IAEA-NS-IRRS-2022/07

ORIGINAL: English

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

MISSION

TO

TÜRKIYE

Ankara, Türkiye

5to 16 September 2022

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY

NUCLEAR REGULATORY AUTHORITY

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REPORT OF THE
INTEGRATED REGULATORY REVIEW SERVICE (IRRS) MISSION
TO
TÜRKIYE

Integrated Regulatory Review Service

IAEA IRRS

REPORT OF THE INTEGRATED REGULATORY REVIEW SERVICE (IRRS) MISSION TO TÜRKIYE

Mission dates:	*5 to 16 September 2022*
Regulatory body visited:	*Nükleer Düzenleme Kurumu (NDK)*
Location:	*Ankara, Türkiye*
Regulated facilities, activities, and exposure situations in the mission scope:	*nuclear power plants, research reactors, radiation sources applications, waste management facilities, emergency preparedness and response, transport, decommissioning, occupational exposure, medical exposure, public exposure and environmental monitoring, interfaces with nuclear security*
Organized by:	*IAEA*

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The number of recommendations, suggestions and good practices is in no way a measure of the status of the national infrastructure for nuclear and radiation safety. 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 Türkiye, an international team of senior safety experts met representatives of the Turkish Nuclear Regulatory Authority (NDK) from 05 to 16 September 2022 to conduct an Integrated Regulatory Review Service (IRRS) mission. The mission took place at NDK headquarters in Ankara. The purpose of this peer review was to review the Turkish governmental, legal and regulatory framework for nuclear and radiation safety.

The IRRS team comprises 16 senior regulatory experts from 15 IAEA Member States, 4 IAEA staff members. The IRRS mission covered all civilian facilities and activities in Türkiye. The review compared the Turkish regulatory framework for nuclear and radiation safety against IAEA safety standards as an international benchmark for safety. The mission was also used to exchange information and experience between the IRRS team members and the Turkish counterparts in the areas covered by the IRRS.

The IRRS team conducted a review of the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; development and content of regulations and guides; emergency preparedness and response; regulation of nuclear power plants; research reactors; radiation sources facilities and activities; occupational radiation protection, control of medical exposure, public exposure control, transport of radioactive material, waste management and decommissioning, and the interface between nuclear safety and security.

The IRRS mission included discussions on two policy issues: the depth and scope of regulatory inspections to be carried out on the authorized person, construction and manufacturing items important to safety in nuclear power plants; and the impact of association of NDK to the Ministry of Energy and Natural Resources to the independence of the regulatory body. The mission included observations of regulatory activities, interviews and discussions with management and staff of the NDK. Activities included visits to the Akkuyu Nuclear Power Plant (NPP), TRIGA Mark-II research reactor, a cyclotron facility, a radiotherapy facility, and the TENMAK waste management facility. The IRRS team members observed regulated activities and performance of inspection activities, including discussions with the licensee personnel and management. Meetings were organized with the Deputy Minister of Energy and Natural Resources, and the Deputy Minister of Environment, Urbanization and Climate Change, and staff of the Ministry of Health. The team also held discussions with the management of Akkuyu Nuclear JSC, which is the license holder of Akkuyu NPP, and representatives of Nuclear Technical Support JSC (NUTED), the technical support organization of NDK.

In preparation for the IRRS mission, NDK conducted a self-assessment and prepared a preliminary action plan to address weaknesses that were identified. The results of the self-assessment and supporting documentation were provided to the team as advance reference material for the mission. During the mission, the IRRS team performed a systematic review of all topics presented in the advance reference material.

As a country constructing the first NPP, a major challenge to the Türkiye is to oversee the construction and to regulate the safe commissioning and operation of its first NPP. This challenge was recognized by the Turkish Government and is being addressed by taking numerous measures, such as:

- Revising the legal framework for safety by issuing the Nuclear Regulation Law No 7381 which stipulates the fundamental principles and rules to be applied for the protection of the workers, the public and the environment;

- Establishing NDK as the new independent regulatory body for oversight of nuclear and radiation safety of facilities and activities on the basis of the Presidential Decree on Organization and Duties of the Nuclear Regulatory Authority No. 95;
- Establishing NUTED as a technical support organization to NDK in regulatory functions such as review, assessment and inspection.

It is necessary that the Government continues to provide support and resources for the oversight activities of the Turkish NPP projects. In particular, focus should be directed towards continued building of NDK's technical capabilities for the surveillance of the construction work and strengthening regulatory oversight during commissioning and operation phases of Akkuyu NPP.

The IRRS team identified a good practice and areas of good performance of NDK. The identified good practice is:

- The Government established a scholarship programme for selected Turkish students to pursue graduate education in the nuclear field at foreign universities with support from the Ministry of National Education. Within this scope, 132 scholarship students are studying abroad on behalf of NDK as of 2022.

The IRRS team recognized that Türkiye has a committed regulatory body for ensuring continuous improvement of safety and the protection of people and the environment, which has also been demonstrated by inviting the IRRS mission.

The IRRS team also identified issues which need improvement and believes that consideration of these will enhance the overall performance of the regulatory framework in Türkiye.

NDK has started to develop regulations in accordance with the IAEA safety standards and international best practices to carry out its regulatory responsibilities. The IRRS team recognized that NDK continues to update their regulatory requirements and encouraged NDK to further enhance the regulatory framework for the effective oversight of facilities and activities. The main challenges of NDK are:

- The completion of development of regulations and guides in line with IAEA safety standards in order to implement the provisions of Law NRL 7381 and Presidential Decree PD 95 by taking into account the exiting regulatory framework and the need for consistency with higher level national legislation;
- The establishment of a systematic process for evaluating the adequacy of advice or services provided by its TSOs to ensure that NDK has a clear understanding and knowledge of the product or service being supplied and for enhancing competencies of its staff accordingly;
- The establishment of arrangements for providing information to and involving interested parties and the public, specifically for collecting their input to regulatory decision making.

The IRRS team made observations that warrant additional emphasis, specifically:

- Develop the national policy and strategy for safety in accordance with the IAEA fundamental safety objective and principles, and establish a strategy to apply the policy following a graded approach;
- Continue efforts to update the regulatory framework for emergency preparedness and response with clear roles and responsibilities during offsite and onsite emergencies;
- Planning workforce to ensure regulatory competence is maintained when qualified staff depart from the organization;

- Completion of integrated management system by incorporating all regulatory processes and improving the measurement of the effectiveness of its management system in order to improve safety performance;
- Assessments of leadership for safety and of safety culture within the regulatory body and establishing a mechanism for fostering safety culture in facilities and activities;
- Development of inspection programme for NPPs for commissioning and operations phases including development of guidance for conducting regulatory inspection;
- Implementation of its inspection programme for radiation sources facilities and activities comprehensively in accordance with its established frequency of inspection;
- Formal cooperation and coordination arrangement between MoH and NDK for regulatory oversight of medical facilities and activities, and ensure that there are no conflicting requirements placed on authorized parties and applicants.

The team also recognized that some of the issues have already been identified by NDK's action plan for improving the national regulatory infrastructure as a result of the self-assessment.

The IRRS review team highlighted the extended full support and cooperation of NDK in the regulatory, technical, and policy issues by all parties in a very open and transparent manner throughout the mission.

I. INTRODUCTION

At the request of the Government of Türkiye, an international team of senior safety experts met representatives of the Türkiye Nuclear Regulatory Authority (NDK) from 05 to 16 September 2022 to conduct an Integrated Regulatory Review Service (IRRS) mission. The purpose of this peer review was to review the governmental, legal and regulatory framework of Türkiye for nuclear and radiation safety. The review mission was formally requested by the Government of Türkiye in February 2020. A preparatory meeting was conducted 5 to 6 May 2022 at the NDK Headquarters in Ankara to discuss the purpose, objectives, and detailed preparations of the review in connection with regulated facilities and activities in Türkiye and their related safety aspects and to agree the scope of the IRRS mission.

The IRRS team consisted of 16 senior regulatory experts from 15 IAEA Member States, 3 IAEA staff members, 1 IAEA administrative assistant. The IRRS team carried out the review in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; development and content of regulations and guides; emergency preparedness and response; occupational radiation protection, control of medical exposure, control of public exposure, transport of radioactive material, waste management and decommissioning. In addition, policy issues were discussed, including 'depth and scope of regulatory inspections to be carried out on the authorized person, construction and manufacturing items important to safety in nuclear power plants' and 'the impact of association of NDK to the Ministry of Energy and Natural Resources to the independency of the regulatory body'.

NDK conducted a self-assessment in preparation for the mission and prepared a preliminary action plan. The results of NDK self-assessment and supporting documentation were provided to the IRRS Team as advance reference material for the mission. During the mission the IRRS Team performed a systematic review of all topics within the agreed scope through review of the advance reference material of Türkiye, conduct of interviews with management and staff from NDK and direct observation of NDK regulatory activities at regulated facilities. Meetings with the Deputy Minister of Energy and Natural Resources and the Deputy Minister of Environment, Urbanization and Climate Change were organized. The team also hold discussions with the management of Akkuyu Nuclear Power Company, which is license holder of Akkuyu Nuclear Power Plant and representative of NUTED, the technical support organization of NDK.

All through the mission the IRRS Team received excellent support and cooperation from NDK.

II. OBJECTIVE AND SCOPE

The purpose of this IRRS mission was to review radiation and nuclear safety governmental, legal and regulatory framework and activities in Türkiye against the relevant IAEA safety standards to report on effectiveness of the regulatory system and to exchange information and experience in the areas covered by the IRRS. The agreed scope of this IRRS review included all facilities and activities regulated in Türkiye. It is expected this IRRS mission will facilitate regulatory improvements in Türkiye and other Member State, utilising the knowledge gained and experiences shared between NDK and IRRS reviewers and the evaluation of the regulatory framework of Türkiye for nuclear and radiation safety, including its good practices.

The key objectives of this mission were to enhance the national legal, governmental and regulatory framework for nuclear and radiation safety, and national arrangements for emergency preparedness and response through:

a) providing an opportunity for continuous improvement of the national regulatory body through an integrated process of self-assessment and review;

b) providing the host country (regulatory body and governmental authorities) with a review of its regulatory technical and policy issues;

c) providing the host country (regulatory body and governmental authorities) with an objective evaluation of its regulatory infrastructure with respect to IAEA safety standards;

d) promoting the sharing of experience and exchange of lessons learned among senior regulators;

e) providing key staff in the host country with an opportunity to discuss regulatory practices with IRRS Team members who have experience of other regulatory practices in the same field;

f) providing the host country with recommendations and suggestions for improvement;

g) providing other states with information regarding good practices identified in the course of the review;

h) providing reviewers from Member States and IAEA staff with opportunities to observe different approaches to regulatory oversight and to broaden knowledge in their own field (mutual learning process);

i) contributing to the harmonization of regulatory approaches among states;

j) promoting the application of IAEA Safety Requirements;

k) providing feedback on the use and application IAEA safety standards;

III. BASIS FOR THE REVIEW

A) PREPARATORY WORK AND IAEA REVIEW TEAM

At the request of the Government of Türkiye, a preparatory meeting for the Integrated Regulatory Review Service (IRRS) was conducted from 5 to 6 May 2022. The preparatory meeting was carried out by the appointed Team Leader Mr Georg Schwarz, Deputy Team Leader Mr Faizan Mansoor and the IRRS IAEA Team representatives, Mr Zia H. Shah, Team Coordinator, and Mr Teodros Hailu, Deputy Team Coordinator.

The IRRS mission preparatory team had discussions regarding regulatory programmes and policy issues with the senior management of NDK represented by Mr Serhat Alten, Head, Department of Nuclear Facilities and other senior management and staff. It was agreed that the regulatory framework with respect to the following facilities and activities would be reviewed during the IRRS mission in terms of compliance with the applicable IAEA safety requirements and compatibility with the respective safety guides:

- Nuclear power plants;
- Research Reactors,
- Waste management facilities;
- Radiation sources facilities and activities;
- Decommissioning;
- Transport of radioactive materials;
- Control of medical exposure;
- Occupational radiation protection;
- Public exposure control;
- Waste management (policy and strategy, predisposal and disposal); and
- Selected policy issues.

Mr Serhat Alten made presentations on the national context, the current status of NDK and the self-assessment results to date.

IAEA staff presented the IRRS principles, process and methodology. This was followed by a discussion on the tentative work plan for the implementation of the IRRS in Türkiye in September 2022.

The proposed composition of the IRRS Team was discussed and tentatively confirmed. Logistics including meeting and workplaces, counterparts and Liaison Officer identification, proposed site visits, lodging and transportation arrangements were also addressed.

The NDK Liaison Officers for the IRRS mission were confirmed as Mr Serhat Alten as the Liaison Officer, and Mr Buğra Kılınç and Ms Fatmanur Küçük as deputy Liaison Officers.

NDK provided IAEA with the advance reference material (ARM) for the review in July 2022. In preparation for the mission, the IAEA review team members reviewed the advance reference material of Türkiye and provided their initial impressions to the IAEA Team Coordinator prior to the commencement of the IRRS mission.

B) REFERENCES FOR THE REVIEW

The relevant IAEA safety standards and the Code of Conduct on the Safety and Security of Radioactive Sources were used as review criteria. The complete list of IAEA publications used as the references for this mission is provided in Appendix VII.

C) CONDUCT OF THE REVIEW

The initial IRRS Team meeting took place on Sunday, 04 September 2022 in Mövenpick Hotel, directed by the IRRS Team Leader and the IRRS IAEA Team Coordinator. Discussions encompassed the general overview, the scope and specific issues of the mission, clarified the bases for the review and the background, context and objectives of the IRRS programme. The understanding of the methodology for review was reinforced. The agenda for the mission was presented to the team. As required by the IRRS Guidelines, the reviewers presented their initial impressions of the ARM and highlighted significant issues to be addressed during the mission.

The host Liaison Officer was present at the initial IRRS Team meeting, in accordance with the IRRS Guidelines, and presented logistical arrangements planned for the mission.

The IRRS entrance meeting was held on Monday, 05 September 2022, with the participation of NDK senior management and staff. Opening remarks were made by Mr Zafer Demircan, President of NDK, Mr Georg Schwarz, IRRS Team Leader and Mr Zia H. Shah, IAEA Team Coordinator. Mr Serhat Alten gave an overview of the context of Türkiye, NDK activities and the action plan prepared as a result of the pre-mission self-assessment.

During the IRRS mission, a review was conducted for all review areas within the agreed scope with the objective of providing Türkiye and NDK with recommendations and suggestions for improvement and where appropriate, identifying good practice. The review was conducted through meetings, interviews and discussions, visits to facilities and direct observations regarding the national legal, governmental and regulatory framework for safety.

The IRRS Team performed its review according to the mission programme given in Appendix II.

The IRRS exit meeting was held on Friday, 16 September 2022. The opening remarks at the exit meeting were presented by Mr Serhat Alten and were followed by the presentation of the results of the mission by the IRRS Team Leader Mr Georg Schwarz. Closing remarks were made by Ms Anna Bradford, IAEA, Director, Division of Nuclear Installation Safety.

An IAEA press release was issued.

1. RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT

1.1. NATIONAL POLICY AND STRATEGY FOR SAFETY

Nuclear Regulation Law No 7381 (NRL 7381) and Presidential Decree on Organization and Duties of the Nuclear Regulatory Authority No 95 (PD 95) are the main documents establishing the legal and regulatory framework for safety and setting out the general principles and mechanisms, hence establishing safety policy and strategy in general. However, there's no special document promulgated by the government addressing national policy and strategy for safety.

Many of the elements of GSR Part 1 (Rev.1) Requirement 1 are included, however all principles are not systematically addressed in the above-mentioned Acts. Specifically, neither NRL 7381 nor the PD95 set out the mechanisms for implementing a national policy taking into account the fundamental safety principles and objective.

In addition, the Government has not clearly documented a commitment to international legal instruments (although this commitment is evident as outlined in section 2, adequate measures for taking account of social and economic developments and the promotion of leadership and management for safety, or the fundamental safety principle on prevention of accidents.

Further, the laws don't describe their implementation in accordance with a graded approach. This is necessary to ensure that the radiation risks associated with facilities and activities receive appropriate attention by the government or by the regulatory body, as noted in paragraph 2.4 of GSR Part 1 (Rev.1).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *There is no documented national policy and strategy for safety that addresses the fundamental safety objective and fundamental safety principles.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) Requirement 1 states that** *"The government shall establish a national policy and strategy for safety, the implementation of which shall be subject to a graded approach… to achieve the fundamental safety objective and to apply the fundamental safety principles established in the Safety Fundamentals." …*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 2.3. states that** *"National policy and strategy for safety shall express a long term commitment to safety. The national policy shall be promulgated as a statement of the government's intent. The strategy shall set out the mechanisms for implementing the national policy."*
(3)	**BASIS: GSR Part 1 (Rev. 1) para. 2.4. states that** *"The national policy and strategy for safety shall be implemented in accordance with a graded approach, depending on national circumstances, to ensure that the radiation risks associated with facilities and activities, including activities involving the use of radiation sources, receive appropriate attention by the government or by the regulatory body."*
R1	**Recommendation: The Government should document its national policy and establish a strategy for nuclear and radiation safety that addresses the mechanisms to achieve the Fundamental Safety Objective and to apply the Fundamental Safety Principles in accordance with a graded approach.**

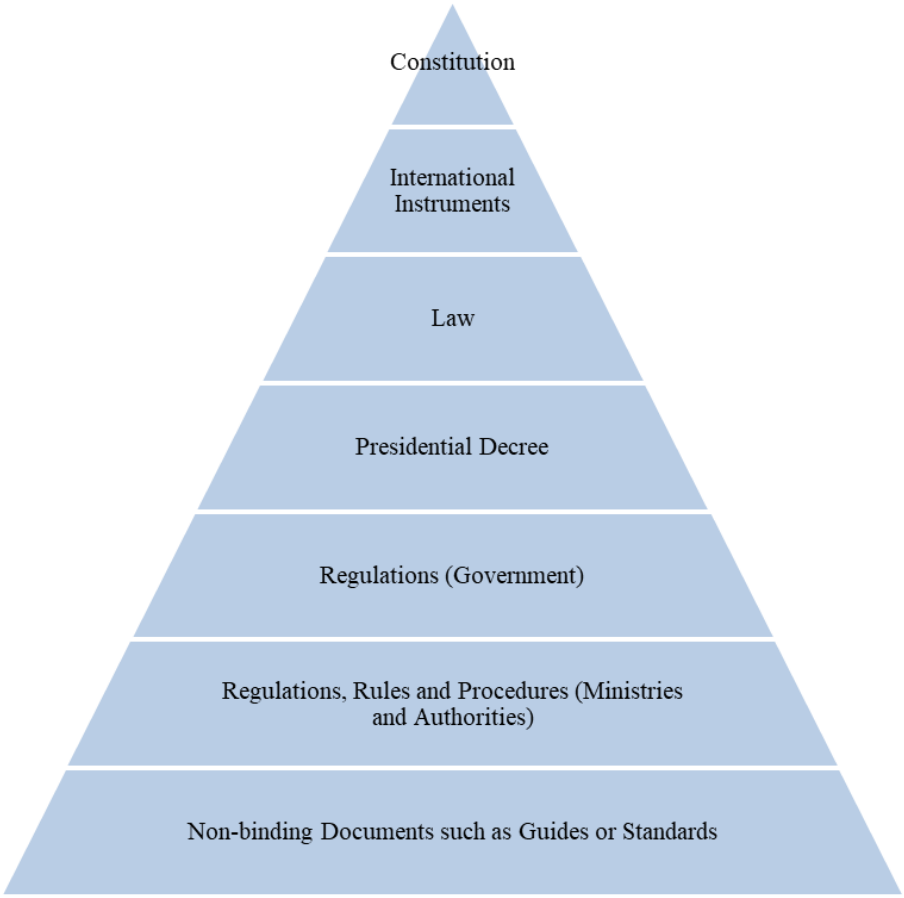
1.2. ESTABLISHMENT OF A FRAMEWORK FOR SAFETY

The Republic of Türkiye reorganized its governmental structure to a presidential republic in 2017 which was implemented in July 2018. This reorganization included Decree Law 702, which established the

Nuclear Regulatory Authority (NDK) as an independent body to take over the regulatory responsibilities in nuclear and radiation safety regulation. However, based on the Constitutional Court ruling on the Decree Law 702, NRL 7381 has been issued in March 2022, laying out the roles and responsibilities of parties related to nuclear energy and ionizing radiation. At the same time, PD 95 has been issued to reinstate Nuclear Regulatory Authority (NDK). NDK is associated with the Ministry of Energy and Natural Resources (MENR), since in Türkiye all regulatory bodies need to be associated with a Ministry to be represented in Parliament. NRL 7381 and PD 95 constitute governmental, legal and regulatory framework for safety.

The main objective of NRL 7381 is to determine the fundamental principles and rules to be applied for the protection of workers, public, environment and future generations from possible harmful effects of ionizing radiation during activities regarding utilization of nuclear energy and ionizing radiation. While NRL 7381 addresses the roles and responsibilities on peaceful use of nuclear energy and ionizing radiation, PD 95 establishes NDK with necessary resources as the nuclear regulatory body.

The hierarchy of the legal instruments in the Republic of Türkiye is given in Figure 1 below.



