atomic Energy Agency through a technical cooperation project. It is going now through the approval process by the highest authorities in the Country. The plan has been developed taking into account the requirements of GSR-Part 7 (IAEA General Safety Requirements – Preparedness and Response for a Nuclear or Radiological Emergency).

The Sultanate of Oman is party since 2009 to the International Convention on Early Notification of a Nuclear Accident (Royal Decree No. 32/2009) and the International Convention on Assistance in the Case of a Nuclear or a Radiological Emergency (Royal Decree No. 33/2009). Obligations under these two international conventions have been integrated in the National Plan.

The Sultanate of Oman participated in the preparation of the Gulf Cooperation Council (GCC) Regional Radiological and Nuclear Emergency Preparedness and Response Plan which was approved by the Council of Ministers of the GCC at their summit meeting held in November 2014, after review by the International Atomic Energy Agency. The Sultanate of Oman ratified the statute of the GCC Emergency Management Center and is actively participating in its activities, particularly the radiation emergency exercises. It should be noted that the GCC Emergency Management Center has an essential role for the coordination and the provisions of technical support for the harmonization of national response actions of GCC Member States in case of a nuclear or a radiological emergency.

It should be noted also that since the presentation made by the Sultanate of Oman at the 6th Review Meeting, the eight environmental radiation monitoring stations installed in 2004 are now in operation after their upgrade and repair. These stations are part of an early warning network that is being designed. The sites for additional radiation monitoring stations have been selected. Action for the construction and installation of the additional stations is being launched.