REGULATORY STRUCTURE OF RADIOLOGICAL SAFETY ISSUES IN TURKEY

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ABSTRACT

In Turkey, Turkish Atomic Energy Authority (TAEA) is the main responsible and national competent authority for all nuclear and radiological activities. The Radiation Health and Safety Department of TAEA is the regulatory body concerning the use, exportation, importation, storage, transportation, transferring and licensing of radiation sources or equipments and also implementation of the provision of the regulations dealing with the above-mentioned matters. The regulatory structure of TAEA, legal instruments for radiation protection, legislation, radiation source and waste management, inspection, training program on the safe uses of radiation sources will be discussed in this paper.

Radiation Health and Safety

In Turkey, the relevant National Authority for regulating activities involving radioactive sources is Turkish Atomic Energy Authority (TAEA). As it is seen from the Figure 1 Radiation Health and Safety Department (RHSD) is responsible for the safety use of radiation sources and equipment and their security. One of the major duties of the RHSD is to control and ensure the adequacy of the installations at the design stage in order to restrict the exposure. There are seven geographical regions in Turkey. All necessary radiation control of the installations, laboratories etc., concerning the use, exportation, importation, storage, transportation, transferring and licensing of radiation sources or equipment is done in five of these regions by RHSD. The necessary control of radiation sources or equipments of the other two regions is done by the Health Physics Division of Çekmece Nuclear Research and Training Center (ÇNRTC) and the measurement results of the control is sent to RHSD for evaluation.

Organization, coordination and implementation of research and development programs in radiation protection, updating the regulations and public information on radiation protection are also major duties of the RHSD.

Countrywide environmental monitoring programs for measuring radionuclides in ground-level air, foodstuffs, terrestrial and aquatic environment, examination of imported or exported products have been still carried out under coordination of RHSD.

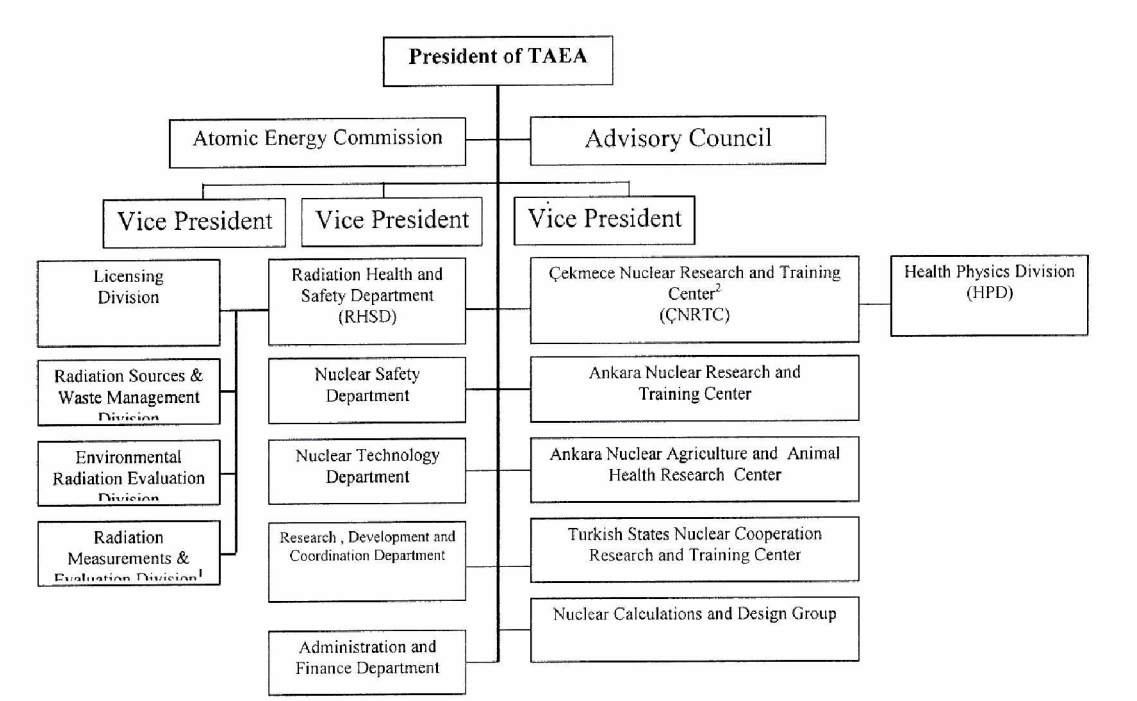


Figure 1. Regulatory Structure of Turkish Atomic Energy Authority

An accurate and reliable dosimetry service is available using passive personnel dosimeters such as thermoluminescent materials and film badges. Whole body counting systems (one in Ankara and two in Istanbul) are in operation for measurements of radioactivity. Secondary Standard Dosimetry Laboratory (SSDL) activities are also carried out by ÇNRTC in Istanbul. Monitoring of external radiation exposure, internal radiation exposure, and food contamination have also been established.