NRL 7381 provides scope and objectives, general principles of safety and protection, obligations and powers of NDK such as: issuance of regulations and guides, granting authorizations (licence, permissions, certifications and approval of the site for a facility) and attaching conditions to the authorizations, conducting inspections and on-site examinations, and imposing administrative sanctions, responsibility of the authorized person, inspectors' power; legal liability for nuclear damage, establishment of technical support organizations for NDK, criminal provisions and administrative sanctions, etc.

The IRRS team observed that the existing laws do not include any provisions for the involvement of interested parties or the public for their input in regulatory decision-making. This was acknowledged in the NDK action plan.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The legal framework of Türkiye does not include any provisions on government and NDK interaction with the public and involvement of interested parties .*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 2.5. states that** *"The government shall promulgate laws and statutes to make provision for an effective governmental, legal and regulatory framework for safety. This framework for safety shall set out the following: …* *(5) Provision for the involvement of interested parties and for their input to decision making;*
(2)	**BASIS: GSR Part 1 (Rev.1) Requirement 36 states that** *"The regulatory body shall promote the establishment of appropriate means of informing … the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body."*
(3)	**BASIS: GSR Part 1 (Rev.1) para. 6.67 states that** *"… the regulatory body, in its public informational activities and consultation, shall set up appropriate means of informing interested parties, the public and the news media about… the processes of the regulatory body... Interested parties including the public shall have an opportunity to be consulted in the process for making significant regulatory decisions, subject to national legislation and international obligations. The results of these consultations shall be taken into consideration by the regulatory body in a transparent manner."*
S1	**Suggestion: NDK should consider improving and documenting the mechanisms for involvement of interested parties and the public to provide their input to key decisions.**

1.3. ESTABLISHMENT OF A REGULATORY BODY AND ITS INDEPENDENCE

PD 95 Article 3.1 establishes NDK as the Nuclear Regulatory Authority to regulate nuclear and radiation safety, security, and safeguards to protect workers, the public, and the environment. The NDK is a public legal and administrative entity that is legally, institutionally, and politically independent with significant financial flexibility. The NDK independently fulfils the duties and powers given to it by NRL 7381, PD 95 and other relevant legislation. According to Article 3.3 of PD 95 NDK's decisions must not be subject to expediency control. No organ, authority or person can give orders or instructions to influence the decisions of NDK.

According to the General Law on Appeals, any administrative decision is subject to appeal in the court. In addition, anyone has the right to appeal to the authority first who made the decision, without losing their right to appeal in court.

PD 95 prescribes organisational principles, tasks and responsibilities of NDK, NDK's organizational units and their functions and responsibilities, financing and budget, the independence of NDK and its relations to MENR.

NRL 7381 stipulates the authorizations, licenses, permits, certificates that are needed from NDK in order to operate facilities or carry out activities in the field of nuclear and radiation safety.

The regulatory staff employed by the Türkiye Atomic Energy Authority have been transferred to the newly established regulatory body NDK. Recruitment of additional personnel at NDK is ongoing.

NDK has its own budget which is subject to less restrictions than other Turkish authorities (e.g., NDK is authorized to temporarily use academic personnel and external experts and to transfer its budget surplus to new year). PD 95 emphasizes that the revenues of NDK must meet its expenses. The revenues are mainly composed of process and service fees. Other revenues of minor importance are publication revenues, revenues of movable or immovable properties, donations, and treasury grants from the general budget.

NDK has not been attributed responsibilities that might compromise or conflict with the responsibility for regulating the safety and security of nuclear facilities and activities.

The NDK is responsible for regulating all facilities and activities involving nuclear energy or ionizing radiation, including safety, security and safeguards, with the exception of medical exposure being regulated by the MoH. NDK's main organs consists of the Board and the Presidency. The NDK president and Board Members are appointed by the President of Türkiye while the rest of NDK staff are appointed by the President of NDK. Under PD 95, NDK comprises nine departments and two service units while their duties and powers are also defined in the decree. The Nuclear Regulatory Board is the decision-making body, and the Authority is obliged to implement the decisions made by the Board. The duties and authorities of the Board have been stipulated in PD 95 whereas requirements ensure their decisions to be free of undue influence.

NDK Board members are excluded from participating in meetings and voting on matters related to themselves and their family. The NDK also issued the Regulation on Vocational and Ethical Principles, where the ethical principles for all NDK staff are constituted. Further issues regarding conflict of interest are regulated by general legal system.

Under NRL 7381, applicants for authorization are obliged to provide all the information and documents requested by NDK for authorization in the required format and content and pay the determined fees. Inspectors and other personnel assigned to accompany an inspection have the authority to enter relevant places or facilities for inspection purposes; to supervise the activities and inspect them at any time; to meet with the people they deem necessary and to conduct examinations, research and investigations on the issues they deem necessary; to request, examine, retain or take copies of all kinds of information, documents and records; to take, remove, retain, properly dispose of or have any material or sample; to make or have measurement, analysis, inspection and testing using any device; to keep visual, audio or written records.

NDK can consult during the establishment of new regulation with responsible authorities. This is according to the Regulation on the Procedures and Principles of Legislation Preparation. According to this regulation every authority needs to consult with other relevant authorities. PD95 also has an article on matters where NDK needs to consult other relevant authorities.

The IRRS team considers that the legal system of Türkiye adequately stipulates the requirements for the establishment of a regulatory body and its independence.

Policy Issue Discussion 1: The Impact of Association of NDK to the Ministry of Energy and Natural Resources to the Independency of Regulatory Body

Under the national governmental system in Türkiye, there are three types of connections between public organizations and ministries: affiliation, relation and association. Affiliated organizations, generally, have responsibilities and duties in the areas under the responsibility and duty of a ministry but are established under a separate law. Such organizations are generally under direct hierarchical control of the ministry. Regulatory bodies are established as separate legal entities and associated with a ministry with no hierarchical connection. Association is only required for the integrity of the administration and facilitation of the coordination. The ministry represents regulatory bodies in the government and in the parliament, such as introducing the budget for the approval of the parliament.

NDK is established by law as an independent regulatory body and is associated with the Ministry of Energy and Natural Resources (MENR), whereas MENR has the responsibility for promotion of nuclear energy in Türkiye. The purpose of this policy issue discussion was to discuss the pros and cons of association of the NDK with the MENR.

The IRRS team gave an overview of different approaches in their respective countries during the discussions as summarized below:

- Being associated with a Ministry that has the legal mandate to decide on nuclear energy development might have its advantages in getting timely resources by the regulatory body by virtue of recognition of the important stages in nuclear power development and importance of regulatory functions. However, being associated with the same ministry may have adverse perception among some of the national and international interested parties over the independence of regulatory body. Association with the ministry of energy may also hinder direct reporting to the government on important matters which are in the apparent domain of conflict of interest between promotional and regulatory functions.
- There are various examples in the member states where both promotors and regulators are under the same ministry and regulators are working without compromising independence. Regular communication and consultation are curial though sometimes could be complex, including the need to resolve different opinions and outlooks on safety and security matters.
- Some public entities such as a nuclear regulator are affiliated with the highest body in the government hierarchy with no affiliation to any ministry. The RB defends its annual funding directly in the Ministry of Finance and would be utilized only by the RB's decision. Although development of regulations should be consulted with different ministries, the regulations are directly issued by the regulatory body.
- Sometimes the RB has been under the ministry of energy where it does not have any independence on budget or other decisions, but has support in the administration aspects. When the RB directly reports to the highest level of government, sometimes it is not easy to promote safety within the government structure, because of no formal contact with other entities within the Government. Further there would be no higher government entity to back the regulatory body when there is a need for a support, such as during a global nuclear or radiological emergency.
- An IRRS mission conducted at a member state recommended that the RB is not effectively independent as both regulators and promotors are under the same ministry, therefore the a new rule was issued by the Government to take the regulatory body toward effective independence which can only be achieved gradually with the revision of all related national legislation. The regulatory body's independent mandate to prescribe its budget has been achieved.
- In some member states regulatory bodies are established under the same ministry where the operator is affiliated with independence stature by legislation. Yet, there is a tendency not to fully implement regulatory decisions independently and from experience, it would be advisable to the extent possible to avoid any affiliation with the same ministry.

1.4. RESPONSIBILITY FOR SAFETY AND COMPLIANCE WITH REGULATIONS

Article 5.3 of NRL 7381 states that the authorized person has the prime responsibility to ensure safety and security in an activity or at a facility. The responsibility for safety only ends with the release from regulatory control.

Article 5.1 of the same Law states that authorized legal persons shall:

- Provide radiation protection, safety and security during the activity,
- Ensure that the activity is carried out by a sufficient number of competent personnel with a culture of safety and security,

- Provide the necessary organizational structure, equipment and financial resources to carry out the activity in a safe and secure manner, …
- Perform safety and security assessments at a frequency determined by the Authority, …
- Submit to the Authority all information and documents required by the Authority in the required form, content and scope,
- Conduct research and investigation required by the Authority regarding safety and security
- Fulfil additional obligations related to safety, security and nuclear safeguards as determined by the Authority as a result of assessments

Article 5.3 which addresses the prime responsibility for safety and security explicitly states that complying with the terms and conditions of a granted authorization and related legislation or to be under regulatory control or delegation or contracting to outsource its responsibilities, shall not reduce or remove the responsibility of the authorized person.

The IRRS team considers that the legal system of Türkiye adequately stipulates requirements for the prime responsibility for safety and compliance with regulations.

1.5. COORDINATION OF AUTHORITIES WITH RESPONSIBILITIES FOR SAFETY WITHIN THE REGULATORY FRAMEWORK

NDK has been established by NRL 7381 and PD 95 as the principal regulatory body on safety and security of facilities and activities related to the nuclear energy and ionizing radiation. However, there are cross cutting issues which involve other regulators and/or authorities that have responsibilities on implementation.

For medical radiation practices NDK cooperates with the Ministry of Health (MoH), for environmental impact assessment NDK cooperates with the Ministry of Environment, Urbanization and Climate Change, for emergency preparedness and response the NDK cooperates with Disaster and Emergency Management Presidency, for transport of radioactive materials NDK cooperates with the Ministry of Transport and Infrastructure.

As for the possible issues that may have relations to peaceful use of nuclear energy and ionizing radiation, PD 95 authorizes NDK to provide input to other authorities or institutions.

The legal system of Türkiye adequately stipulates the requirements for the coordination of authorities with responsibilities for safety within the regulatory framework, although the IRRS team identified some weak areas in cooperation between different authorities. For example, see recommendation R18 for appropriate coordination between authorities responsible for regulatory supervision of medical facilities and activities.

1.6 SYSTEM FOR PROTECTIVE ACTIONS TO REDUCE EXISTING OR UNREGULATED RADIATION RISKS

The Regulation on Radiation Safety requires that radiation levels in natural environments are to be monitored by NDK when necessary and cooperation is made with relevant ministries, institutions and organizations when deemed necessary. No dose limitation is applied to exposure from natural radiation sources.

The remediation activities for contaminated areas are subject to authorization from NDK according to the Regulation on Authorization of Environmental Remediation Activities of Contaminated Areas. Applicants are required to submit a technical report to NDK, which includes at least the method, equipment, radioactive waste management, radiation protection and emergency measures regarding the elimination of radioactive contamination.

A contaminated dumpsite in Gaziemir, Izmir and 36 burial sites for tea, contaminated from the fallout of Chernobyl Accident, fall into the existing exposure situations category. Regarding these sites, periodic monitoring activities are carried out by NDK and wastes from Gaziemir site are planned to be handled within the scope of the near surface radioactive waste facility to be built by TENMAK.

NRL 7381 assigns TENMAK as responsible authority for taking necessary measures, including recovery and disposal, for any orphan source with the cooperation of relevant institutions and organizations.

NDK was authorized and made responsible to establish and operate a national registration system for radiation sources to monitor of the movement of sources and identify any orphan source.

The IRRS team considers that the legal system of Türkiye adequately stipulates the requirements for the system for protective actions to reduce existing or unregulated radiation risks.

1.7. PROVISIONS FOR THE DECOMMISSIONING OF FACILITIES AND THE MANAGEMENT OF RADIOACTIVE WASTE AND OF SPENT FUEL

Although there is no separate policy document from the government dealing with Radioactive Waste Management in Türkiye, nor for decommissioning of facilities, the elements of such policies are addressed in NRL 7381 (Part Four: "Radioactive Wastes, Used Fuels and Special Accounts") and in the "National Radioactive Waste Management Plan" (see recommendation R1 in section 1.1).

The general safety principles regarding radioactive waste management are mentioned in "Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities" (2022).

The main requirements for the safe management and disposal of radioactive waste and spent nuclear fuel and for the safe decommissioning of facilities are given in NRL 7381.

The strategy for radioactive waste management (RWM) in Türkiye is described in the National Radioactive Waste Management Plan, 2020 (NRWMP). A reference waste management scenario, taking into account present and future elements of the nuclear programme and for the medium and long-term management of radioactive waste (RW), is described in the NRWMP. According to the NRWMP, and specifically in view of limited VLLW storage capacity at Akkuyu NPP, a surface repository should have to be operational by at least 2036.

At present, Türkiye has 2 RRs and RW is mainly produced by these and by activities in radiation facilities (50000 radiation sources, multiple medical application systems; and, institutional wastes). There are also legacy situations (58 tons of contaminated tea from the fallout of Chernobyl accident) and contaminated material from a scrap metal facility. Türkiye is investing in Nuclear Energy by constructing 4 nuclear reactors (VVER 1200) in Akkuyu, and programming an extension with 4 more units in Sinop area. Spent fuel (SF) will be kept within storage in the power plant until a disposal facility becomes available. Reprocessing of the SF is an option as well as declaring the SF immediately as radioactive wastes. Waste management technologies will be part of the new NPP infrastructure. At present TENMAK operates a radioactive waste processing and storage facility in Istanbul and is also responsible for establishing the national radioactive waste inventory, as part of NRWMP. This inventory is updated every five years.

The policy/strategy for decommissioning consists of decommissioning a facility without delay followed by clearance of the site for reuse purposes. At present, no decommissioning activities are the subject of license applications in Türkiye.

The polluter pays principle is applied. To ensure that financial resources for radioactive waste management and for the decommissioning are available when needed, two separate funds ("special accounts") were established by NRL 7381. The same Article identifies what these funds can be used for. All RW producers must contribute to the funding. The account management board (MoENS) yearly decides on the contributions to be paid.

As mentioned in PD95, NDK establishes regulatory control over RWM activities and facilities and for decommissioning and closure of nuclear installations, radiation facilities and radioactive waste facilities.

1.8. COMPETENCE FOR SAFETY

Recognizing the need to build domestic competence in the area of nuclear safety, the government has made provisions for building and maintaining the capability of authorities responsible for safety of facilities and activities in a number of legal acts.

With the Akkuyu NPP project, ensuring the competency for safety was also recognized as one of crucial goals in the Eleventh Development Plan (2019-2023). Similarly, strengthening of human resources was set as targets in the 2019-2023 Strategic Plan of MENR.

Regarding the NPP project, special provisions have been added to intergovernmental agreement to ensure necessary human resources, including vocational and professional education of citizens of Türkiye to be available when needed, and also responsibilities for the authorized person have been laid out in NRL 7381.For professional education, a total of five universities in Türkiye offers degrees of Bachelor of Science, Master of Science and Philosophy of Doctorate in nuclear engineering and science. Currently there are no vocational schools providing educational activities in the fields of nuclear energy and ionizing radiation. Ankara Chamber of Industry and Hacettepe University are making efforts in this area and there is a new radiation technician programme in Akdeniz University.

MENR is responsible for coordination of activities ensuring human resources at a national level while NDK is responsible for ensuring that regulatory oversight of facilities and activities are carried out by a competent and adequate number of personnel. Furthermore, NRL 7381 stipulated the establishment of NUTED, the technical support organization for NDK to ensure the access of NDK to any additional competencies that may need.

Türkiye established the YLSY Program, which is an overseas graduate education scholarship program run by the Ministry of National Education in return for compulsory service in order to meet the qualified human resources needs of universities and public institutions and organizations. YLSY is intended to meet the qualified human resources needs of universities and public institutions and organizations by sending students abroad to receive postgraduate education with scholarship, through the examination held by the Ministry of National Education, in order to realize the science and technology transfer needed by Türkiye. Students study abroad on behalf of the Ministry of National Education and on behalf of NDK.

Within the scope of YLSY, education can be made in almost all countries of the world. The countries where students can study are determined by the YLSY Guidelines published every year. The selection of students who will receive graduate education is made by written and oral exams. Students who do not have sufficient foreign language scores to be accepted by universities abroad within the scope of the program can attend foreign language courses in Türkiye or abroad financed by the Ministry of National Education.

Scholarship amounts are determined by the proposal of the Ministry of National Education and the decision of the Ministry of Finance. Payments are made from the budget of the Ministry of National Education. Those who are sent abroad for compulsory service on behalf of higher education institutions and public institutions and organizations, after successfully completing their education, are appointed to the relevant staff of the institutions they needed by to fulfil their compulsory service obligations.

For several years, NDK used this tool to recruit new staff in addition to the regular governmental system to hire new personnel, ensuring their minimum level of education. The NDK identified its competency need, both in number and field, pre-identified the main subject of thesis for potential students and requested the Ministry of National Educational to select the students.

Students sent abroad by NDK under the YLSY programme are employed by NDK after their postgraduate studies. As of September 1, 2022, within the scope of YLSY, a total of 29 people completed their

postgraduate education abroad and were employed at NDK. By the end of 2022, the number of these people is expected to reach 54. Of the 96 students expected to start working in the next 6 years, 12 are pursuing doctorate and 84 master degrees. A total number of 132 students have been sent abroad for studying on behalf of NDK within the scope as of 2022.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Türkiye established an overseas graduate education scholarship program to meet the qualified human resources needs of universities and public institutions and organizations. A large portion of these students are sent on behalf of NDK and are expected to join the NDK after finishing their education.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) Requirement 11 states that** *"The government shall make provision for building and maintaining the competence of all parties having responsibilities in relation to the safety of facilities and activities.*
GP1	**Good Practice: The Government established a scholarship programme for selected Turkish students to pursue graduate education in the nuclear field at foreign universities with support from the Ministry of National Education. Within this scope, 132 scholarship students are studying abroad on behalf of NDK as of 2022.**

Applicants are responsible for demonstrating the competency and adequacy of their human resources for authorization of any facility or activity. Verification of technical competences of authorized persons are carried out during the extension of authorization if there is an expiration duration identified for the authorization or through the periodic safety reviews, if there is not a provision for expiration in the regulations.

1.9. PROVISION OF TECHNICAL SERVICES

The private sector in Türkiye can provide safety significant technical services to authorised parties. Some of these services also require a licence or certificate from NDK. The facilities and activities for which an authorization is required are listed in NRL 7381. These include third party inspection companies, manufacturers of items important to the safety of nuclear installations, transport of radioactive materials, etc.

The conditions and procedures for obtaining an authorization for these activities are dealt with in various sector-specific regulations, which are;

- Regulation Regarding Equipment Procurement Process and Approval of Manufacturers for Nuclear Facilities,
- Regulation on Construction Inspection of the Nuclear Power Plants,
- Regulation on Safe Transport of Radioactive Materials,
- Regulation on Authorization of Institutions to Provide Dosimetry Services,
- Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices.

Use of third-party inspection companies is necessary because legislation on areas other than nuclear exclude competence of particular inspection on nuclear facilities. So, the only competent authority for nuclear installations is NDK. Because of this NDK certifies other inspection authorities for inspections in nuclear installations for their area of work.

NDK at national level performs the environmental control service in accordance with PD 95 to conduct the national radiation monitoring activity. For the calibration services, TENMAK provides the services of Secondary Standard Dosimetry Laboratories which is authorised as a radiation facility.

1.10. SUMMARY

Türkiye has developed a legal and regulatory framework for the safety and security based on international safety standards. The existing legal and regulatory framework contain some aspects of national policy and strategy, however, further elaboration on policy and strategy is required which should include all elements of national policy and implementing strategy based on IAEA safety standards. An independent regulatory body has been established for the oversight of facilities and activities. Responsibility for safety has been assigned to the operator. In addition, there is a comprehensive human resource development programme in order to build competence.

While demonstrating a commitment to the required legal framework as functions and responsibility of the government, some areas for improvements have been identified by the IRRS team which include the following:

- documenting national policy and strategy for safety that addresses the fundamental safety objective and fundamental safety principles
- a clear division of roles and responsibilities between the ministries
- provisions in the legal system for the involvement of interested parties

Türkiye has a very good scholarship programme for selected Turkish students studying abroad and the IRRS team has recognised this as a Good Practice.

2. THE GLOBAL SAFETY REGIME

2.1. INTERNATIONAL OBLIGATIONS AND ARRANGEMENTS FOR INTERNATIONAL COOPERATION

Türkiye was among the first signatories of the IAEA Statute in 1956 and takes an active part in the global regime ratifying related international treaties and conventions for nuclear and radiation safety.

Türkiye also made a political commitment with regard to the Code of Conduct on the Safety and Security of Radioactive Source and notified IAEA of their intention to act in accordance with the Guidance on the Import and Export of Radioactive Sources.

Bilateral agreements have been concluded between the government of the Republic of Türkiye and the governments of Argentina, Bulgaria, Canada, France, Korea, Romania and Russian Federation, Ukraine, USA, Germany, Jordan, Japan, Belarus. Agreements for cooperation with the regulatory bodies of Finland, Hungary, Belarus, Chechia, China, Russian Federation, Ukraine and USA have been signed.

The IRRS team was informed that communication with some of the neighbouring countries which operate NPPs is poor in terms of early notification of nuclear accidents. Communication with these countries is possible only through the IAEA platforms.

Türkiye voluntarily participated in the European Union Stress Tests after the Fukushima Daiichi accident within the scope of observer status in ENSREG. The second National Stress Test report has been submitted in December 2021 and the first phase of peer review, the table-top review, has been implemented in May 2022.

Türkiye has also used international assistance from European Union under the "Instrument for Pre-Accession Assistance" and "Instrument for Nuclear Safety Co-operation" to train its staff using in-situ missions and on-the-job training at other competent regulatory bodies or expert companies.

As the regulatory authority, NDK participates in the safety standards committees of IAEA and contributes to the development of safety standards. Moreover, NDK is involved in Regional and Interregional projects of IAEA. NDK has also been involved in several international expert groups working on nuclear safety & regulatory review topics such as OECD NEA/MDEP and other expert groups under NEA. NDK also applied for membership as an observer in Western European Nuclear Regulators Association (WENRA).

NDK also participates in several conventions, workshops, and meetings of international organizations.

2.2. SHARING OF OPERATING EXPERIENCE AND REGULATORY EXPERIENCE

NDKs regulations related to nuclear and radiation safety have several requirements on using operating experience at different levels and for different facilities. The Regulation on Notification and Reporting of Unusual Event for Research Reactors already exists. NDK already started preparation and will issue regulations which will cover Event Notification and reporting of all Events in all Nuclear Facilities. The IRRS team was informed that dealing with international experiences will be covered in these regulations.

Türkiye has become a part of the IAEA/NEA International Reporting System for Operating Experience (IRS) in 2020 in accordance with CNS Article 19 and is continuing its contributions to the platform. It has also participated in the Incident Reporting System for Research Reactors. At the moment NDK doesn't analyse reports from the IRS. NDK also doesn't have procedures for the review, assessment and dissemination of information on operational events. NDK is working on procedures for describing the process of reviewing and evaluating international operating and regulatory experience. This was acknowledged in the NDK Action Plan.

In addition to these regulations and activities, NDK shares its experiences in authorization of a NPP by hosting scientific visits, workshops and on the-job training from several embarking countries. NDK also generates reports about radiological events through the INES system.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has started preparation of regulation and guide, however they have not established yet a system or analysed international operating experiences to identify and disseminate lessons learned for use by authorized parties, the regulatory body and other relevant authorities.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) Requirement 15 states that** *"The regulatory body shall make arrangements for analysis to be carried out to identify lessons to be learned from operating experience and regulatory experience, including experience in other States, and for the dissemination of the lessons learned and for their use by authorized parties, the regulatory body and other relevant authorities."*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 3.4. states that** *"The regulatory body shall establish and maintain a means for receiving information from other States, regulatory bodies of other States, international organizations and authorized parties, as well as a means for making available to others lessons learned from operating experience and regulatory experience. The regulatory body shall require appropriate corrective actions to be carried out to prevent the recurrence of safety significant events. This process involves acquisition of the necessary information and its analysis to facilitate the effective utilization of international networks for learning from operating experience and regulatory experience."*
R2	**Recommendation: NDK should establish a system for analysing international operating experiences to identify lessons to be learned and for dissemination of the lessons learned and for their use by authorized parties, the regulatory body and other relevant authorities.**

2.3. SUMMARY

Türkiye is party to all international conventions and agreements. In addition, with a new regulatory framework and a new independent regulatory body established with NRL 7381, better compliance with these conventions is provided.

NDK already joined the IAEA IRS but needs to establish a system to analyse international operating experiences.

3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

3.1. ORGANIZATIONAL STRUCTURE OF THE REGULATORY BODY AND ALLOCATION OF RESOURCES

NDK was established to protect workers, the public, the environment, and future generations from the possible harmful effects of radiation during the conduct of activities related to nuclear energy and ionizing radiation under the Decree of the President No. 95 "Organization and Duties of the Nuclear Regulatory Authority." Part five of that Decree establishes NDK's structure including the President, two Vice Presidents and eleven total service units. The number of budgeted staff positions in 2022 was 381 with 211 staff currently on board. 132 scholarship students are currently being educated in required technical areas with the intent of fulfilling the remaining budgeted positions when finished with their studies.

Formal decisions within NDK are made by a 5-member board, appointed by the president of Türkiye, one being the president of the NDK. The president of NDK is supported by two vice presidents who are responsible for leading 9 of NDK's business units between them. The organizational structure of NDK is approved by the President and Board and can be modified as long as the service units defined in the decree are maintained. This provides NDK the flexibility to reorganize and more effectively or efficiently fulfil its responsibilities if deemed necessary.

To fulfil the role assigned to NDK, the NDK president has broad authority (granted by PD95) to divide service units among the vice presidents, assign work among service units and, if appropriate, assign additional duties, authorities, and responsibilities to the service units.

NDK is funded from the general fund of the state budget. The president is annually responsible for developing a budget proposal in accordance with the Authority's strategic plan. This approach ensures that adequate resources are available regardless of fees collected from authorized parties.

NDKs service units are organized and funded in a way that is commensurate with the radiation risks associated with facilities and activities it is tasked with, in accordance with a graded approach.

PD95 identifies the roles of NDK to include: safety, security, and nuclear safeguards in production of nuclear energy and radiation; authorization and oversight of the building, operation, decommissioning and closure of nuclear installations, radiation facilities and radioactive waste facilities; authorization and oversight of nuclear materials, sources, radioactive wastes; export and import control within the scope of nuclear safeguards; and, radiation emergency management.

3.2. EFFECTIVE INDEPENDENCE IN THE PERFORMANCE OF REGULATORY FUNCTIONS

PD95, Article Three (3), states that "The Authority independently fulfils and uses the duties and powers given to it by Law No. 7381, this Presidential Decree and other relevant legislation. Authority decisions must not be subject to expediency control. No organization, authority or person can give orders or instructions to influence the decisions of the Authority." Although NDK maintains an "association" with MENR, this is a formality of government structure rather than a reporting structure (see also policy discussion in section 1.3 on this issue).

There is a requirement within the government of Türkiye which prohibits civil-service employees from working for a previously regulated employer for three years. There is also a general requirement that prohibits any civil servants to have any connection with a regulated entity. Further, all civil servants within Türkiye are prohibited from holding a second job, receiving gifts from regulated parties, maintaining membership in a political party, disclosing confidential information, and conducting unauthorized interviews with the media. Accordingly, all these requirements are maintained for NDK staff. However, if a staff member is recruited from an authorized party, there is no period of delay (e.g., one year) imposed on the staff member to forgo authorization or oversight of activities conducted by their previous employer,

which could create a conflict of interest. The IRRS team was informed that for all new employees, there is a period of training and observation which have a practical effect of delaying direct oversight of a previous employer.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK does not require a specific waiting period for new staff members who are recruited from authorized parties before they can inspect/oversee the activities of the authorized party who previously employed them.*	
(1)	**BASIS: GSR Part 1 (Rev.1) para. 4.8 states that** *"To maintain the effective independence of the regulatory body, special consideration shall be given when new staff members are recruited from authorized parties..."*
S2	**Suggestion: NDK should consider requiring new staff to wait for a certain period before permitting them to independently oversee the regulated activities of their previous employer.**

3.3. STAFFING AND COMPETENCE OF THE REGULATORY BODY

NDK has developed its first Workforce Plan in 2022 and provides an overview of the status of its staffing as well as a plan to provide adequate competent staff to perform its functions. The Plan evaluates historical workload for each unit and job to inform future workload expectations. Further, the plan defines the roles of certain jobs and assesses the individuals currently employed in those roles to form a baseline. The Plan also provides a strategy for training existing staff to develop skills where there are gaps to fulfil the projected workload.

NDK has experienced success using its scholarship program for training new recruits that have ultimately been retained by NDK upon completion of their studies. However, the Workforce Plan does not provide for succession planning, especially related to the loss of experienced personnel. This was acknowledged in NDK's Action Plan.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK's Workforce Plan does not include analysis for the departure of qualified personnel.*	
(1)	**BASIS: GSR Part 1 (Rev.1) Requirement 18 states that** *"The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities."*
(2)	**BASIS: GSR Part 1 (Rev.1) para. 4.11 states that** *"... A human resources plan shall be developed that states the number of staff necessary and the essential knowledge, skills, and abilities for them to perform all the necessary regulatory functions."*
(3)	**BASIS: GSR Part 1 (Rev.1) para. 4.12 states that** *"... the human resources plan for the regulatory body shall cover recruitment and, where relevant, rotation of staff in order to obtain staff with appropriate competence and skills, and shall include a strategy to compensate for the departure of qualified staff."*
S3	**Suggestion: NDK should consider incorporating additional analysis in its Workforce Plan to ensure regulatory competence is maintained when qualified staff depart from the organization.**

Although there is some focus on in-service training by the NDK, it is not required that staff must periodically retrain (e.g., annually, biannually, triennially – depending on subject matter). In addition,

although there is a general structure within the civil service of Türkiye for managing individual performance, NDK has not yet implemented an individual performance management system. NDK is in the process of enhancing the position descriptions to be able to establish standard expectations for all staff, but this work is not complete. The lack of a formalized, individual performance management system creates a vulnerability in NDK's ability to assess the competence of its staff over time.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK does not maintain a system to periodically retrain staff on subjects (e.g., regulatory, safety culture, IMS, document management, technical, etc.). The NDK Training Plan does not address training for specific review and assessment of potential technologies including inspection. In addition, NDK has not implemented an individual performance management system.*	
(1)	**BASIS: GSR Part 1 (Rev.1) Requirement 18 states that** *"The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities."*
(2)	**BASIS: GSR Part 1 (Rev.1) para. 4.13 states that** *"A process shall be established to develop and maintain the necessary competence and skills of staff of the regulatory body, as an element of knowledge management. This process shall include the development of a specific training programme on the basis of an analysis of the necessary competence and skills. The training programme shall cover principles, concepts and technological aspects, as well as the procedures followed by the regulatory body for assessing applications for authorization, for inspecting facilities and activities, and for enforcing regulatory requirements."*
(3)	**BASIS: GSG-12 para. 6.24 states that "***The introduction of new types of facilities or new activities, the introduction of novel technologies, the ageing of facilities or the passage of a facility to another stage of its lifetime should be considered in the planning of competences and in the adaptation of training programmes."*
R3	**Recommendation: NDK should establish a process that requires all staff to be periodically retrained on various subjects, as appropriate, to maintain the necessary competence and skills of those staff.**
S4	**Suggestion: NDK should consider enhancing its Training Plan to include new types of facilities or new activities, and the introduction of novel technologies.**
S5	**Suggestion: NDK should consider completing their position description analysis and implementing an individual performance management system to evaluate staff competence and provide staff feedback on expectations.**

The Workforce Plan includes good performance as it indicates that most of the in-service training is provided by staff of the Authority, which provides many opportunities for knowledge transfer between NDK staff.

3.4. LIAISON WITH ADVISORY BODIES AND SUPPORT ORGANIZATIONS

Typically, government organizations within Türkiye are expected to obtain goods and services using the national procurement system and law. Given the unique challenges associated with obtaining the knowledge and skills to advise NDK regarding engineering and science, NRL 7381 establishes a joint stock company, NUTED, over which NDK maintains ownership control. At the present time, NDK owns 100% of the stock of NUTED. In practice, the relationship is most similar to a customer (NDK) and a consultant/contractor (NUTED). NDK issues specific requests for services (tasks) to NUTED. NUTED responds with an estimate for providing the services. If acceptable, NDK enters into an agreement with NUTED based on the estimate.

NDK obtains a wide array of services from NUTED to supplement their own staff experts in the areas of authorization, inspection, and other areas of consultation.

Although NDK procedures require NDK staff to lead authorizations and inspections and to make all final decisions, more could be done to document how NDK ensures the adequacy of NUTEDs products.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NUTED provides services to NDK including review and assessment, training, and inspection support activities. NDK has not fully documented the process to assess services provided by NUTED.*	
(1)	**BASIS: GSR Part 1 (Rev.1) Requirement 20 states that** *"The regulatory body shall obtain technical or other expert professional advice or services as necessary in support of its regulatory functions, but this shall not relieve the regulatory body of its assigned responsibilities."*
(2)	**BASIS: GSR Part 1 (Rev.1) para. 4.22 states that** *"The obtaining of advice and assistance does not relieve the regulatory body of its assigned responsibilities. The regulatory body shall have adequate core competence to make informed decisions. In making decisions, the regulatory body shall have the necessary means to assess advice provided by advisory bodies and information submitted by authorized parties and applicants."*
(3)	**BASIS: GSG-12 para. 3.19 states that** *"Where external expert support is used, the regulatory body should still ensure that sufficient internal staff are available, having the capability to determine the need for and extent of external expert support, and also to evaluate the adequacy of any advice or services provided. Responsibilities for fulfilling core regulatory functions should not be delegated."*
S6	**Suggestion: NDK should consider establishing a systematic process for evaluating the adequacy of advice or services provided by its TSOs to ensure that NDK has a clear understanding and knowledge of the product or service being supplied.**

As described above, NDK employs many competent staff, has recruited many future staff who are continuing their education, and obtains advice and assistance from NUTED. NRL 7381 allows NDK to recruit faculty members from academic institutions for temporary assignments. In addition, NDK significantly relies on international experts to gain additional, independent expertise to supplement their knowledge.

3.5. LIAISON BETWEEN THE REGULATORY BODY AND AUTHORIZED PARTIES

In addition to the "formal mechanisms of communication with authorized parties" stated in IAEA GSR Part 1 (Rev. 1), Requirement 21, NDK engages in additional, informal communications with authorized parties, when appropriate, to ensure that communications are both open and reasonably efficient. When these types of informal interactions occur, it is typical that more than one member of NDK is present to avoid any appearance of impropriety. In addition, these informal communications are typically only held between NDK management and authorized party management. Currently, there is no practice of holding "workshops" between the collective of authorized parties and NDK staff to discuss issues of common concern.

The authorization of NPPs within Türkiye, to provide a sufficient level of thoroughness, contain multiple layers of requirements. NDK regulation contains binding legal requirements that an authorized party must meet. Those requirements are further supplemented with the regulation of the former Turkish regulator, TAEK, and requirements of the vendor country (where analogue NPPs have previously been authorized). One challenge with this approach is that the foreign countries requirements are not binding under the law in Türkiye, an enforcement issue that NDK is trying to work through (see R23 in section 8.2).

The authorized party for each NPP under construction or in operation must maintain a reactor safety committee to evaluate all changes to the NPP and determine if the change has a safety impact. NDK resident inspectors keep track of changes and seek guidance from NDK reactor specialists about changes. In addition, the authorized party is required to submit a list of all changes monthly to NDK. This method allows NDK to oversee the decisions of the reactor safety committees and assess the appropriateness of their change assessments. Any changes deemed to have a safety impact must be submitted to NDK for approval. If approved, this permission could be granted in multiple ways including the issuance of a new license, depending on the specific request.

The IRRS team observed that NDK takes advantage of host country regulatory documents to help focus their review, especially in areas previously identified as high risk or challenging. This is considered an area of good performance.

3.6. STABILITY AND CONSISTENCY OF REGULATORY CONTROL

NDK has instituted an IMS to clarify roles and responsibilities for the leadership and staff of the Authority. This IMS is audited annually to identify areas for improvement. Although NDK's IMS continues to be under development, it provides a good foundation for the establishment of stability and consistency in the way NDK conducts its business. Module 4 contains additional insights from the IRRS team's assessment of the IMS and its contribution to the stability and consistency of regulatory control.

To ensure stability in regulatory control there are multiple steps in the evaluation of findings by knowledgeable individuals prior to the issuance of violations. For example, inspectors identify findings and make suggestions to the appropriate service unit about whether to issue a violation. It is the service unit that has the authority to issue a violation (if there is no included sanction) or make a recommendation of a violation to the NDK president (if there is an included sanction).

Changes to regulation follow the legal framework established in Türkiye, which includes opportunities for interested parties (including the public) to provide input prior to the implementation of any new regulation. This allows NDK to understand the impacts of any new regulation and to balance the benefits of safety enhancements when making modifications to well established practices.

3.7. SAFETY RELATED RECORDS

NDK maintains all the types of safety-related records defined in the IAEA standards in multiple electronic and physical files. The location of and processes associated with creating, maintaining, and archiving these records is maintained within its IMS. NDK maintains an electronic document management system for the storage of its correspondence, inspection reports, and decision documents for rapid retrieval. Further, in compliance with national law within Türkiye, NDK transfers certain records to its national archive according to required schedules. This is an electronic process managed by the administrative support staff of the Authority.

Authorized parties are required by NDK regulation to maintain adequate records that are appropriate and graded to the individual authorized party.

3.8. COMMUNICATION AND CONSULTATION WITH INTERESTED PARTIES

In the development of NDK's regulations, there are requirements for making drafts available for interested parties, including members of the public, to provide feedback on those drafts for consideration in the final regulation. The IRRS team also evaluated the interactions between NDK and The Disaster and Emergency Management Presidency, reporting to the Ministry of Interior in relation to the responsibility to inform the public regarding radiation risks in an emergency. As a result, the IRRS team is satisfied that NDKs processes are designed to inform interested parties, the public and the news media about the radiation risks associated with facilities and activities. However, progress can be made in obtaining input from the public

and informing the public regarding both the regulatory process and decisions made by NDK. This was acknowledged in NDK's action plan.

There is currently no public participation in the legal framework of Türkiye for NDK or any other regulatory body. However, the IRRS team was informed that the 10th Development Plan (2014-2018) (approved by the Grand National Assembly of Türkiye on 2 July 2013 Decision No:1041), 792. "Policies for storage, management, elimination of radioactive wastes will be formed taking into consideration the issues of transparency and reliable informing of the public."

Currently, if a member of the public wants access to an NDK document (e.g., an inspection report) they must make a request of the Authority and if that document has no sensitive information, it can be released to that individual. Additional information (e.g., violations issued by NDK) could be published on the NDK website to build public trust in the NDK.

A general recommendation (see R2) related to communication with the public can be found in section 1.2 of this report.

3.9. SUMMARY

In the relatively short period since NDK was established, the Authority has accomplished a great deal to build an organization to be effective in protecting the health of the public and the environment well into the future. PD95 incorporated most of the IAEA standards in the establishment and organization of NDK which created a strong foundation for the Authority to build upon. In addition, NDK is making strides in several different areas: strategic planning and measuring, workforce planning, training planning, and establishing a consistent system for implementing its regulatory processes.

NDK has been successful in staffing the Authority with newly educated recruits and should consider, as it matures, how to maintain competency and experience for its long-term needs. Additionally, it is important to regularly assess the competence of all staff to identify developmental needs that they have and ensure that all staff remain competent in both administrative and technical skills to be effective in completing the Authority's objectives.

A focus on public access to decisions and actions by NDK can build more trust for both the Authority and the authorized parties that they regulate.

4. MANAGEMENT OF THE REGULATORY BODY

4.1. RESPONSIBILITY AND LEADERSHIP FOR SAFETY

NDK top management demonstrated leadership and commitment to safety by defining and appointing management to establish an integrated management system (IMS) and later procured technical support for the development of the IMS.

In 2020, NDK conducted studies to prepare a strategic plan for the period of 2021-2025 and to determine the mission, vision, corporate values, and principles of the Authority. As a result, the goals, objectives, and activities to be implemented within the scope of the strategic plan and the performance indicators to be considered in their evaluation have been determined.

NDK promotes a questioning and learning attitude by providing trainings internally and abroad and by providing maximum possible participation to the decision-making activities, starting from the lowest level.

All above indicate that NDK is in compliance with GSR Part 2, Requirement 2, Paragraph 3.2. However, there is no indication how NDK ensures that safety is an overriding priority and acknowledging that safety encompasses interactions between people, technology and the organization as required by GSR Part 2, Requirement 2, Paragraph 3.1 (a) and (b).

During the IRRS mission, NDK addressed the abovementioned issue by updating the Integrated Management System Implementation Guide.

4.2. RESPONSIBILITY FOR INTEGRATION OF SAFETY INTO THE MANAGEMENT SYSTEM

Senior management fulfils the responsibility of establishing, implementing, maintaining, and continuously improving a management system to ensure safety through the Department of Strategy Development. According to PD 95, one of the duties of this department is "Establishing a performance and efficiency-based management system in the Authority, determining job descriptions and work and procedures flows, carrying out or getting work done for the development and improvement of business processes." These responsibilities are carried out by a group under the department with the contribution of appointed staff from each department of NDK but there is no indication that senior management retains accountability for the management system even where individuals are assigned responsibility for coordinating the development, application, and maintenance of the management system.

During the IRRS mission, NDK addressed the abovementioned issue by updating the Integrated Management System Implementation Guide.

4.3. THE MANAGEMENT SYSTEM

As stipulated in NRL 7381, NDK gives priority to safety and security included in the IMS. The establishment of NDK's IMS, also integrates occupational health and safety, quality, budget, and accounting elements in accordance with ISO Standards.