Legislation

Turkish Atomic Energy Act is the principal law and it states its objectives as to promote research, development and use of nuclear energy for peaceful purposes. Its provision also deals in very broad terms with the control of nuclear materials, nuclear reactors, nuclear waste and protection from radiation hazards. Radiation Safety Decree provides mainly licensing regime covering radiation sources or equipments and their use, production, import, export, transport and storage. Radiation Safety Regulation is recently published regulation and based on Basic Safety Standards (BSS) [1] published by IAEA and 96/29/Euratom EC Directive [2].

Regulations have been updated with respect to recent improvements in radiation protection philosophy. In Turkey, there is a large number of applications with radiation sources. In order to achieve adequate radiation safety, TAEA defined a strategy of thorough licensing, radiation shielding of all equipment and development of local safety procedures in all establishments having these sources. TAEA-RHSD is the national regulatory authority and the licensees are responsible

to the national radiation protection regulations through competence, organization and quality assurance.

Legal instruments for radiation protection

All of the regulations given below were prepared and revised in accordance with the international safety standards, especially IAEA recommendations,. These are:

a) Radiation Safety Decree issued on 7.9.1985
b) Radiation Safety Regulations issued on 24.3.2000
c) Regulations for Licensing of X-Ray Equipment Used in Dentistry issued on 12.9.1993
d) Regulations for Licensing of Gamma and Electron Beam Irradiation Facilities issued on 18.06.1994
e) Regulations for Licensing of Radiotherapy Facilities issued on 21.7.1996
f) Regulations for Safe Transport of Radioactive Material issued on 10.9.1997
g) Regulations for Radioactive Waste issued on 15.1.2000
h) Regulations for National Emergency Preparedness issued on 15.1.2000

Figure 2 gives some important regulation on radiation protection, TAEA's legislation framework and publication dates and Official Gazette numbers of some important regulations.

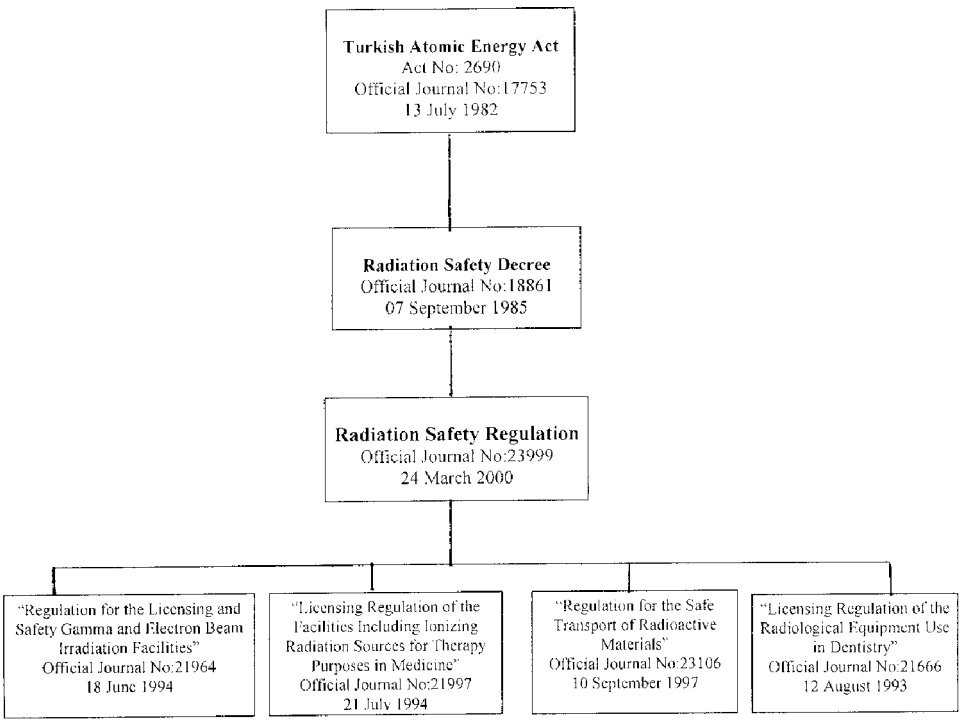


Figure 2. Some Important Regulations and Their Publication Dates.