NDK's Integrated Management System has been certified by ISO 9001:2015 on 20 April 2021 and ISO 45001:2018 on 20 April 2021.

Arrangements in the management system for the resolution of conflicts arising in decision making processes, according to NDK, are defined in PD 95 but the IRRS team did not identify these arrangements in any documentation of its management system.

Although a graded approach has been included in an IMS policy statement that NDK use this approach in all its activities, it is not clear where the criteria used to grade is documented.

The IRRS team noted that the documentation of the management system covers most of NDK's activities, but improvements can still be made. This was acknowledged in NDK's Action Plan.

The documentation of the management system is controlled, and versions are tracked. Documents can only be created and revised by people assigned with editorial rights. All revised documents undergo a re-approval depending on their relevance by the president, vice president or departments heads.

NDK Archives are subject of the general regulations of the government. Procedures and principles regarding the issuance of documents formed as a result of the work and transactions of public institutions and organizations, ensuring their protection under the necessary conditions and preventing their loss due to any reason are regulated by Regulation on State Archive Services.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK's integrated management system does not contain procedures for the resolution of conflicts arising in the decision-making process and there is no documented guidance or criteria on how to apply the graded approach to NDK's regulatory functions.*	
(1)	**BASIS: GSR Part 2 para. 4.10 states that** *"Arrangements shall be made in the management system for the resolution of conflicts arising in decision making processes".*
(2)	**BASIS: GSR Part 2 para. 4.15 states that** *"The criteria used to grade the development and application of the management system shall be documented in the management system."*
(3)	**BASIS: GSR Part 2 Requirement 8 states that** *"The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use."*
R4	**Recommendation: NDK should update the management system documentation to address the resolution of conflicts arising in the decision-making process and define criteria on how to apply a graded approach to its regulatory functions.**

4.4. MANAGEMENT OF RESOURCES

The management of NDK human and financial resources is handled by the Department of Support Services, which in June 2022 published the first NDK Workforce Plan. In addition, the first NDK Training Plan has been developed in 2022. Also, as part of personnel training, 132 graduates were sent abroad for higher degree education on NDK scholarship. The annual training program is approved by the Nuclear Regulatory Authority Board and personnel are trained in accordance with this program. The annual budget of the NDK is accepted by the Nuclear Regulatory Authority Board and it is presented and defended in the Grand National Assembly of Türkiye for approval by MENR.

The IRRS team was informed that despite this, there is no direct provision regarding evaluating the competence on leadership for any managerial level and one of the requirements is for leaders to be an example figure in their area of expertise. The issue of assessing and maintaining competence of both leadership and staff is addressed more generally in section 3.3 "Staffing and Competency of the Regulatory Body" (see recommendation R4 in section 3.3).

4.5. MANAGEMENT OF PROCESSES AND ACTIVITIES

The IMS contains three different types of processes: core processes, management processes, and supporting processes. The documentation of the IMS mentions five core processes: Regulation, Authorization, Inspection, Enforcement, Emergency Preparedness and Response.

However, the IAEA general safety guide GSG-13 suggests seven core processes including "Review and assessment of facilities and activities" and "Communication and consultation with interested parties" which also are supported by requirements of GSR Part 1 (Rev. 1). Although the IRRS team was informed that review and assessment process is part of authorization process, GSR Part 1 (Rev. 1) Requirement 25

requires that review and assessment shall be performed prior authorization. The IRRS team suggested that the review and assessment process be independent from authorization process.

The activities related to the goods and services and infrastructure purchased by the relevant departments of NDK are carried out within the scope of the Public Procurement Legislation. However, procurement of goods, services and consultancy services related to regulation and supervision of NDK, survey, service and consultancy services related to field and feasibility studies within the scope of nuclear power plant projects can be made directly by NDK.

The IRRS team was also informed that the procedure related to monitoring and managing the items, products and services that may influence safety is "Procedures and Principles Regarding NDK Purchasing Transactions" which is not part of the IMS yet. NDK intends to integrate the procurement of items and services related to safety in its management system.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Although NDK's IMS includes documentation of "Review and assessment of facilities and activities" and "Communication and consultation with interested parties" processes, they are not considered as core processes as suggested in GSG-13. In addition, there is no provision regarding procurement of items and services related to safety in the IMS.*	
(1)	**BASIS: GSR Part 2 Requirement 25 states that** *"The regulatory body shall review and assess relevant information — whether submitted by the authorized party or the vendor, compiled by the regulatory body, or obtained from elsewhere — to determine whether facilities and activities comply with regulatory requirements and the conditions specified in the authorization. This review and assessment of information shall be performed prior to authorization and again over the lifetime of the facility or the duration of the activity, as specified in regulations promulgated by the regulatory body or in the authorization".*
(2)	**BASIS: GSR Part 2 Requirement 36 states that** *"The regulatory body shall promote the establishment of appropriate means of informing and consulting interested parties and the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body."*
(3)	**BASIS: GSG-13 Section 3 states that** *" ... The regulatory body carries out review and assessment of information relevant to safety ... Finally, communication and consultation with interested parties are important throughout the lifetime of the facility or duration of the activity to both inform and obtain the views of the public and other interested parties."*
(4)	**BASIS: GSR Part 2 Requirement 11 states that** *"The organization shall put in place arrangements with vendors, contractors and suppliers for specifying, monitoring and managing the supply to it of items, products and services that may influence safety."*
S7	**Suggestion: NDK should consider incorporating in its Integrated Management System the following processes:** - **review and assessment of facilities and activities;** - **communication and consultation with interested parties; and** - **procurement of items and services related to safety.**

4.6. CULTURE FOR SAFETY

NDK commitments stipulated in the IMS Policy indicate the importance given by senior management to safety culture. However, NDK recognizes that being a newly established IMS, the means, and procedures for enhancing the safety culture of staff is limited with the module on Regulatory Approach included in the Training Program of NDK (approved in February 2022) which has just been initiated.

NDK mentioned that safety culture is part of the decision-making process, and in any other regulatory activity carried out by the departments. In addition, NDK's target is to increase its efficiency, with a focus on safety and security, which demonstrates their support in fostering a strong safety and security culture through the development of safety attitudes and behaviours of individuals and teams.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The means and procedures for enhancing the safety culture of staff is limited.*	
(1)	**BASIS: GSR Part 2 para 5.2 (f) states that** *"Senior managers and all other managers shall advocate and support: The means by which the organization seeks to enhance safety and to foster and sustain a strong safety culture, and using a systemic approach (i.e. an approach relating to the system as a whole in which the interactions between technical, human and organizational factors are duly considered)".*
S8	**Suggestion: NDK should consider institutionalising management support of the means by which the organization enhances safety and fosters a strong safety culture.**

4.7. MEASUREMENT, ASSESSMENT AND IMPROVEMENT

The NDK Integrated Management System is monitored to ensure compliance with the objectives, targets, ISO 9001:2015, and ISO 45001:2018 through an annual internal audit to identify weaknesses and continuous improvement and a management review at planned intervals to ensure its continuity, suitability, adequacy, and effectiveness. Also, the IRRS team was informed that the overall management system of the regulatory body is subject to evaluation by independent third parties as ISO audits, every year.

The IRRS team was informed that the improvement of the management system needs to continue, in particular in terms of staff recognizing its importance and using effectively in their activities. This was acknowledged in the NDK action plan.

Furthermore, NDK recognized the need to improve measuring the effectiveness of its management system (e.g. revising its management review cycle). and tools for the assessment of the safety culture and leadership for safety needed to be developed in IMS. This was acknowledged in the NDK action plan.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK is not consistently measuring the effectiveness of its management system in order to improve safety performance.*	
(1)	**BASIS: GSR Part 2 Requirement 13 states that** *"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety. "*
S9	**Suggestion: NDK should consider improving the measurement of the effectiveness of its management system in order to improve safety performance.**
Observation: *NDK has started a process for the development and strengthening of a common understanding of safety. However, assessment of leadership for safety and of safety culture has not yet been conducted.*	
(1)	**BASIS: GSR Part 2 Requirement 14 states that** *"Senior management shall regularly commission assessments of leadership for safety and of safety culture in its own organization."*
R5	**Recommendation: NDK should regularly conduct assessments of leadership for safety and of safety culture.**

4.8. SUMMARY

NDK considered that the implementation of its management system is an important element for the effective realization of the duties and strategic goals and objectives.

The IRRS team noted several areas of improvement concerning the comprehensiveness of the existing management systems with reference to IAEA Safety Standards GSR Part 1 (Rev. 1) and GSR Part 2. As examples, these should include developing and implementing processes, regular assessment of safety culture, review and assessment of facilities and activities, communication, and consultation with interested parties, and updating and improving NDK's overall documentation of the management system.

5. AUTHORIZATION

5.1. GENERIC ISSUES

The legal basis for authorization of nuclear facilities and their related activities is NRL 7381, which stipulates mandatory requirements related to restriction of the rights of people or legal person. PD 95 stipulates the establishment of NDK and its role, responsibilities and organization.

Authorizations stipulated in NRL 7381 are licenses, permits and certificates. Licenses are required for operation of a nuclear facility, radiation facility, radioactive waste facility and radiation applications. For nuclear facilities, permits are required for preparation of the site, manufacturing of the equipment determined by NDK, construction of the facility, commissioning, decommissioning, re-start of operation, and modifications related to safety and security. NRL 7381 also defines in what cases permits are required for other nuclear facilities. A certificate is required for those who provide training on radiation protection, provide services for radiation protection, manufacture equipment and so on. The requirements stipulated in NRL 7381 cover different types of authorizations for the different stages in the lifetime of a facility or the duration of an activity.

The transition provision of NRL 7381 allows existing regulations to be implemented until the regulations specified in NRL 7381 enter into force and undecided current authorization applications will be concluded in accordance with the provisions of the regulations in force before the effective date of NRL 7381. Based on this transition provision, the Decree on Licensing of Nuclear Installations is still applied in the processes and the procedures for authorizations. Because the Decree on Licensing of Nuclear Installations is established based on the previous law, which was replaced by NRL 7381, authorizations stipulated in the Decree are different from those stipulated in NRL 7381.

The information needed to be submitted to NDK including safety assessments and procedures for submission are stipulated in the Decree on Licensing of Nuclear Installations. Based on NRL 7381, NDK is responsible for conducting review and assessment for authorizations.

The Decree on Licensing of Nuclear Installations categorizes nuclear installations into two groups, which are nuclear reactor facilities and nuclear fuel cycle facilities. Each group of facilities also has sub-groups of 7 or 5 types of facilities, respectively. Authorizations are to be granted for each type of facility, but the same provisions of the Decree are applied to the facilities in the same category. Regulations which are applied to a specific facility are limited to nuclear power plants, research reactors and nuclear fuel cycle facilities.

NDK can specify conditions necessary for safety when NDK grants authorizations based on NRL 7381. Provisions for cancellation, suspension or restriction of the authorizations are stipulated in NRL 7381.

Procedures for appealing against NDK's decisions including specifying conditions are not provided in NRL 7381 but are subject to the general legal system.

The legal basis which allows NDK to require authorized parties to modify an authorization is not stipulated in NRL 7381, but there is a provision in PD 95 stipulating that duties and authorities of NDK include defining and modifying authorizations.

The IRRS team was informed that the Decree on Licensing of Nuclear Installations will be replaced by the draft "Regulation on Authorizations Regarding Nuclear Installations" (drafted consistent with NRL 7381 and PD 95) and the Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities (Published in 2022). Currently, the Decree is applied to the processes and the procedures for authorizations even though authorizations stipulated in the Decree and the Law are different.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Authorizations stipulated in the Decree on Licensing of Nuclear Installations are different from those stipulated in NRL 7381.*	
(1)	**BASIS: GSR Part 1 para. 4.33. states that** *"Prior to the granting of an authorization, the applicant shall be required to submit a safety assessment, which shall be reviewed and assessed by the regulatory body in accordance with clearly specified procedures."*
(2)	**BASIS: GSR Part 1 para. 4.34. states that** *"The regulatory body shall issue guidance on the format and content of the documents to be submitted by the applicant in support of an application for an authorization."*
R6	**Recommendation: NDK should finalize the draft Regulation on Authorizations Regarding Nuclear Installations and implement it as early as practicable.**

NDK is in the process of establishing necessary regulations consistent with IAEA Safety Standards which will establish the criteria and bases for granting authorizations. It is important for NDK to finalize these regulations on priority (also see recommendation R20 in section 9.1).

5.2. AUTHORIZATION OF NUCLEAR POWER PLANTS

Authorizations of nuclear power plant are granted according to the Decree on Licensing of Nuclear Installations. This Decree stipulates licensing stages for NPPs including Site Licence, Construction License and Operation Licence with sub-stages of permissions. The authorization for equipment manufacturing is covered under the regulation Regarding Equipment Procurement Process and Approval of Manufacturers for Nuclear Facilities. This authorization consists of two approvals: manufacturing approval is required to start manufacturing equipment important to safety before limited work permit is given because of the long procurement period and manufacturers approval is required when manufacturer is going to take part in the equipment procurement process. In addition to these, operating personnel of nuclear power plants are required to be certified based on Regulation on the Operating Organization, Qualifications and Training of Operating Personnel, and Licenses of Operating Personnel in Nuclear Plants.

5.3. AUTHORIZATION OF RESEARCH REACTORS

There are two research reactors located in Istanbul, Türkiye, TRIGA MARK-II and 5 MW Pool Type Reactor, TR2. The TRIGA Mark-II is in the operational stage and the other in extended shutdown for a number of years. The operational license of the TRIGA Mark-II research reactor was issued in 1979. In 2010, regulatory guides have been issued on the content of layout and safety analysis for research reactors. The approval of research reactors is carried out in accordance with the "Decree on Licensing of Nuclear Installations (CD No. 83/7405)". This decree covers the various stages of licensing of nuclear facilities and provides a graded procedure for approval. Nuclear Law No. 7381 (NRL 7381) states that it is mandatory to obtain a license from the authority to operate a nuclear facility and that applicants for approval are obliged to provide all the information and documents requested by the authority for approval in the required format and that the contents and the authorization issued cannot be transferred. The NDK has the legal right to determine the conditions of approval required for the approval of a nuclear installation, which includes the terms relating to safety, security, and nuclear safety in accordance with Article 4(5) of this Law. In addition, NRL 7381 states that regulatory controls and exemptions relating to the limits and conditions of these exemptions are determined by regulations by the authorities on the basis of graded procedures, so that safety requirements can be met. The Regulation on Operating Organization, Personnel Qualification and Operating Personnel Licensing for Research Reactors, 2005" (OG No. 25973) requires the approval of the employees of the reactor operator or senior operator by the regulatory body. According to the Regulation, the regulatory body issues personnel licences to operators and senior operators for four years and renewal

of the licences for the same period is required by Article 36 of the Regulation. There is no regulatory obligation to submit updated safety analysis reports and periodic safety review reports to the authority. The licensee is required to submit an annual report to the regulatory body detailing environmental monitoring and individual dose reports in accordance with the requirements of the "Regulation on records and reports in research reactor" (OG No. 27144) (see recommendation R10 in section 6.1.1).

5.4. AUTHORIZATION OF RADIOACTIVE WASTE MANAGEMENT FACILITIES

According to NRL 7381, a license is needed for the operation of a radioactive waste facility, whereas a permit is required for construction, commissioning, decommissioning, closure and any modifications related to safety and security of the installation. According to NRL 7381, siting is subject to the approval of NDK.

Although the "Regulation on Radioactive Waste Management" states that public and stakeholders shall be informed in an effective manner, interested parties are not involved in the decision-making process for licensing activities and facilities, with the exception of other authorities having responsibilities in the process of licensing (eg Ministry of Environment, Urbanization and Climate Change (MoEUC) for Environmental Impact Assessment (EIA)). Interested parties are however concerned in the process of developing regulations, as well as in the EIA process from the MoEUC. The need for involving interested parties in the decision-making process was also recognized in the National Radioactive Waste Management Plan (NRWMP), stating that this would imply a modification in the legislation. In order to allow interested parties to provide their input in the decision-making process for licensing, legislation has to be modified at governmental level (see Rxx in section 1.2).

The recently published (July 2022) "Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities" establishes the procedures and principles regarding the authorization of activities in radioactive waste facilities (processing, storage, disposal). This regulation deals with responsibilities, principles and authorizations needed in the phases of the lifetime of the facility. It also specifies for each step (from siting up to clearance of regulatory control) the list of documents to be submitted.

The internal "Procedure for Authorization of Radioactive Waste Management Facilities" (2021) is used when authorizing Waste Management Facilities.

5.5. AUTHORIZATION OF RADIATION SOURCES FACILITIES AND ACTIVITIES

Radiation sources facilities and activities are licensed in accordance with NRL 7381 and the 'Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices'. Authorization of radiation sources facilities and activities is carried out by NDK's Department of Radiation Applications in accordance with the 'Procedure on Licensing of Radiation Facilities and Applications' and 'Procedure on Permits and Approvals for Radiation Facilities and Applications'.

The regulation establishes three groups of facilities and activities based on the risks associated with the facilities and activities. The first group includes irradiation facilities, accelerator facilities, standard calibration facilities and radiation source production and preparation facilities, which in NDK terminology are defined as 'facilities'. The rest of facilities and activities included in first, second and third group are defined as 'practices'. A license is issued for all radiation sources facilities and activities and is valid for five years.

In addition to license requirements, the regulation sets out the requirements for approvals and permits for different stages in the lifetime of the facility or duration of an activity – such as field approval, spatial design approval, clearance and release approval, commissioning permit, and decommissioning permit. For example, field approval must be received for gamma irradiation facilities and the commissioning permit must be received for gamma irradiation facilities, accelerator facilities, radiopharmaceutical preparation facilities, radioisotope generator production and preparation facilities, proton therapy facilities, and

standard calibration facilities. The IRRS team was informed that by the end of 2021, there were around 20000 licensees, 21 of them facilities and the rest of other practices as categorized in the regulations.

The regulation also prescribes requirements for exemption from regulatory requirements of radiation sources (both radioactive sources and x-ray generators). In this regulation, radioactive sources are categorized in five categories. The requirements for import and export state that for sources imported from abroad a permit must be received in addition to the license received for use of the radioactive sources or license for import and export of the sources.

Requirements for license amendment due to modifications in a facility or conduct of activity, and for renewal of a license are set in these regulations. Control of radiation sources is ensured until the end of the lifetime of the source through the different authorization mechanisms from the time sources are imported until they are exported out of the country or transferred to the waste facility.

Content of the authorization application for radiation sources facilities and activities is prescribed in the regulations and in more detail in the documents on "Procedures and Principles". Information on the content of the application for different types of facilities and activities is provided and is easily accessible by the applicant on the NDK website.

NRL 7381 prescribes the responsibility of authorized person to perform safety and security assessments. The regulations set out obligations of the licensee including to ensure that the necessary precautions are taken by evaluating the radiological and non-radiological risks for the normal working conditions and possible accidents related to the radiation facilities and activities. Requirements for the authorization state that results on pre-license tests have to be included in the evaluation report submitted by applicant for a commissioning permit. The IRRS team was informed that this evaluation report is the equivalent of a safety assessment and that, since issuance of the regulations, only one application has been received. In this one case NDK provided the applicant with special guidance for the content of the safety assessment report considering that there are no specific requirements in regulations and guides for carrying out the safety assessment (see recommendation R22 in section 9.5).

5.6. AUTHORIZATION OF DECOMMISSIONING ACTIVITIES

At present no specific regulation exist dealing with decommissioning of nuclear facilities.

According to NRL7381 no authorization can be granted for the operation of a facility without providing the adequacy of the guarantee by the Accounts Management Board (MoENS), in case of an early decommissioning of the facility.

According to the "Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities", decommissioning and closure processes in radioactive waste facilities are taken into consideration when designing the facility. The "Regulation on Special Principles for the Safety of Nuclear Fuel Cycle Facilities (NFCF)" determines that during the design of a fuel cycle facility, necessary measures shall be taken for facilitating the decommissioning process.

"Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices" regulates decommissioning, including issuing decommissioning permit, and requiring the decommissioning plan to be included in the radiation protection programme submitted by the applicant for the authorization to use the radioactive source.

5.7. AUTHORIZATION OF TRANSPORT

PD 56 gives regulatory authority to the Ministry of Transport and Infrastructure for the regulation of transport activities through the following international regulations: transport by road through the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), by railway through the International Regulations on Rail Transport of Dangerous Goods (RID), by sea through the International

Maritime Dangerous Goods-code (IMDG-code) and by air through the International Civil Aviation Organization's technical instructions (ICAO-TI).

NDK is the competent authority for radioactive material for all modes of transport concerning these international agreements and regulations and for issuing approvals for transport of radioactive material. NDK and the Ministry of Transport and Infrastructure have a close cooperation in transport matters. Authorization requirements for transport of radioactive material is stated in NRL 7381, which states that the activities that require permission from the NDK are export, import, transportation and transit of radioactive material. Transportation of radioactive sources also requires a licence from NDK. The applicant applies to NDK for a transport license electronically and NDK initially performs a pre-authorization inspection of the facility or activity, usually by the technical support organisation NUTED. A radiation protection plan is included in the application and checks are made of the person responsible for radiation safety as well as the procedures for transport activities. If the application is complete and the pre-authorization inspection result is acceptable, NDK issues a license for transport, which normally is valid for five years. After the license is issued another inspection is performed, primarily to check for updates of the radiation protection plan, but this checklist is more comprehensive and detailed.

For the transport of High Activity Sealed Sources (HASS) an additional permit is needed, primarily for the security of the transport. For transportation of fissile materials, it is necessary to obtain only a permit from the NDK that is particular to that fissile material by fulfilling the safety, security and radiation protection requirements.

The IRRS team was informed that there are 10 to 15 applications for transport license every year and about 54 companies are authorized by NDK to transport radioactive material. In addition there are also about 2500 applications of permits for the import, export, transportation or transit of radioactive material.

The IRRS team was informed that no new package design applications have been submitted to NDK for approval, although NDK has approved (validating the original approval) imported package designs, as required by the regulations for transport of radioactive material. The shipment of these packages has also been approved by NDK. A recommendation related to review and assessment of package designs has been provided in section 6.7.

5.8. AUTHORIZATION ISSUES FOR OCCUPATIONAL EXPOSURE

Occupational exposure is reviewed and assessed during the authorization of facilities and activities. One of the main documents reviewed in an application for authorization is the radiation protection programme which includes information on justification and optimization of radiation protection for the radiation facilities and activities. Content of radiation protection programme is prescribed in regulations, as well as in several practice specific guides, e.g., for nuclear medicine, industrial radiography, medical radiology, and veterinary medicine.

Regarding optimization of radiation protection, the optimization principle is established in the regulations. As a tool to optimize occupational exposure, "Regulation on Radiation Safety" establishes reference levels to be applied to radiation facilities and activities, while "Regulation on Radiation Protection in Nuclear Facilities" states that the reference levels will be set by the licensee and approved by NDK.

Dose limits are established in various legal provisions (Radiation Safety Decree, Regulation on Radiation Safety, Regulation on Radiation Protection in Nuclear Facilities, and Regulation on Radiology Services). The dose limits established in Radiation Safety Decree and in Regulation on Radiation Safety are not fully compatible with Schedule III of GSR Part 3.

The dose limit for radiation workers established on Decree on Radiation Safety is 5 rem per annum, for the whole-body dose due to internal and external sources, which is outdated and requires to be updated to ensure compatibility with the dose limits on GSR Part 3.

The dose limit for the lens of the eye established for radiation workers in Regulation on Radiation Safety is 150 mSv per year, whereas Schedule III of GSR Part 3 establishes a limit of 20 mSv averaged over 5 years, with a maximum of 50 mSv in a single year.

The IRRS Team was informed that NDK is currently drafting a new Regulation on Radiation Protection that will merge the existing Regulations on Radiation Safety, Regulation on Radiation Protection in Nuclear Facilities and Regulation on Protection of Outside Workers from Risks of Ionizing Radiation in Controlled Areas.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The dose limits on Radiation Safety Decree and Regulation on Radiation Safety are not compatible with the dose limits in Schedule III of GSR Part 3.*	
(1)	**BASIS: GSR Part 3 para. 3.26 states that** *"The Government or the Regulatory Body shall establish, and the Regulatory Body shall enforce compliance with the dose limits specified in Schedule III for occupational exposures and public exposures in planned exposure situations."*
R7	**Recommendation: NDK should update the dose limits to ensure compatibility with IAEA Safety Standards.**

The regulations include provisions to establish the responsibilities of licensees, external companies and workers regarding protection against the risks of ionizing radiation in planned exposure situations. The licensee is responsible for taking the necessary measures to protect the workers and inform the workers about the risks of working in controlled areas.

For external workers in controlled areas, the regulations establish the need to have a written arrangement between the licensee and the external company, ensuring that the external workers are protected from the risks of occupational exposure.

The regulations do not require any consultation between employers, licensees and workers in the processes of establishing the local rules and procedures necessary for the protection of workers and other persons.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The regulations do not have any provisions in place to articulate the consultation of workers, neither directly nor through their representatives in establishing and developing the local rules and procedures necessary for the protection and safety for workers and other persons.*	
(1)	**BASIS: GSR Part 3 para. 3.94(a) states that** *"Employers, registrants and licensees, in consultation with workers, or through their representatives, where appropriate:* *(a) Shall establish in writing local rules and procedures that are necessary for protection and safety of workers and other persons."*
R8	**Recommendation: NDK should establish regulatory provisions to ensure the consultation of workers by employers, registrants and licensees in the processes of developing the local rules necessary for protection and safety of workers and other persons.**

Dosimetry services need to be authorized by NDK, and the authorization is renewed every five years. There are currently three private organizations and one state-owned organization (TENMAK) providing dosimetry service authorized by NDK.

Radiation Protection Officers need to undertake an examination at TENMAK, after training in an authorized institution. The IRRS Team was informed that the current regulation has to be revised for NDK to take the responsibility of examining the candidates to Radiation Protection Officer.

5.9. AUTHORIZATION ISSUES FOR MEDICAL EXPOSURE

The responsibilities for regulating safety and security of sources in medical applications have been assigned to the NDK. However, the minimum requirements for radiation sources and equipment used for medical purposes, quality, market surveillance and inspection, and the issues related to the protection of patients and carers and comforters from radiation are regulated by the MoH, with the approval of the NDK. The responsibilities of regulatory oversight of medical exposure were legally transferred from NDK to the MoH through PD-95 in March 2022.

The authorization by NDK is about safety of the facility and the sources used for medical facility and it takes into account only some aspects of medical exposure that need consideration during the authorization process. The authorization given by the MoH for medical practices does not fully address all requirements in GSR Part 3 on medical exposure, as current regulations issued by the MoH do not establish these requirements. A recommendation related to updating requirements for medical exposure is given in section 9.9 (see recommendation R24 in section 9.9).

The Regulation on Radiology Services issued by MoH in April 2022 includes provision that if the licence granted by the NDK expires or is revoked, the MoH should be informed within five working days at the latest. However, there is no requirement that NDK should be informed if the authorization issued by the MoH has expired or is revoked. A recommendation related to establishing a formal cooperation and coordination arrangement between the MoH and NDK for effective regulatory oversight facilities and activities is given in Section 7.9 (see recommendation R18 in section 7.9).

5.10. AUTHORIZATION ISSUES FOR PUBLIC EXPOSURE

Dose limits to the public are established in various regulations (Radiation Safety Decree, Regulation on Radiation Safety, Regulation on Radiation Protection in Nuclear Facilities). The dose limits established in Radiation Safety Decree and in Regulation on Radiation Safety are not fully compatible with Schedule III of GSR Part 3. A recommendation related to this issue is given in RXXX

In nuclear facilities, a radiological environmental monitoring program is required from the licensee to be submitted during application for construction license to assess the public dose during operation and accidents. If the programme is accepted by NDK, according to the Regulation on Radiation Protection in Nuclear Facilities, it needs to be implemented starting two years before the facility is commissioned This regulation requires continuous monitoring of the releases from the facility by stationary measuring systems and by analysing samples in the laboratory.

For the waste management facility, the IRRS team was informed that the licensee carries out routine monitoring of the facility discharges and analyses environment samples, which are reported to NDK.

NDK has issued the “Regulation on National Radiation Monitoring and Radiation Control” in 2022, which provides the procedures and principles regarding the execution of national radiation monitoring and radiation control activities for ionizing radiation, and the duties and responsibilities of relevant persons, institutions and organizations. NDK is required to prepare and implement, or ensure the implementation of, the National Radiation Monitoring Master Plan, which is the basis for determining the policy and strategy regarding national radiation monitoring activities.

Existing exposure situations are regulated by related institutions identified in the Master Plan by taking the appropriate opinion of NDK in accordance with the. PD 95 and the Regulation on Radiation Safety.

NDK is yet to issue approval for the remediation of the existing exposure situation at the contaminated dumpsite at Gaziemir, Izmir. However, it has addressed the rules and principles regarding the authorization of environmental remediation activities of areas exposed to radioactive contamination in accordance with its Regulation on Authorization of Environmental Remediation Activities of Areas Exposed to Radioactive Contamination) issued in 2022.

The principles to remove a site from the regulatory control are addressed in the Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control. This regulation specifies the dose constraint to critical groups for removing the site from the regulatory control as 300 µSv/year.

Exposure to natural radiation due to radon are required to be regulated by relevant public authorities and organizations, in line with the new Regulation. According to the Regulation on Radiation Safety, the permissible annual average concentration level for radon gas is 400 Bq/m3 in houses and 1000 Bq/m3 for workplaces. Technical reports on radon measurements in houses and on indoor radon gases were published in 2014 and 2012 respectively by the Turkish Atomic Energy Authority which showed that the Radon levels were well below permissible levels.

NDK has issued Authorisation for supplier of one Consumer product of a Gaseous Tritium Light Source and one non-medical human scanners after verification of the justification and design related issues.

NDK issues spatial(layout) approvals to new or modified high hazard radiation facilities, after due verification of public exposure considerations. The IRRS team noted that reference to the spatial approval as part of the authorization conditions could give better clarity.

The IRRS team was informed that the low power TRIGA Mark-II Research Reactor does not operate for more than about 15 hours in a year, there are no significant releases from the reactor. According to the "Regulation on Radioactive waste management", environmental monitoring programme should be applied in the operating facilities where yearly maximum doses received by critical groups exceeds 10 µSv. Hence, no environmental monitoring programme is conducted.

5.11. SUMMARY

Licences, permits and certificates are issued by NDK for NPPs, research reactors, radioactive waste management facilities, radiation sources, decommissioning and transport. However, authorizations stipulated in the Decree on Licensing of Nuclear Installations are different from those stipulated in the law. NDK is considering to finalize the draft Regulation on Authorizations Regarding Nuclear Installations and related guides.

The IRRS team also identified non-conformities with the IAEA Safety Standards regarding dose limits in occupational and public exposure and the lack of regulatory provisions to articulate the consultation of workers, in establishing and developing the local rules and procedures necessary for the protection and safety for workers and other persons.

6. REVIEW AND ASSESSMENT

6.1. GENERIC ISSUES

6.1.1. MANAGEMENT OF REVIEW AND ASSESSMENT

Review and assessment for the authorizations of nuclear installations and related activities are carried out by NDK based on the Decree on Licensing of Nuclear Installations. Information and documents needed to be submitted for authorizations by applicants are stipulated in this Decree. Another review and assessment carried out by NDK, which is regarding manufacturers, is stipulated in the Regulation Regarding Equipment Procurement Process and Approval of Manufacturers for Nuclear Facilities.

NRL 7381 stipulates graded approach as one of its general principles. There is a provision in the Decree on Licensing of Nuclear Installations which requires a graded approach, but that provision only refers to the scope of Site Reports, Preliminary Safety Analysis Reports and Final Safety Analysis Reports. The IRRS team was informed that the Draft Regulation on Authorizations Regarding Nuclear Installations defines 5 categories of nuclear installations and provides a dedicated section to each facility. Different requirements are stipulated individually in each section.

The Decree requires any modification in the facility which might affect safety to be approved by NDK and similar requirement is stipulated in the draft Regulation Regarding Authorizations Regarding Nuclear Installations. Authorization of modifications are required when safety is affected but criteria or procedure to judge which modification affects safety is not provided.

NRL 7381 requires licensees to perform safety assessments at the frequency determined by NDK but there are no provisions which clearly articulate a requirement on periodic safety review (PSR) except radioactive wase facilities. The IRRS team was informed that this issue is meant to be resolved by finalizing the draft of Regulation Regarding Authorizations Regarding Nuclear Installations and by its implementation.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *With the exception of radioactive waste facilities, there are no requirements for the periodic safety review of nuclear facilities.*	
(1)	**BASIS: GSR Part 4 Requirement 24 states that** *"The safety assessment shall be periodically reviewed and updated."*
(2)	**BASIS: GSR Part 4 para. 4.8. states that** *"The frequency at which the safety assessment shall be updated is related to the radiation risks associated with the facility or activity, and the extent to which changes are made to the facility or activity. As a minimum, the safety assessment shall be updated in the periodic safety review carried out at predefined intervals in accordance with regulatory requirements. Continuation of operation of such facilities or conduct of such activities is subject to being able to demonstrate in the reassessment, to the satisfaction of the operating organization and the regulatory body, that the safety measures in place remain adequate".*
(3)	**BASIS: GSR Part 4 para. 5.10. states that** *"The safety assessment shall be periodically reviewed and updated at predefined intervals in accordance with regulatory requirements. Periodic review may need to be carried out more frequently to take into account:* *(a) Any changes that may significantly affect the safety of the facility or activity;* *(b) Significant developments in knowledge and understanding (such as developments arising from research or operating experience);*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	(c) Emerging safety issues due to a regulatory concern or a significant incident; *(d) Safety significant modifications to the computer codes, or changes in the input data used in the safety analysis."*
(4)	**BASIS: GSR Part 1 (Rev.1) para. 4.33 states that** *"Prior to the granting of an authorization, the applicant shall be required to submit a safety assessment, which shall be reviewed and assessed by the regulatory body in accordance with clearly specified procedures. The extent of the regulatory control applied shall be commensurate with the radiation risks associated with facilities and activities, in accordance with a graded approach."*
R9	**Recommendation: NDK should establish requirements for periodic safety review and review criteria for evaluating periodic safety report of nuclear facilities according to a graded procedure.**

Review and assessment activities involving multiple departments of NDK are coordinated following IMS documents such as NTD.PR.07 Procedure for Review and Assessment and Reporting for Nuclear Facilities.

6.1.2. ORGANIZATION AND TECHNICAL RESOURCES FOR REVIEW AND ASSESSMENT

Review and assessment are performed by the Department of Nuclear Installations of NDK. If the department's capacity for the review and assessment needs to be expanded, NDK can call in additional experts from NUTED or other firms. In particular, NDK plans to involve NUTED in preparing for and conducting review and assessment of future application of operating licenses.

For more information on staffing and competence of the regulatory body see section 3.4.

6.1.3. BASES FOR REVIEW AND ASSESSMENT

PD 95 stipulates that issuing regulations regarding activities covered by NRL 7381 is one of the responsibilities of NDK. NDK has established various regulations and guides so far, but many of them need to be revised to be in line with newly enacted NRL 7381 and PD 95. Until the new regulations specified in the law enter into force, current regulations continue to be implemented based on the transition provision of NRL 7381. The Decree on Licensing of Nuclear Installations and its related regulations and guides are still used based on this provision.

Procedures to establish the bases for review and assessment of applications for nuclear power plants are stipulated in the Directive on Determination of Licensing Basis Regulations, Guides and Standards and Reference Plant for Nuclear Power Plants. This directive requires applicants who are going to construct and/or operate a nuclear power plant to propose a complete list of regulations, guides and standards forming the review and assessment basis, and this list needs to be approved by NDK at the beginning of the licensing process.

6.1.4. PERFORMANCE OF REVIEW AND ASSESSMENT

The process of review and assessment for authorizations is controlled and managed, based on IMS documents established by NDK which includes NTD.PR.07 Procedure for Review and Assessment and Reporting for Nuclear Facilities. This document specifies three detailed processes. The first process is an acceptance check. In this process, it is confirmed whether all necessary documents within the scope and contents requested by NDK are provided. The second process is a conformance review of the contents of the application to regulatory requirements. The third process is verification of information provided in the application. On-site investigation and/or cross-check calculation of safety analyses may be conducted in the third process.

6.2. REVIEW AND ASSESSMENT FOR NUCLEAR POWER PLANTS

The generic regulatory framework for nuclear installations is also applied to nuclear power plants. The regulations for review and assessment are in a transition phase and currently both the Decree on Licensing of Nuclear Installations and NRL 7381 are applied for review and assessment.

Based on the Directive on Determination of Licensing Basis Regulations, Guides and Standards and Reference Plant for Nuclear Power Plants, an applicant proposes a complete list of regulations, guides and standards which will be used as the bases for review and assessment. This proposed list needs to be approved by NDK before the licensing process begins. The proposed list consists of national regulations of Türkiye, Safety Fundamentals and requirements documents of IAEA Safety Standards, regulations in the vendor country's and third countries' regulations (in order of priority). If there are conflicts, the priority is set in the same order. In the review and assessment of the list, only the conformance of the preparation process to the Directive is checked.

Based on the Directive, the applicant also proposes a reference plant that needs to be approved by NDK. In the process of approving the reference plant, a report containing detailed information on the reference plant, justifications for selection, comparison between the reference plant and the plant for which a license is applied, are reviewed. In review and assessment of the construction license application, information on the differences with the reference plant necessary to evaluate the effect of those difference on the safety of the plant for which a license is applied is submitted to NDK and to be used.

In review and assessment for licensing of Akkuyu nuclear power plant, documents regarding the results of level 1 and 2 probabilistic safety assessments are required to be submitted with the application for review and assessment by NDK. A provision of NRL 7381 allows NDK to request applicants to provide any information and documents necessary to confirm safety of nuclear installations.

The governments of the Russian Federation and the Republic of Türkiye signed a cooperation agreement in May 2010 providing for the construction of Akkuyu NPP comprising four power VVER-1200 reactors.

The Akkuyu NPP construction project is the world's first NPP project implemented according to the Build - Own - Operate model (BOO). The Russian nuclear manufacturer, Rosatom, will provide the four units under this BOO agreement that entails Russia funding and retaining majority ownership of the NPP. The license holder is the Akkuyu Nuclear JSC (ANAS). This project company established by the Russian party under Turkish law will construct, operate and decommission the NPP. The total project cost is estimated at 20 billion US dollars. The stake of Rosatom in the project is 99.2%. The investment will be recovered via a 15-year fixed price power purchase agreement where the Turkish Electricity Trade & Contract Corporation (TETAS) that will purchase 70% of energy produced by Akkuyu's unit 1 and 2 and 30% of unit 3 and 4 after the commencement of commercial operation.

A BOO model expands the scope of licensed activities to include design, construction, operation and decommissioning. The licensee must be able to demonstrate they are qualified to conduct all licensed activities including sufficient competent resources within the licensee's organization to oversee ('Intelligent Customer') any work it commissions externally and the subsequent flow through of the supply chain.

The IRRS team has visited the license holder of Akkuyu NPP (ANAS) at its Ankara Headquarters and was informed about its organisational structure, competencies and resources. ANAS has a total of 2300 employees working in all fields of nuclear safety. The IRRS team was informed that independent review of design changes and control of the quality of the ongoing construction work are currently the main tasks.

ANAS is the licence holder, owner and operator of Akkuyu NPP and is mainly in the hands of the vendor country. To assure the long-term sustainability of safe operation it is important to set a long-term target for having a sufficient number of Turkish employees in key plant positions, which could assure safe operation under any kind of circumstances.

There is an intensive exchange with NDK on technical issues, in particular with regard to the applicable regulations for the ongoing construction works.

6.3. REVIEW AND ASSESSMENT FOR RESEARCH REACTORS

According to NRL 7381, NDK is responsible for the review and evaluation of the safety analysis report to determine whether the regulatory requirements are applicable in accordance with NRL 7381. There are no clear requirements for periodic safety assessments of nuclear installations, but the person authorized to perform the safety assessment at the frequency determined by the authority in accordance with Article 5(1) of the Law is required. The mission team noted that NDK graded methods are applied to ensure that a review and evaluation of a facility is consistent with radiation risk. The IRRS team observed that there are no specific standard requirements or procedures for SAR or PSR review. The Decree on licensing of nuclear installations is still in force and it describes the minimum level of information for the safety assessment report and the general format and the timeline for the submission for approval of nuclear facilities. Comprehensive periodic safety reviews are not addressed by licensing decrees for nuclear installations. NDK has a process for enhancing the capabilities of its technical staff but does not consider the area of review and evaluation of the facility's safety documents, and need to consider in the skill and training plan by periodically requesting safety reports of new types of facilities or by updating the technology at another stage of its life (see suggestion S2 in section 3.3 and recommendation R10 in section 6.1.1).

6.4. REVIEW AND ASSESSMENT FOR WASTE MANAGEMENT FACILITIES

The “Procedure for Review and Assessment and Reporting for Nuclear Facilities” (NTD.PR.07) is used in reviewing and evaluating the documents submitted to the Authority, and reporting the results during the authorization process to establish or operate a nuclear facility. For the AKKUYU plant the “Preliminary Safety Analysis Report (PSAR) Waste Management Review & Assessment Guideline” is used for the evaluation of the part of the PSAR dealing specifically with waste management, whereas the “PSAR Decommissioning Review & Assessment Guideline” is used for the evaluation of the part of the PSAR dealing with decommissioning. The evaluation reports, shown to the IRRS team, refer to these guidelines.

Present regulations do not require a periodic safety review for waste management facilities. The IRRS team was informed that such requirement will be taken up in the draft of the “Regulation on Authorization of Nuclear Facilities” (see recommendation R10 in section 6.1.1). The “Regulation on Radioactive Waste Management” (2013) deal with the provision to make a periodic safety assessment of Waste Management Facilities. The “Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities” (2022) states that a periodic safety review should be made at the latest every 10 years.

6.5. REVIEW AND ASSESSMENT FOR RADIATION SOURCES FACILITIES AND ACTIVITIES

Review and assessment for radiation sources facilities and activities is carried out by NDK’s Department of Applications during the authorization process, including pre-authorization inspection, as well as during the renewal of license every 5 years.