Some Important Items on Radiation Source and Waste Management

Radiation Source and Waste Management Division (RSWMD) of RHSD is responsible for the import, export, transport, maintenance, etc. permission of radiation sources or devices containing radiation sources. According to Radiation Safety Regulation, companies working in this business should provide the licence from TAEA. Some other important items on the national system for the safety of radiation sources are as follows:

a) Additional TAEA permission is required each time when a source is imported to, or exported from Turkey, and whenever a source is to be transported within Turkey. In order to obtain permission to transport of the radiation sources, the consigner must comply with the Turkish Regulations for "The Safe Transport of Radioactive Materials". Permission is granted when the appropriate paperwork provided to TAEA, including details of the transport route and emergency plans dose rate measurements is required according to Transport Regulation mentioned above. Imported sources are also subject to customs control by TAEA officials;

b) Radiotherapy facility operators must notify TAEA each time a source is changed. TAEA is then required to make dose rate measurements to ensure that the shielding specification of the installation for the new source is satisfactory. Additionally, the output values of cobalt-60 teletherapy sources are checked using TLD's with the method of dose comparison in the SSDL Laboratory of ÇNRTC.

Waste Management

Medical and industrial institutions, research laboratories and research reactor are the main sources of radioactive wastes. These are collected from these sources are treated and stored at Low Level Radioactive Waste Treatment Facility (LLRWTF) which has been put in operation within the technical cooperation program with International Atomic Energy Agency (IAEA) in 1989 installed at ÇNRTC in accordance with the regulations of TAEA. Compressible solids are compacted. Sealed sources are cemented with their original containers. Chemical precipitation method is applied for the liquid wastes and concentrated sludge is cemented. 5 Mwt research reactor resins are also cemented. Spent fuels of research reactor are sent back to the contracted countries after a considerable cooling time in the reactor pool. TAEA is responsible for the management of radioactive waste produced in the country.

Inspections

According to Radiation Safety Regulation users of radiation sources or of devices containing radiation sources should be inspected routinely to ensure that they are complying with Regulation. Additional inspection may be necessary for example after an incident or accidents. Inspections can involve one or more of the following [3-4]:

a) ensuring that equipment, facility, systems, buildings and operational procedures correspond to Radiation Safety Regulation,

b) to examine records keeping of personnel, records of radioactive waste collected, records of radiation sources and records on incidents or accidents,

c) interviews and/or consultation with licensee and staff,

d) visual examination of working practices,

e) checking the operation of system and warning signs,

f) checking on actions resulting from previous inspections,

g) discovering deficiencies and problems not previously identified.

New Provisions about Radiation Sources

TAEA will take the following actions to prevent possible radiation accidents:

a) All radiotherapy centers (46) in Turkey should be routinely inspected. License conditions will be reviewed and details of the cobalt-60 sources will be compared with the TAEA inventory. Furthermore, licensees will be informed of the procedures for re-exporting used teletherapy sources and TAEA will offer temporary storage in ÇNRTC for them, if required,

b) The output of all cobalt-60 teletherapy machines will routinely be checked with TLDs supplied by TAEA's Secondary Standard Dosimetry Laboratory (SSDL),

c) Companies who apply to TAEA to re-export sources are required to specify the exact date the sources will be delivered to the consignee. The re-export must take place not later than 15 days after the application and the consignor must ensure that the consignee confirms acceptance of the source.

Training for the safe Use of Radiation Sources

Training on radiation safety is one of the most major components of TAEA. Particularly targets are the staff of the regulatory authority including 20 new regulatory officials who have been employed in RHSD this year. Main education topics are implementation of system of notification and authorization, the development of regulatory requirements, the inspection of premises and the enforcement of the Radiation Safety Regulation. Theoretical and on the job training programs have to be continued. One or two days education programs have also been employed to custom officers and civil defense officers who may encounter orphan sources in the course of their duties. In order to constitute proper awareness of the requirements of Radiation Safety Regulation, training programs have been employed to users of radiation sources. Booklets and other training materials have been published and distributed to them. As well as the regulatory officials, the users of radiation source need to be trained in how to deal

with radiological emergencies that may arise due to a breakdown of controls and radiation incidents or accidents.

REFERENCES

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