NDK reviews the documents submitted by the applicant and carries out a pre-authorization inspection (on-site examination). The pre-authorization inspection is carried out by Department of Inspections who can request the support of technical support organization NUTED. The IRRS Team was informed that pre-authorization inspections for radiation source facilities and activities are mainly conducted by NUTED personnel, who are trained by NDK and using pre-authorization inspection checklists provided by NDK. Regulations include a provision that for authorization of the third group of radiation facilities and activities (low risk), pre-authorization inspection is not mandatory; however, the IRRS team was informed that this provision is not currently being implemented, and a pre-authorization inspection is conducted as part of the review and assessment during initial authorization in all facilities and activities. The IRRS team noted that assigning NDK and NUTED resources to carry out pre-authorization inspection for all of facilities and

activities may have some impact on having enough resources to implement inspection programme (see recommendation R17 in section 7.5).

Although a separate procedure for review and assessment has not been established, provisions for review and assessment are covered in the authorization procedures. Review starts with the completeness check of documents submitted by the applicant in the online authorization application system. Subsequently, the review and assessment checklist is completed, and a report is prepared in NDK's online system for registering all sources and recordkeeping (radiation source management system). The IRRS team recognized as an area of good performance NDK's use of automatic alarms in the online radiation source management system software to follow up on expired licences and corrective actions that have not been addressed and reported by the licensee. The alarm is visible throughout all steps of authorization and review and assessment, as it shows up in the section on the licensee, as well as for every source.

6.6. REVIEW AND ASSESSMENT FOR DECOMMISSIONING ACTIVITIES

Licensing for decommissioning is regulated by the NRL 7381, however, no licence application for decommissioning has been initiated as yet. For the Akkuyu nuclear power plant the internal guideline "PSAR Decommissioning Review & Assessment Guideline" is used for the evaluation of the part of the PSAR dealing with decommissioning. For radiation facilities the decommissioning plan is part of the radiation protection programme and as such evaluated during the licensing process. It was informed to IRRS team that in order to obtain the decommissioning permit for a facility, the final decommissioning plan, as part of the radiation protection programme, will be required and evaluated.

The team was also informed that the draft "Regulation on Decommissioning" will allow for licensing of decommissioning of all type of facilities.

6.7. REVIEW AND ASSESSMENT FOR TRANSPORT

The evaluation of the arrangements of the transport companies applying for a transport license is undertaken by an inspection from NDK or the technical support organisation NUTED before the transport license is issued. NDK uses a checklist to verify the regulatory compliance of the application.

Package designs of type B(U) and type C approvals are unilaterally approved in the country of origin, but type B(M) package designs and packages for fissile material are multilateral approvals, meaning these packages must be approved, as well as have an approval of shipment, by all countries where the consignment is to be transported through or into. Package designs that need authority approval and is approved by foreign authorities is accepted and approved (validated) by NDK, which is required by SSR-6 (Rev. 1). However, this approval or validation of foreign approved package designs are accepted by NDK without a thorough assessment of the safety analysis report for the package design, as required by SSR-6 (Rev. 1).

The IRRS team was informed that no applications have been received by NDK for special arrangements or special form radioactive material to date. NDK is also responsible for approving special form radioactive material (SFRM), which is an indispersible solid radioactive material or a sealed capsule that require a unilateral approval. The IRRS team was informed that there are no domestic producers of special form radioactive material.

Doses to personnel involved in the transport of radioactive material are required to be assessed and there are regulations on protective measures, such as monitoring radiation doses, wearing dosimeters, etc. NDK has not arranged for or performed any periodic assessment of doses to workers and members of the public due to the transport of radioactive material. Reviews should also be considered if significant changes in transport patterns occur or when new technology related to radioactive material is introduced. The review may help in achieving and maintaining public confidence. This requirement is stated in the national regulations on transport of radioactive material. According to these regulations, doses to persons should be

collected and reviewed and can be achieved through a combination of radiation measurement and assessments.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has not arranged for, or performed a periodic assessment of the radiation doses to workers and members of the public due to the transport of radioactive material.*	
(1)	**BASIS: SSR-6 (Rev. 1) para. 308 states that** *"The relevant competent Authority shall arrange for periodic assessments of the radiation doses to persons due to the transport of radioactive material, to ensure that the system of protection and safety complies with GSR Part 3".*
R10	**Recommendation: NDK should arrange for the periodic assessment of the radiation doses due to the transport of radioactive material, to ensure that the system of protection and safety complies with GSR Part 3.**
Observation: *NDK does not perform a thorough assessment of package designs before approving a package or a shipment requiring authority approval in Türkiye.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 4.33. states that** *"Prior to the granting of an authorization, the applicant shall be required to submit a safety assessment, which shall be reviewed and assessed by the regulatory body in accordance with clearly specified procedures. The extent of the regulatory control applied shall be commensurate with the radiation risks associated with facilities and activities, in accordance with a graded approach".*
(2)	**BASIS: SSR-6 (Rev. 1) para. 811 states that** *"Each Type B(M) package design, including those for fissile material which are also subject to paras 814-816 and those for low dispersible radioactive material, shall require multilateral approval.*
(3)	**BASIS: SSR-6 para. 825 states that** *"Multilateral approval shall be required for:* *The shipment of Type B(M) packages not conforming with the requirements of para 639 or designed to allow controlled intermittent venting.* *a) The shipment of Type B(M) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is lower.* *b) The shipment of packages containing fissile material if the sum of the CSIs of the packages in a single freight container or in a single conveyance exceeds 50. Excluded from this requirement shall be shipments by sea-going vessels if the sum of the CSIs does not exceed 50 for any hold, compartment or defined deck area and the distance of 6 m between groups of packages or overpacks, as required in Table 11, is met.* *c) Radiation protection programmes for shipments by special use vessels in accordance with para 576(a).* *d) The shipment of SCO-III."*
R11	**Recommendation: NDK should update the approval procedures of Type B(M) package designs, packages for fissile material and low dispersible radioactive material as well as approval of shipment of packages containing fissile material, to comply with SSR-6 (Rev. 1).**

6.8. REVIEW AND ASSESSMENT FOR OCCUPATIONAL EXPOSURE

The regulations require the licensee of a radiation facility to review the Radiation Protection Programme every year. NDK reviews the changes on the Radiation Protection Program through checks during

inspections and assesses the Radiation Protection Programme in case of renewal or modification of the licence.

Radiation facilities are required to keep records related to occupational exposure of radiation workers, but are not required to send occupational exposure reports to NDK, instead, the dose records for category A radiation workers are uploaded to the Central Dosimetry Recording System by the authorized dosimetry services. The TLD, OSL and ring type dosimeters of the category A radiation workers are read every two months.

NDK reviews these records, which can be the origin of an unplanned inspection, in case the doses reported are above the threshold stablished by NDK.

The Central Dosimetry Recording System keeps records of the occupational exposure of Category A radiation workers, as well as information related to the exposure, such as dose estimates in case of malfunction of the dosimeter, special health report and chromosomic aberration data in case of overexposures.

The dose records are integrated in the "State File" of the exposed worker, alongside with other official records from different administrations, and are always accessible by the user with digital certificate. The IRRS team recognized the Central Dosimetry Recording System as an area of good performance.

6.9. REVIEW AND ASSESSMENT FOR MEDICAL EXPOSURE

Review and assessment related to medical exposure is within the jurisdiction of Ministry of Health. It is carried out with respect to regulations developed by the Ministry in April 2022. Review and assessment related to the authorizations of the radiation sources and the practices that use radiation sources for medical purposes are performed by NDK in accordance with Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices. The IRRS team noted that further evaluation on the review and assessment responsibilities and activities of the Ministry of Health would be needed.

6.10. REVIEW AND ASSESSMENT FOR PUBLIC EXPOSURE

The responsibilities for public exposure related to safety assessment and compliance with the operational limits and conditions rests with the licensee and are submitted to NDK for review. The "Regulation on Radiation Protection in Nuclear Facilities" on optimization and dose constraints states the requirement that these responsibilities are achieved through the measures and controls to be taken throughout the lifetime of the nuclear facility. The regulation also states that the dose constraint to be applied during normal operation for the public, is determined by the NDK, for each nuclear facility. Regulations however do not address the dose constraint requirement for radiation facilities.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has not specified the dose and risk constraints, as appropriate, to be used in optimization of protection and safety for public exposure, in the operation of radiation facilities.*	
(1)	**BASIS: GSR Part 3 para.3.22(c) states that** *"The Government or the Regulatory body shall establish or approve constraints on dose and on risk, as appropriate, or shall establish or approve a process for establishing such constraints, to be used in the optimization of protection and safety."*
R12	**Recommendation: NDK should establish appropriate constraints on dose and risk to be used in the optimization of protection and safety for radiation facilities.**

The Requirements for Exemption are stated in “Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices”. NDK has listed on its website the exempted sources such as X-ray diffractometers and X-ray Spectrometers.

6.11. SUMMARY

The legal framework for review and assessment is established by NRL 7381 and PD 95 for nuclear installations. Processes and procedures are provided by Decree on Licensing of Nuclear Installations which will be completely replaced by implementing the new regulation which is currently being drafted. The IRRS team identified in the current framework that there is room for improvement:

- regarding the need for periodic safety review with the exception of radioactive waste facilities for which a periodic safety review is already foreseen in current regulation.
- related to the approval procedure for package design in transport regulations.

The mechanism for capacity building of the technical staff of research reactors does not address the training in specific review and assessment of safety analysis report for future authorization processes of the facility and for inspection.

Personnel involved in transport activities are assessed and regulations on protective measures are foreseen, but NDK has not arranged to perform a periodic review and assessment of doses to workers and members of the public due to transport activities.

Public dose constraint for performing assessment of public exposure, is required to be specified for nuclear facilities. However, no constraint on dose or risk is specified for public exposure for radiation facilities.

7. INSPECTION

7.1. GENERIC ISSUES

The authority and requirements for NDK to conduct inspection activities in Türkiye is established in NRL 7381 and PD 95. NRL 7381 gives NDK the authority to inspect authorized persons, including contractors, subcontractors, suppliers and sub-suppliers. The law authorizes NDK to perform these inspections announced or unannounced, scheduled or unscheduled. NRL 7381 describes that NDK may authorize third-party inspection companies to provide services to the authorized party, subject to the oversight of NDK.

Additionally, NRL 7381 describes that NDK inspectors are authorized by the Board, and have total access to authorized facilities, records and to interview staff of the authorized user. The law also describes that the inspectors of NDK have the authority to immediately contact officials at the authority and the authorized party should they see situations where safety or security is endangered, and that the inspectors may request law enforcement assistance from local authorities during inspections.

PD 95 further describes inspection activities of NDK and identifies the specific responsibilities of organizational units inside NDK. Specifically, PD 95 Article 19 establishes the NDK Department of Inspection, describes the various functions of this department including inspection planning, implementation of administrative sanctions, issuing reports and monitoring corrective actions, and gaining technical support from other institutions as necessary. NRL 7381 also establishes the legal framework for a technical support organization for NDK, named the Nuclear Technical Support Joint-Stock Company (NUTED).

To establish principles and fundamentals of inspections, NDK issued the Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation in May 2021. General rules of inspections, inspection formats and methods and obligations of inspected bodies are explained in this Regulation. Inspection periodicity and scope are determined by taking into consideration of graded approach principle. NDK prepares annual inspection program by taking into account the results of the inspections conducted in the previous period, the characteristics of the inspected activity and relevant plan, program and working calendar of the authorized persons. The IRRS team noted that the methodology used to implement this graded approach to planning inspection activities has only recently been developed, and is not documented in NDK's IMS at present.

The Department of Inspections has established an Inspection Directive within NDK's IMS. Directive provides instructions on implementation of the various steps of inspection, including annual planning, preparation, conduct of the inspection, and documentation of results. The Directive also details five separate inspection procedures at NDK (manufacturing, construction, commissioning, operations, and radiation facilities) with 109 supporting checklists covering all inspection activities. The Directive also prescribes weekly, monthly and annual activity reports to allow analysis of inspection information. The Team looked at NDK's use of these activity reports, and noted that more could be done to use this data to make periodic adjustments to the inspection program for all types of facilities and activities.

In 2021, NDK's annual inspection plan included 23 planned inspections at Akkuyu NPP, 2 at research reactors, 7 inspections of authorized third-party inspection organizations, 18 radiation facilities, 1 low level radioactive waste facility, and a few hundred other inspections related to authorization activities at a variety of facilities and activities such as radioactive source inspections.

The Regulation describes the qualification activities necessary for inspectors to be authorized by the Board for a period of five years. One required activity in the Regulation is completion of a year-long inspector candidate program. None of the 19 currently authorized inspectors have completed this program, rather they are authorized based on their substantial regulatory experience and inspection training program prior to the establishment of NDK. Training has been conducted on a variety of important subjects, but the formalized

program that would allow authorization of the remaining 17 inspector candidates in the Department of Inspections is still in draft awaiting approval. This gap is acknowledged in NDK's self-assessment action plan. In NDK's inspection program, authorized inspectors currently perform inspections for a wide range of functional areas, however if deemed necessary inspectors receive specialized training in any particular type of activity.

NDK has a number of improvements planned to the Regulation, and a draft has been developed for possible approval in 2022.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The inspector candidate programme described in the Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation has not been approved for use.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 2.36. (b) states that** *"The government: … Shall make provision for adequate arrangements for the regulatory body and its support organizations to build and maintain expertise in the disciplines necessary for discharge of the regulatory body's responsibilities in relation to safety"*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 4.13 states that** *"A process shall be established to develop and maintain the necessary competence and skills of staff of the regulatory body, as an element of knowledge management. This process shall include the development of a specific training programme on the basis of an analysis of the necessary competence and skills. The training programme shall cover principles, concepts and technological aspects, as well as the procedures followed by the regulatory body for assessing applications for authorization, for inspecting facilities and activities, and for enforcing regulatory requirements."*
(3)	**BASIS: GSG-12 para. 6.71. states that** *"The training requirements for regulatory staff should be based on the functional areas of the regulatory body. One of the objectives of training is to develop the knowledge, skills and attitudes of the staff of the regulatory body in order to widen their appreciation of the work being undertaken by themselves as well as others. Basic elements of a training programme for a regulatory body are listed in Appendix III."*
R13	**Recommendation: NDK should complete the development of the inspector candidate program to allow authorization of inspectors as described in the Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation.**

7.2. INSPECTION OF NUCLEAR POWER PLANTS

Two members of the IRRS team travelled to Akkuyu NPP and held thorough discussions with the leadership of ANAS and also with the onsite NDK inspectors and NUTED technical experts. The Team also reviewed a recently issued NDK inspection report which documented five inspection findings, including the supporting inspection plan, request for information, and entrance/exit meeting notes. The IRRS Team noted that this report was sent only to ANAS, as inspection reports issued by NDK are not made publicly available.

Manufacturing inspections conducted by NDK (primarily through the efforts of NUTED at foreign facilities) are substantial. In 2021 NDK documented 32 findings at authorized manufacturing facilities, and a graded approach is utilized to communicate the findings to the vendor and monitor corrective actions. Of the 88 inspection findings issued at manufacturing facilities since the beginning of Akkuyu component construction in 2019, 68 have been closed by NDK, and 20 remain open awaiting completion of corrective actions by the authorized vendors.

Regarding inspections at Akkuyu NPP, in 2021 NDK inspectors completed 488 person-day inspections while NUTED staff completed 2256 person-day surveillances. Additionally, NDK inspectors performed approximately 70 person-day inspections of authorized third-party inspection organizations related to the Akkuyu project in 2021. During these inspections, NDK documented 37 inspection findings. After receipt of a report containing inspection findings, ANAS must respond with an NDK form within 15 working days describing the corrective actions taken, causal factors, and actions taken to prevent future violations. The amount of information required to be provided by ANAS varies with safety or security significance using a graded system, which is described in NDK's Classification of Findings Procedure. These forms are reviewed by NDK's Department of Inspections, and if found to be sufficient the finding is closed. If the corrective actions are insufficient, the matter is transferred to the Department of Nuclear Facilities, if relevant, for further review and potential enforcement action. The IRRS Team inquired about assessment processes using these inspection results. Clearly the NDK staff periodically reviews trends in inspection findings and described that letters could be issued to ANAS describing trends. No process was apparent whereby adjustments would be made to the inspection program or other NDK processes based on trends in inspection finings. Furthermore, the IRRS Team learned that the significance of inspection findings in NDK's classification procedure is based upon impact to the regulatory process or how directly they are established in Turkish law, also based upon their potential impact on safety or security.

The IRRS team reviewed NDK's internal guidance for performing various types of inspections, as documented in the Inspection Directive. While the Directive does describe that a reactive inspection should be performed "Due to an extraordinary event that occurred", the Directive does not provide any guidance on what types of events or circumstances might warrant such an inspection. The Team learned that one such inspection has been conducted at Akkuyu NPP based on concerns that were raised about activities at the site. Additionally, guidance has not been developed to apply a graded approach to reactive inspections to align the timeliness or size of the inspection with the safety or security significance of the event.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK does not have written procedures for implementing a graded approach to conducting reactive inspections, nor do NDK's procedures describe the various reasons that reactive inspections may be needed.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) Requirement 29 states that** *"Inspections of facilities and activities shall be commensurate with the radiation risks associated with the facility or activity, in accordance with a graded approach."*
(2)	**BASIS: GSG-13 paras. 3.243.-245. state that** *"Reactive inspections, by individuals or teams, are usually initiated…in response to an unexpected, unplanned situation or incident in order to assess its significance, the implications for safety and the adequacy of corrective actions…A pre-established, graded approach to responding to special circumstances will assist in determining the appropriate level of resources for use in reactive inspections."*
S10	**Suggestion: NDK should consider enhancing written procedures for the NPP inspection programme to describe the different reasons for reactive inspections, and to define a graded approach for their size and scope.**

NDK has established a robust set of inspection checklists to support manufacturing and construction inspections at NPPs. To date no inspection guidance has been approved for the upcoming commissioning phase at Akkuyu NPP, or for the operations phase. The NDK staff is aware of this gap and demonstrated that there is notable work in progress to develop these tools and to gain experience in commissioning and operations oversight through benchmarking trips to regulatory bodies in other countries with established programs. This gap is acknowledged in NDK's self-assessment action plan.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has not established an inspection program for the commissioning or operations phases for NPPs. The inspection procedures and supporting checklists need to be developed to allow inspectors to train on them and for the licensee to be prepared for NDK's inspections.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 4.50. states that** *"The regulatory body shall develop and implement a programme of inspection of facilities and activities, to confirm compliance with regulatory requirements and with any conditions specified I the authorization. In this programme, it shall specific the types of regulatory inspection (including scheduled inspections and unannounced inspections), and shall stipulate the frequency of inspections and the areas and programmes to be inspection, in accordance with a graded approach."*
(2)	**BASIS: GSG-13 para. 3.281. states that** *"Inspections should be conducted in accordance with an approved inspection programme, plan, guidelines, procedures and checklists."*
R14	**Recommendation: NDK should develop its inspection programme for NPPs for commissioning and operations phases.**

The IRRS team discussed the assignment of resident inspectors at Akkuyu NPP. NDK has one resident inspector at Akkuyu who has been onsite for approximately two years. Three resident inspector candidates were also onsite at the time of the visit. NDK intends to continue the assignment of resident inspectors at Akkuyu when the units are in operation, with a total of 12 resident inspectors assigned once all four units are in operation. Due to the nature of current activities at Akkuyu NPP, the resident inspector's activities are primarily focused on monitoring construction activities along with the approximately 21 assigned NUTED staff. The resident inspector has not received any guidance yet on how his role will change once commissioning or operations begin at the site. The Team looked at NDK's Inspection Directive, and at the Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation, and noted that no guidance exists on the very important role of the resident inspector in the oversight program, nor do written expectations exist for important functions such as staff development, emergency response, or communications with the authorized party and NDK headquarters staff. NDK described that the upcoming revision to this Regulation will provide some legal description of the resident inspector's role, although more detailed guidance needs to be developed within NDK's IMS.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has not defined the roles for the resident inspector position at NPPs.*	
(1)	**BASIS: GSG-13 para. 3.262. states that** *"The regulatory body should issue internal guidance for its inspectors on performing regulatory inspections in order to ensure a consistent approach to inspection while allowing sufficient flexibility for inspectors to take the initiative in dealing with new concerns that arise. Each inspector should be given adequate training in following this guidance."*
S11	**Suggestion: NDK should consider establishing written guidance on the various functions to be assigned to the resident inspectors at NPPs to provide clarity and consistency.**

Policy Issue Discussion 2: Depth and Scope of Regulatory Inspections to be carried out on authorized person, Construction and Manufacturing Items Important to safety of Nuclear Power Plants.

NDK carries out the inspections/supervisions determined by the risk-based inspection strategy, together with the TSO NUTED. Surveillance activities supported by NUTED are carried out on the basis of a quality plan and surveillance within the framework of graded approach. As a result of the surveillance activities, weekly, monthly and quarterly reports are prepared and submitted to the Nuclear Regulatory Authority. In addition, information notes or technical reports are prepared by NUTED regarding the problems or important activities.

The purpose of this policy issue discussion was to share the experience of how inspection is done in other countries during different phases of a nuclear power plant.

The IRRS team gave an overview of different approaches in their respective countries during the discussions and is summarized below:

- Inspections are performed by the inspectors of the regulatory body and any need for corrective actions is prescribed by inspectors in a certain time. In depth review is conducted when complex issues are surfaced during inspections. Inspection of quality assurance aspects of the manufacturing entities is also done by support from TSO.
- Resident inspectors were assigned during construction and operation of the NPP.
- The RB conducts inspection but there is also a TSO who conducts inspection at different stages of the lifecycle of the facility. At some levels, for instance in the construction phase, inspection is done by the RB. In commissioning phase, the TSO would do inspection but there are some hold points where inspectors form the RB would conduct inspection. Also for inspections conducted with the support of TSOs, the regulatory body also sends its own inspectors from time to time for verification.
- Although there is provision in legislation to use TSO staff for some regulatory bodies, inspections are conducted only through staff of the regulatory body. There is a resident inspector who would conduct regulatory inspection but normally another inspector is sent from the RB office to conduct inspection together with the resident inspector.
- Inspection of nuclear and radiation facilities at facility sites are conducted by resident inspectors which report to the headquarters. If needed, subject specialists are also sent from headquarters. Resident inspectors conduct different types of inspections such as those related to the management system, control points and general surveillance; whereas the inspectors are sent from headquarters also to conduct inspection related to specialized aspects such as inspections of licensees' safety culture. There is a comprehensive training programme for inspectors in relation to the regulatory requirements and processes, including inspectors' authority, communication skills, and report writing skills, etc.

7.3. INSPECTION OF RESEARCH REACTORS

Regulatory inspections are carried out by the NDK in accordance with the annual inspection plan which is in line with the Regulation of Inspection Regarding Nuclear Energy and Ionizing Radiation (2021).

The duration and scope of the inspections are determined by taking into account the principle of graded procedures for individuals and activities within the scope of this regulation and includes visits to the facilities at least once in a calendar year. NDK has a significant number of inspection checklists for individual activities, but not for the facility-level inspection programmes.

The NDK has training programs and the necessary training materials for inspectors, but there is no specific training method for inspectors who will be engaged in inspection activities at the facility within the regulations or the NDK IMS (see S3 in section 3.3).

There is no requirement on overseeing the safety culture in research reactor facilities, which was observed during site visits. The inspection program is designed in a generic way that does not detail a specific level of inspection at the research reactors facility.

The Regulation of Inspection Regarding Nuclear Energy and Ionizing Radiation allows the NDK to conduct inspections, and requires a systematic regulatory inspection procedure that covers all areas of research reactor facility inspections. The lack of trained inspectors for specific facilities and proper inspection procedures, including specific facility-level inspection checklists, are not covered in the aspects of regulatory supervision.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Inspection procedures and checklists for the facilities are not consistently prepared in accordance with a graded approach. NDK prepared several inspection checklists for the activities but not for the specific facilities, and do not take in to account the graded approach.*	
(1)	**BASIS: GSR Part 1 (Rev.1) para. 4.50 states that** *"The regulatory body shall develop and implement a programme of inspection of facilities and activities, to confirm compliance with regulatory requirements and with any conditions specified in the authorization."*
(2)	**BASIS: GSG-13 Para. 3.253 states that** *"The regulatory body should have an overall plan for the programme of inspection that it intends to undertake at a facility or during an activity".*
(3)	**BASIS: GSG-13 Para. 3.268 states that** *"The inspection procedures of the regulatory body should incorporate and use a variety of methods …."*
S12	**Suggestion: NDK should consider developing an inspection procedure and checklist that is compatible with the facility's formal inspection programme and takes account of the graded approach.**

7.4. INSPECTION OF WASTE MANAGEMENT FACILITIES

Inspection of Waste Management Facilities is covered in NDK's internal processes and procedures. Inspections in facilities are conducted at least one time in calendar year.

During the IRRS mission, the IRRS team witnessed an inspection by NDK of the TENMAK RW processing and storage facilities in Istanbul. The waste management at the facility is limited to hotcell operations, in-drum compaction, decontamination of liquids and storage of wastes. Storage of solid RW is performed in ISO containers (NORM materials in 200 liter drums), and in buildings (sealed sources and wastes in overpacks). Inspection was performed based on the checklist mentioned in "Inspection Report of Wastes from the use of Radioactive Materials Places where it is made harmless". It was the first inspection in 2022, compared to 1 in 2021. Inspection was performed in an efficient way. Documents were presented by TENMAK and verified by NDK. The IRRS team expert was informed that TENMAK has a Quality Assurance programme, but this is not applied in the RWM facility because of unavailability of an independent qualified expert in the installations.

Before the inspection, inspectors and team expert were provided with an electronic dosimeter. During inspection of the installations the IRRS team noticed that installations do not conform present safety requirements, and that individual protection equipment (e.g. overshoes) was not made available to the people. For the storage installations it was noticed that, although dose rates are mentioned on the individual packages, and there are area monitoring systems in operation throughout the waste management facility, no

written information was available mentioning the ambient dose rate at the entrance of the waste processing and storage rooms/areas. Doors of some ISO containers (stored in open air and containing NORM materials) were in open position. For the in-drum compaction unit, no direct monitoring nor sampling (via filter) of the exhaust air outlet is foreseen. By leaving the controlled zone inspectors and team expert were not controlled for contamination (hand, feet).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *No complete safety analysis of the existing processing and storage installations with focus on enhancement of safety of waste processing and storage conditions and installations, in line with IAEA Safety Standards, has been submitted by TENMAK to NDK, regarding enhancement of safety of the installations.*	
(1)	**BASIS: GSR Part 5 Requirement 3 states that** *"The regulatory body shall establish the requirements for the development of radioactive waste management facilities and activities and shall set out procedures for meeting the requirements for the various stages of the licensing process. The regulatory body shall review and assess the safety case and the environmental impact assessment for radioactive waste management facilities and activities, as prepared by the operator both prior to authorization and periodically during operation. The regulatory body shall provide for the issuing, amending, suspension or revoking of licences, subject to any necessary conditions. The regulatory body shall carry out activities to verify that the operator meets these conditions. Enforcement actions shall be taken as necessary by the regulatory body in the event of deviations from, or noncompliance with, requirements and conditions."*
(2)	**BASIS: GSR Part 5 para. 3.9. states that** *"The regulatory body has to carry out activities that are necessary to verify that requirements for safety and environmental protection are being met by the operator. These activities are required to be supported by an effective management system, including the establishment and maintenance of a strong safety culture".*
R15	**Recommendation: NDK should ensure during the relicensing of the TENMAK waste processing and storage facility that the highest priority is given to personnel safety and safety of radioactive waste and installations and that in the short term an appropriate plan is developed by TENMAK with focus on enhancement of processing and storage of the radioactive wastes and safety of the facility in general.**

The waste processing and storage activities/facilities are authorized by NDK till March 2023 and will have to be relicensed as radioactive waste facility before March 2023 in application of the recently published "Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities". To prepare the description of the content of documents to be submitted for licensing of the near surface disposal facility a working group was created in March 2021, composed of representatives of the MoENR, NDK and TENMAK. Another working group, composed of representatives of NDK and TENMAK deals with the documents for the relicensing of the treatment and storage facilities at Istanbul. The IRRS team verified the existence of the working groups via documents presented by NDK including scope and contents.

7.5. INSPECTION OF RADIATION SOURCES FACILITIES AND ACTIVITIES

Inspection frequency for radiation sources facilities and activities is established in the Directive on Radiation Safety Inspections in accordance with a graded approach. For example, radioisotope production facilities must be inspected every year, while diagnostic radiology facilities have to be inspected once in 5 years. The IRRS Team was informed that the frequencies defined in the inspection programme of NDK are being revised to use NDK's resources more effectively.

Based on inspection frequencies and other provisions of regulations, using software of NDK an annual inspection plan is developed where inspection of all the 21 'facilities' is planned; however, for the rest of facilities and activities (recognised as practices by NDK) only a number of inspections is planned annually, e.g., for 2022 there are 380 practices planned to be inspected. Annual inspection plan is sent for the Board's approval at the end of each year and executed in the following year. In addition, a weekly inspection plan is drawn up with information of licensees to be inspected (both facilities and practices). The IRRS Team was informed that inspection of all facilities and activities in accordance with the determined frequency are not completed by NDK due to lack of resources.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The inspection frequency has been established in accordance with a graded approach and annual inspection plan is prepared. However, the established inspection frequency is not implemented for all radiation sources facilities and activities.*	
(1)	**BASIS: GSR Part 1 (Rev 1) Requirement 27 states that** *"The regulatory body shall carry out inspections of facilities and activities to verify that the authorized party is in compliance with the regulatory requirements and with the conditions specified in the authorization."*
(2)	**BASIS: GSR Part 1 (Rev 1) para. 4.50. states that** *"The regulatory body shall develop and implement a programme of inspection of facilities and activities, to confirm compliance with regulatory requirements and with any conditions specified in the authorization".*
(3)	**BASIS: GSR Part 1 (Rev 1) para. 4.52. states that** *"Regulatory inspections shall cover all areas of responsibility of the regulatory body, and the regulatory body shall have the authority to carry out independent inspections."*
R16	**Recommendation: NDK should implement its inspection programme comprehensively for all radiation sources facilities and activities.**

NDK's Department of Inspections is responsible for carrying out planned regular inspections and reactive inspections for facilities and activities using radiation sources. The IRRS team was informed that considering that for 20 000 licensees only 10 inspectors are available, NDK uses support from NUTED personnel for inspections of facilities using radiation sources. In 2021, 264 planned inspections and 371 unplanned inspections were carried out with the support of NUTED. Inspections are performed by at least two inspectors, one always an NDK inspector, while the other person can be from another NDK department or NUTED. Training of NDK inspectors is ensured when they are hired. However, periodic re-training of NDK inspectors on inspection of radiation sources facilities and activities is not performed (see recommendation R4 in section 3.3).

In addition to regulations, the 'Principles and Procedures of Inspections Regarding Radiation Facilities and Radiation Applications' and 13 checklists are used for inspection of radiation sources. After performing inspection, inspection reports are prepared, and an official letter is sent for informing inspection results to the licensee.

The IRRS team observed an NDK inspection of a cyclotron facility operated by TENMAK. The IRRS team was informed that for inspection preparation NDK inspectors review the license and license conditions, radiation protection programme and other documents related to safety, and the previous inspection report. The inspection consisted of an entrance meeting, interviews with TENMAK personnel, visual observation of the facility and dose rate measurements performed by inspectors. For the inspection, the checklist for an accelerator facility was used and inspection report was completed. NDK Inspectors provided the licensee with information on inspection findings, including non-compliances from previous inspection that were not corrected, as well as positive findings on good performance of licensee with regard to radiation protection.

7.6. INSPECTION OF DECOMMISSIONING ACTIVITIES

At present no decommissioning activities are ongoing. The IRRS team was informed that when decommissioning commences, inspections will be carried out by NDK in accordance with NRL 7381 and 'Regulation on Inspections Regarding Nuclear Energy and Ionizing Radiation Activities'.

7.7. INSPECTION OF TRANSPORT

Transport related inspections are performed either by NDK itself or NUTED on behalf of NDK before a transport license is issued by NDK. There are 10 designated inspectors in NDK and 26 technical experts in NUTED, all authorized for transport and radiological inspections. Inspections are regularly performed of the companies that hold a transport license. The transport inspection schedule is approved by the NDK Board with inspections planned to be performed every three years, although at present this regularity is stretched to every four or five years. If appropriate, reactive inspections can also be undertaken. Inspections are usually announced and performed by NDK or NUTED at the company, where checks of regulatory requirements are undertaken using a checklist. The checklist for transport inspections covers radiation protection, training, measuring instruments, protective equipment, transport procedures, prior discrepancies or incidents, emergency plan, radiation protection plan and measurements.

Regulatory activities regarding transport of dangerous goods, including class 7 radioactive material, on road, railway, by sea and air, is also carried out in accordance with international conventions by the Ministry of Transport and Infrastructure, as stated in the decree law number 655 on some arrangements regarding transportation and infrastructure. Inspection activities on transports of dangerous goods are the responsibility of the Ministry of Transport and Infrastructure and are also carried out by the police. The police receive training in dangerous goods transport regulations administered by the Ministry of transport and infrastructure and can at any time contact NDK on matters of transport of radioactive material.

7.8. INSPECTION OF OCCUPATIONAL EXPOSURE

The general principles of inspection for occupational exposure are established in Regulation on Inspections Regarding Nuclear Energy and Ionizing Radiation.

NDK conducts the inspections to radiation facilities using checklists prepared by the Department of Inspections. These checklists include items specific to occupational exposure, such as, modifications on the Radiation Protection Program, qualifications of the Radiation Protection Officer, dose records of radiation workers, etc.

7.9. INSPECTION OF MEDICAL EXPOSURE

The PD95 established that the MoH is responsible for carrying out inspections related to medical exposure. In medical facilities, NDK has the mandate and responsibility for inspecting the safety of the facility and the sources, occupational and public exposure.

During a site visit to observe an inspection conducted by NDK on a radiotherapy facility, the IRRS team observed that NDK's inspection also covered elements of medical exposure. These included:

- investigation of unintended medical exposure and corrective actions taken after unintended medical exposure,
- calibrations of dosimetry equipment used for calibration of linear accelerators,
- use of contact shielding on patients,
- quality assurance of linear accelerators,
- how and by whom treatment planning is conducted,

- verification of pregnancy of patients before exposure to medical exposure, and
- records of patient's.

The NDK inspection checklist for radiotherapy, nuclear medicine and radiology facilities includes items related to medical exposure.

The provisions to inspect medical exposure were given to MoH in March 2022. The IRRS team was informed that between March and the IRRS Mission, the MoH had conducted 25 inspections at medical facilities.

Although both NDK and MoH have responsibilities in relation to regulatory oversight of medical facilities, they do not have an established formal mechanism on sharing information. For example, there is no formal agreement on how and which inspection findings are shared with each other.

NDK is developing draft regulations on radiation protection which also include provisions related to control of medical exposure. However, considering that the responsibilities of medical exposure has been transferred to the Ministry of Health, it is not clearly defined and documented how the regulations issued by MoH and NDK on patient exposure will be implemented in parallel and how any potential gaps or overlaps of regulatory oversight in medical exposure will be avoided.

Moreover, although some provisions, such as the requirement for acquiring authorization from MoH before NDK issues an authorization, are reflected in the MoH regulations on 'Regulations on Radiology Services', the specific roles and responsibilities as well as areas of communication and consultation for effective implementation of the regulations issued by both regulatory authorities is not clarified and formalized.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The roles and responsibilities of NDK and the MoH in relation to the regulatory oversight of medical exposure are not clearly defined and there are no formal cooperation and coordination arrangements.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 2.18 states that** *"Where several authorities have responsibilities for safety within the regulatory framework for safety, the responsibilities and functions of each authority shall be clearly specified in the relevant legislation. The government shall ensure that there is appropriate coordination of and liaison between the various authorities concerned in areas such as:…* *3) Applications of radiation in medicine, industry and research;…* *This coordination and liaison can be achieved by means of memoranda of understanding, appropriate communication and regular meetings. Such coordination assists in achieving consistency and in enabling authorities to benefit from each other's experience."*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 2.19 states that** *"If responsibilities and functions do overlap, this could create conflicts between different authorities and lead to conflicting requirements being placed on authorized parties or on applicants. This, in turn, could undermine the authority."*
R17	**Recommendation: The MoH and NDK should establish a formal cooperation and coordination arrangement for regulatory oversight of medical facilities and activities, and ensure that there are no conflicting requirements placed on authorized parties and applicants.**

7.10. INSPECTION OF PUBLIC EXPOSURE

NDK does not have a separate inspection programme for public exposure, but requirements for public exposure are verified as part of the inspection of the facility and activity. NDK verifies compliance to the

operational limits and controls to ensure the protection of the public. NDK has recently issued Authorisation for providers of consumer products and non-medical human scanner facility and is yet to carry out inspections. The IRRS team was informed that the Turkish Atomic Energy Authority had carried out a study on the radioactive contamination at the Gaziemir site. Presently, the physical protection of the Gaziemir site is ensured by the owner so that public cannot enter the contaminated site. The NDK has received an application for authorisation for the remediation of the site.

The team reviewed the inspection check list of discharges from nuclear medicine treatment facilities, that uses I-131. The discharge criteria established in the "Regulation of Radioactive waste for radiation facilities" for I-131 is not verified during inspection and is not part of the checklist. The team was informed that the Inspection checklists are being revised and the aspects of public exposure such as verifying the discharge criterion will be incorporated in the checklist (see Sxx in section 7.3).

7.11. SUMMARY

The IRRS team concluded that there is a sufficient legal basis for the conduct of inspections and that most NDK internal processes and inspection practices are in accordance with relevant IAEA documents. The IRRS Team encourages NDK to consider actions to improve in several thematic areas:

- In the case of radiation sources, inspection planning, and inspection completion has been challenged by a lack of sufficient resources to complete the inspections, at the frequency determined by NDK.
- NDK should complete the development of its inspector candidate programme.
- Further development of inspection programme guidance should be prioritized, including guidance on the graded approach to reactive inspections, inspection programme for NPP commissioning and operations phases, the duties and practices of the NPP resident inspectors, and for use of a graded approach for research reactor inspection procedures and checklists.
- NDK should ensure during the relicensing of the TENMAK treatment and storage facility that the highest priority is given to personnel safety and safety of radioactive waste. NDK should also consider verifying the compliance with requirements related to discharges to the environment.
- The IRRS team identified that MoH and NDK should establish a formal cooperation and coordination arrangement for regulatory oversight of medical facilities and activities, and ensure that there are no conflicting requirements placed on authorized parties and applicants.

For most types of authorized users, NDK inspections are planned and performed in such way that an acceptable level of assurance that regulatory requirements are met is achieved. NDK NPP inspectors are motivated to discharge their duties and respected by inspected organizations.

8. ENFORCEMENT

8.1. ENFORCEMENT POLICY AND PROCESS

The enforcement policy for responding to non-compliance by authorized parties with regulatory requirements, or with any conditions specified in the license, is established within the legal framework of the Republic of Türkiye and is based on the Presidential Decree on Organization and Duties of the Nuclear Regulatory Authority (PD) 95 the Nuclear Regulation Law (NRL) 7381, both of which were established in March 2022 and publicized in the Official Gazette on March 5, 2022. Based on these high-level legal standards, the powers and functions of NDK for the implementation of enforcement actions are provided, and the application of sanctions are stipulated. These legal standards replaced the legal authority that had previously been issued in Decree Law No. 702, issued in 2018, but that was annulled by the Constitutional Court in 2021 for administrative reasons.

The Regulation on Nuclear Regulatory Authority Administrative Sanctions was published in Official Gazette in February 2021 and determines the application principles of administrative sanctions. The enforcement system consists of criminal and administrative sanctions. Administrative sanctions consist of suspension, restriction, or revocation of authorization and administrative fines to be imposed by NDK. The provision for criminal sanctions is also covered in Article 24 of NRL 7381 but implementation of these sanctions is the responsibility of the court system, not a function of NDK.

The administrative sanctions within NDK's authority are described in Article 25 of NRL 7381, and consist of imposition of administrative fines, suspension of authorization, restriction of authorization, and revocation of authorization. This article requires that the administrative sanctions are applied in a variety of circumstances including operation without a required license, permit or certificate; breach or exceedance of limits set forth in NRL 7381 or secondary legislation; or submittal of misrepresenting documents or misleading information to NDK. The amount of the fines allowed in Article 25 varies with the radiation risk of the facility type, and includes a range for each fine to allow for a graded approach based on the circumstances of each violation.

In addition to imposed administrative fines in accordance with Article 25 of NRL 7381, a sufficient time shall be given to the related person by the Authority for the correction of non-conformances. If the non-conformances are not corrected in the given time, additional administrative fines are imposed as twice of the previous fine. If a misrepresented document, misleading information or change in the authorization conditions forms the basis for authorization and it is not possible to correct them, the authorization is suspended, restricted or revoked in addition to the administrative fine. In cases where it is determined that the acts listed in the Article 25 of NRL 7381 cause damage to the health and safety of the public and environment, the administrative penalty is increased one-fold. In addition to the administrative fine, the Authority may restrict or suspend licenses or permits, during the continuation of the risk posed on the public and the environment by these acts. NDK may revoke the license or permit in accordance with the severity of the risks that are posed to the public and environment.

NDK may, if it deems necessary, take necessary measures including detention and transport to ensure the safety and security of nuclear material, radioactive sources and radioactive waste or have these necessary measures taken and the cost shall be borne by the authorized person.

The process regarding administrative sanctions begins with inspectors documenting an inspection finding in a report to the licensee. After receiving such a finding, the licensee must fill out a form describing the cause of the violation and the corrective actions taken to restore compliance and prevent recurrence. The NDK Department of Inspections reviews these actions, and if they are determined to be untimely or inadequate, then the issue is passed along to the related technical departments who perform a thorough review of the issue and develop a pre-determination report. Facts are gathered, validated and the pre-determination report is provided to the licensee for a response. Within thirty days, the licensee may provide

a justification for their position, which is combined with additional legal analysis, testimony, and other supporting information and provided to the President of NDK for review with a proposal for enforcement actions. This report, called the determination report, is then approved by the NDK President and forwarded on to the NDK Board for final action.

The application of administrative fines or other administrative sanctions does not remove the obligation of authorized persons to take security and safety measures. Until the administrative sanction decision is taken, in cases where security or safety is endangered or may be compromised and delay of the intervention is inconvenient, additional measures may be taken, including stopping or limiting the activity authorized by the President.

The administrative sanction decision is graded using a methodology described in Annex 1 to the Nuclear Regulatory Administrative Sanctions Regulation. NRL 7381 defines a range of possible financial penalties for a number of different types of violations. A severity level is determined by NDK using criteria in Annex 1, resulting in a percentage to be applied to the penalty range to determine the proposed penalty. Escalation criteria also exists to increase or decrease the penalty based on other factors (such as repeat violations or actual safety consequences). The IRRS Team reviewed this process and determined that the criteria in the Annex for determining severity leaves were vague and would not reasonably provided for a graded approach for sanctions for authorized users such as research reactors or nuclear power plants.

While there is no direct provision for an appeal of NDK's issuance of an enforcement action in NRL 7381 or Nuclear Regulatory Administrative Sanctions Regulation, the process for making the determination recommendation to the NDK President includes an opportunity for the authorized party to provide a written defense to provide their point of view. Additionally, Article 25 (7) of NRL 7381 describes that the recipient of an administrative sanction can file a lawsuit in the administrative court within 30 days of being assessed the fine.

Additionally, the IRRS team determined that NDK has a described criteria in the Directive On Radiation Safety Inspections' (RSGD.02.Y01) for revoking the Authorization for radiation source facilities and activities. The observed non-compliances are communicated through an official letter to the licensee, and a maximum of 3 months is given for implementing corrective actions. This time frame can be extended upon request to NDK. NDK described that a graded approach is used in determining the deadline for corrective actions, but that the criteria for doing so is not documented.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The graded approach for assigning Severity Levels and for determining the deadline for corrective actions for violations in the Nuclear Regulatory Administrative Sanctions Regulation does not include adequate criteria for safety significance levels for violations at some types of authorized users.*	
(1)	**BASIS: GSG 13 para. 3.308. (a) states that** *"The factors to be taken into account by the regulatory body in deciding which type of enforcement action is appropriate in each case include the following (1) the safety significance of the non-compliance or of the violation and the complexity of the corrective action necessary."*
(2)	**BASIS: GSG 13 para. 3.313. states that** *"If there is no immediate risk to safety, the regulatory body should allow the authorized party a reasonable period of time in which to complete a corrective action. The time period should reflect the safety significance of the issue and the complexity of the corrective action required as well as other relevant factors (e.g. the proximity to a maintenance outage). However, in an integrated approach to safety, the contribution to the total risk of each non-compliance requiring a corrective action should be considered."*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
S13	**Suggestion: NDK should consider revising the criteria for the graded approach to enforcement included in Severity Level guidance in Annex 1 to the Nuclear Regulatory Administrative Sanctions Regulations to provide criteria that are appropriate to the different types of authorized facilities or activities, and documenting the criteria used for the graded approach in determining the deadline for corrective actions for all facilities and activities.**

8.2. ENFORCEMENT IMPLEMENTATIONS

The IRRS team discussed the application of the enforcement process with the representatives of NDK. The team discovered that since the inception of NRL 7381, there have been two attempts to apply administrative sanctions to authorized parties. In both cases the NDK Board returned the case without action. This occurred because both of the underlying violations had occurred during the period after annulment of Decree Law 702 and before publication of NRL 7381. The NDK Board determined that since NDK lacked a legal authorization during this time, NDK lacked the authority to issue administrative penalties for violations that occurred during the gap in regulatory authority. For example, a hospital had a change of ownership and the new owner had not received a license. NDK started process for issuing monetary penalty, however, it was not enforced and the sanction was stopped.

Additionally, the IRRS team was informed that Turkish courts have determined that not all elements of the licensing basis for Akkuyu NPP can be enforced using the administrative sanctions of NRL 7381. Due to the use of the build-own-operate model for the Akkuyu NPP, many elements of the licensing basis list for the NPP are codes, standards or legal requirements from the Russian Federation. NDK staff understands that NRL 7381 clearly establishes the legal authority for NDK to issue administrative sanctions for a failure by an authorized party to comply with any part of its licensing basis. However, based on opinions issued in the courts, there is a concern that any sanctions issued against foreign regulatory requirements could be overturned in the courts should the authorized party sue NDK after receipt of an administrative sanction.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Some elements of the licensing basis for NPPs may not be enforceable under Turkish law. The courts have signalled that the administrative sanctions of NRL 7381 Article 25 cannot be applied to requirements, adherence to codes and standards from the vendor country since they are not specifically described in Turkish law.*	
(1)	**BASIS: GSR Part 1 (Rev. 1) para. 2.5 states that** *"The government shall promulgate laws and statutes to make provision for an effective governmental, legal and regulatory framework for safety. This framework for safety shall set out the following: ....* *(10) Provision for the inspection of facilities and activities, and for the enforcement of regulations, in accordance with a graded approach;"*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 4.54 states that** *"The regulatory body shall establish and implement an enforcement policy within the legal framework for responding to non-compliance by authorized parties with regulatory requirements or with any conditions specified in the authorization."*
R18	**Recommendation: NDK should make changes to legal or regulatory structures that would allow for enforcement actions such as administrative sanctions to be applied to all of the regulatory requirements in the licensing basis for NPPs, whether they be established in Turkish law or the in regulatory programme provided by the vendor country.**

8.3. SUMMARY

NDK has developed and maintains a comprehensive enforcement system that is based on legally established enforcement authority with a wide set of sanctions, with a construct for providing a graded approach for determining the amount of the sanctions to be applied.

NDK should pay attention to developing a more appropriate set of criteria for determining the severity level for proposed administrative sanctions that reflect the unique nature of each type of authorized activity or facility. Additionally, NDK should pursue improvements to the legal framework for enforcement to ensure that all elements of the licensing basis for Akkuyu NPP can be enforced using the full range of enforcement tools described in NRL 7381.

The IRRS team noted that the Nuclear Regulatory Administrative Sanctions Regulation will have to be revised, as it currently refers to the annulled Decree Law No. 702 as the legal basis for enforcement.

Overall, the enforcement system in the Republic of Türkiye provides for effective and transparent communication between NDK authorities and authorized parties.

9. REGULATIONS AND GUIDES

9.1. GENERIC ISSUES

The Turkish regulatory framework is based on a set of legal documents which are organized into a hierarchy of seven distinct levels. The top level includes the constitution, The international instruments. laws and presidential decrees are on the next lower levels. Below governmental decree and regulation are the "secondary regulations" which are the regulations, rules and procedures of Ministries and authorities. The lowest level is for non-binding documents such as guides and standards. A process for establishing or adopting, promoting, and amending regulations and guides is in place. The format and development process of legal instruments must be in accordance with the national "Regulation on the Procedures and Principles of Legislation Preparation" which was updated in 2022. As a result, NDK updated its procedure on "Secondary Regulation Preparation Procedures and Principles" within the scope of the IMS of NDK in 2022. NDK regulations are drafted and revised according to this regulation and its main processes and procedures

For the preparation of secondary regulation drafts, the responsible department head must form a working group consisting of at least three persons and including one person from the Legal Department. NDK considers IAEA safety requirements, relevant regulations from other nations, and lessons learned from regulatory activities. After evaluation of internal comments, the NDK Board decides to obtain external input on the draft regulation. Drafts are provided to all interested parties and published for public comments within fifteen days. If NDK seeks international input on the draft regulation, an unofficial English translation is prepared, taking into account the institutions that will provide input. In case of a request for additional time by the institutions and organizations to which the draft of the regulation is forwarded, a period of not more than fifteen days may be granted. After evaluating the external input, the draft is declared ready for the Board's decision. Regulations not required to be published in the Official Gazette enter into force on the date of the Board's decision. Regulations that must be published in the Official Gazette, are sent to the Presidency to be published in the Official Gazette by the Board Services Directorate, with the coordinated initials of the Legal Department, following the Board's decision. All regulations in force are available on NDK website.

Guides are drafted by appropriate departments of NDK. Guides are approved by the president of NDK. NDK's procedure only requires internal consultation. In the practice of NDK, if deemed necessary, external comments are also sought for draft guides prior to approval. After approval, guides are published on NDK's website and relevant authorized parties are notified if deemed necessary. The issue of further developing the process on development of guidelines to systematically involve all interested parties is addressed more generally in Module 4.5, in Suggestion S6.

NDK has a Secondary Regulation Preparation Plan according to their internal procedure on the development of regulation. The Secondary Regulation Preparation Plan (which includes the subject heading of the secondary regulation draft, a brief summary of its content, the anticipated preparation time, the responsible service unit and the units to be coordinated) is prepared by the Legal Department by taking the opinions and requests of the technical departments. The Plan is approved by the President. The Plan covers a one-year period and is regularly revised and updated each December. According to the procedure, secondary regulations are reviewed by the responsible departments with a maximum period of four years. The regular review and revision of regulation and guides due to the newly issued regulation is not defined in the plan. When NRL 7381 came into force, the regulatory framework of Türkiye now complies with the IAEA Safety Fundamentals. Hence, an update of all existing regulations is being undertaken. The IRRS team was informed that regulatory documents will be updated in accordance with the lessons learned from reviewing prior applications, the Fukushima Daiichi accident, and to comply with the recent IAEA safety requirements and guides. During the update, some documents are expected to be replaced or combined. NDK has a plan to revise a significant amount of regulation and guides. To optimize the use of limited resources, the IRRS

team noted that it would be useful to define priorities using a graded approach. In the regulation developing process no priority has been defined.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK has a Secondary Regulation Preparation Plan only for one-year long period but regularly revised and updated in each December. The regular review and revision of existing regulation is not covered in the plan. In the regulation developing process no priority is defined."*	
(1)	**BASIS: GSG-13 para 3.60 states that** *"The regulatory body should follow a consistent process for establishing, reviewing and revising regulations and guides. The process should be well documented, comprehensive, cover all regulated activities and facilities, and should ensure a clear allocation of responsibilities. When establishing new regulations as well as revising existing regulations, careful consideration should be given to the cumulative effect of changes on safety."*
(3)	**BASIS: GSG-13 para 3.63(b) states that** *"Setting the priority for the development of the regulations or guide. The regulatory body should consider the advantages and disadvantages of the proposed regulations or guide, including such matters as: the risks associated with the facility or activity; the need for, and the costs associated with, improvements in safety; the number of authorized parties to be affected; the effects on the efficiency of the authorization process; and the feedback of information and experience from review and assessments, inspections, investigations and enforcement activities."*
S14	**Suggestion: NDK should consider further developing the Secondary Regulation Development Plan for a longer period, taking into account a graded approach.**

The IRRS team was informed that in the near future NDK plans a comprehensive review of the existing regulations. The IRRS team noted that the process could be supported by the involvement of a group of independent experts with an external and comprehensive viewpoint. The regulatory body may consider establishing an advisory committee on legal issues. The advisory committee could provide a valuable service to the regulatory body by helping to ensure that regulations are clear, practicable and complete.

A graded approach has been applied when providing exemptions from the law as "Activities related to nuclear energy and radiation and persons, facilities, devices and materials related to these activities are subject to regulatory control in terms of safety, security and nuclear safeguards. The exemptions to be granted and the limits and conditions of these exemptions are determined by the Authority in the regulation using a graded approach, so as to meet the security and safety requirements." A graded approach has been used while drafting regulatory processes and requirements for different facilities. According to the draft regulation on authorizations regarding nuclear installations, for example, some authorization steps are combined, simplifying the application documents required depending on the risk of the authorized activities. Implementation of a graded approach and participation of interested parties into the development of regulations is applied in the regulatory processes of NDK.

The regulation in force does not completely reflect IAEA safety requirements and best practices. This was acknowledged in NDK's Action Plan.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *There are several shortcomings in the current regulation (e.g., Periodic Safety Review, defence in depth concepts, cliff edge effect, postulated initial events for design, design extension conditions, operating experience feedback and fire safety are not regulated).*	
(1)	**BASIS: GSR Part 1 (Rev. 1) Requirement 33 states that** *"Regulations and guides shall be reviewed and revised as necessary to keep them up to date, with due consideration of relevant international safety standards and technical standards and of relevant experience gain"*
(2)	**BASIS: GSR Part 1 (Rev. 1) para. 4.62 states that** *"The regulations and guides shall provide the framework for the regulatory requirements and conditions to be incorporated into individual authorizations or applications for authorization. They shall also establish the criteria to be used for assessing compliance. The regulations and guides shall be kept consistent and comprehensive, and shall provide adequate coverage commensurate with the radiation risks associated with the facilities and activities, in accordance with a graded approach".*
R19	**Recommendation: NDK should fully implement the provisions of NRL 7381 and PD 95 in its regulations and guides. In this respect, an overall review of NDK's regulations and guides should be carried out in order to identify:** - **provisions in the current regulations and guides of NDK conflicting with higher level legislation,** - **gaps regarding the IAEA standards, and** - **relevant experience gain.**

NDK has regulations which are considered applicable to multiple areas, which are currently under review. For example, the IRRS team was informed that the drafts of Decree on Licensing of Nuclear Installations will include all submissions, review and assessment basis, goals and procedures for all authorizations of relevant facilities, considering a graded approach.

The Decree on Radiation Safety includes basic radiation protection provisions and authorization of radiation facilities and practices. However, it is already updated and most of its provisions are included in various regulations such as the Regulation on Radiation Safety and the Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices. These decrees will be annulled together with the Decree on Licensing of Nuclear Installation after all provisions are addressed in the new regulations.

The Regulation on Management System for Nuclear, Radiation and Radioactive Waste Facilities is updated to comply with GSR Part 2 and extended to apply on all nuclear, radiation and radioactive waste facilities. The regulation was issued in April 2022.

The Regulation on Radiation Protection in Nuclear Facilities addresses radiation protection issues in nuclear facilities, since the regulations on radiation safety excludes nuclear facilities. The regulation will be replaced by the draft regulation on Radiation Protection which will encompass all facilities and activities. Provisions specific to nuclear facilities will be addressed in the draft Regulation on Nuclear Safety.

The Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control addresses issues on clearance criteria for release of radioactive materials and removal of nuclear facility sites from regulatory control. The draft Regulation on Authorizations Regarding Nuclear Facilities already addresses the main issues of authorization of decommissioning.

The Regulation on Management of Radiation Emergencies addresses the issues of classification of emergency cases, responsibilities of authorized persons for on-site emergency preparedness and response,

and the primary responsibilities of other authorities or governmental bodies in the case of a radiation emergency. The IRRS team was informed that this regulation will be updated to comply with NRL 7381.

The Regulation on Equipment Procurement Process and Approval of Manufacturers for Nuclear Facilities includes provisions on the regulatory control of NDK over the supply chain for nuclear facilities and manufacturing of items important to safety of a facility, and on the authorization process of manufacturers for nuclear facilities. The IRRS team was informed that the regulation will be replaced by the Regulation on Authorizations Regarding Companies that Provides Goods and Services to Nuclear Facilities within the scope of the authorization of companies which provide safety significant goods and services. The provisions on procurements and manufacturing of equipment are addressed in the draft Regulation on Authorizations Regarding Nuclear Facilities.

9.2. REGULATIONS AND GUIDES FOR NUCLEAR POWER PLANTS

Türkiye has a set of safety requirements specific to Nuclear Power Plants which are partially under revision. The IRRS team was informed that NDK is developing a new regulation on Nuclear Safety on the basis of IAEA safety standards. This activity is ongoing, and the drafts are under internal consultation. The regulation will be supported with lower-level requirements documents or guides for more detailed issues.

NDK identified issues relevant to safety are not covered by the existing regulation, including: defence in depth concepts, cliff edge effect, postulated initial events for design, design extension conditions, operating experience feedback, and fire safety. Some additional specific issues for NPPs that are not addressed in regulations are: access to containment, steam supply systems, and support systems. The IRRS team was informed that these shortcomings will be addressed in the revision of regulations. (see recommendation R20 in section 9.1.).

The new regulation will replace the Regulation on Specific Principles for Safety of Nuclear Power Plants, the Regulation on Design Principles for Safety of Nuclear Power Plants, and the Regulation on Nuclear Power Plant Sites.

The regulation on Construction Inspection of the Nuclear Power Plants, includes provision for third party inspections during construction of nuclear power plants and in the authorizations processes for third party inspection companies. The requirement on this regulation is extended to all nuclear facilities and to other specified activities like manufacturing within the scope of draft Regulation on Authorizations Regarding Nuclear Facilities and the IRRS team was informed that it will be replaced by the Regulation on Authorizations Regarding Companies that Provides Goods and Services to Nuclear Facilities for authorization processes.

In order to prepare for the commissioning and operation of the NPPs the Regulation on Operating Organization, Personnel Qualification and Operating Personnel Licensing for Nuclear Power Plants will be revised. The mentioned regulations address the organizational issues, personnel and training requirements, and authorization of key personnel, namely, reactor operators and senior operators. Within the frame of the updated experience gained during the construction phase will be taken into account. Additionally, the NDK's Practical Guides are developed to provide more details on specific regulatory requirements and associated criteria. These are:

- Guide on the Format and Content of the Site Report for Nuclear Power Plants
- Guide on Specific Design Principles (this will be replaced by a more comprehensive guide for NPPs)
- Guide on Construction Activities that Can Be Conducted in Nuclear Facilities as of Authorization Stages (will be annulled, issues are addressed in Regulation on Authorizations Regarding Nuclear Facilities)
- Guide on Owner and Authorization Applications for Nuclear Installations

In addition to these, the following drafts are under development.

- Regulation on Fire Safety in Nuclear Facilities
- Regulation on Notifications, Records and Reports for Nuclear Facilities

9.3. REGULATIONS AND GUIDES FOR RESEARCH REACTORS

According to PD 95 one of the duties of the regulatory body is to review and evaluate the information and documents submitted to the authority for approval. There is a regulation on operational safety called "Regulation on Specific Principles for Safety of Research Reactors (OG No. 27144, 2009). In addition, there is a regulation called the "Recording and Reporting Regulation in Research Reactors" (OG No. 27144, 2009), which regulates the records kept regularly during the operation of the research reactor and the reports submitted to the regulatory authority. The records required to be kept in accordance with the regulations are examined, reviewed and evaluated in terms of operational safety during inspection. Provisions relating to documents submitted to the Regulatory Authority for review and evaluation during the licensing process of nuclear installations are included in the Decree on the Licensing of Nuclear Installations (CD No. 83/7405, 1983).

The NDK has an action plan to formulate existing regulation amendments and has also been initiated for new regulations and guides. However, the IRRS team noted that NDK would benefit from expanding its action plan to develop some documents that review an important regulatory requirement for approval purposes, as well as evaluate safety analysis reports and periodic safety reports.

The NDK has drafted an updated version of the regulations on licensing of nuclear installations based on NRL 7381 and CD No. 83/7405. The NDK will have to finalize the updated version of the regulation to implement an effective regulatory core process at the facility level.

9.4. REGULATIONS AND GUIDES FOR WASTE MANAGEMENT FACILITIES

The “Regulation on Radioactive Waste Management” describe the classification of radioactive wastes. In terms of half-life and activity, considered disposal options are near surface disposal, intermediate depth, deep disposal and borehole disposal. In Turkish regulation LLW and ILW are grouped as LILW waste category. Depending on the activity level and half-life of the LILW, this waste may be disposed in a near surface, intermediate depth or deep disposal facility.

Provisions for the minimization of radioactive waste are established the “Regulation on Radioactive Waste Management” and in the “Regulation on Special Principles for the Safety of Nuclear Fuel Cycle Facilities”. In order to minimize the volume of RW, the “Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control” determines methods and principles related to clearance of radioactive material and waste from operation and decommissioning of nuclear facilities and to release of site from regulatory control.

The Radiation Protection Programme to be submitted for license application for radiation facilities according to the “Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices”, allows to propose in the Waste Management Plan, clearance and exemption limits for radioactive materials.

However, in order to make clearance generally applicable for all activities/facilities, the scope of the existing clearance regulation should be extended.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control determines methods and principles related to clearance of radioactive material and waste from operation and decommissioning of nuclear facilities and to release of site from regulatory control. To make it applicable to all activities and facilities, the scope of the regulation should be extended.*	
(1)	**BASIS: GSR Part 3 Requirement 8 states that** *"The regulatory body shall approve which sources, including materials and objects, within notified practices or authorized practices may be cleared from regulatory control" Para. 3.12 states that "The regulatory body shall approve which sources, including materials and objects, within notified or authorized practices may be cleared from regulatory control, using as the basis for such approval the criteria for clearance specified in Schedule I or any clearance levels specified by the regulatory body on the basis of these criteria."*
(2)	**BASIS: GSR Part 5 para. 3.8. states that** *"To facilitate compliance with regulatory requirements, the regulatory body has to do the following: ... - Establish criteria for the clearance of material from regulatory control, in accordance with national policy"*
(3)	**BASIS: GSR Part 5 Requirement 10 states that** *"Radioactive material for which no further use is foreseen, and with characteristics that make it unsuitable for authorized discharge, authorized use or clearance from regulatory control, shall be processed as radioactive waste…"*
(4)	**BASIS: RS-G-1.7 para. 3.4. states that** *"The primary radiological basis for establishing values of activity concentration for the exemption of bulk amounts of material and for clearance is that the effective doses to individuals should be of the order of 10 μSv or less in a year."*
(5)	**BASIS: WS-G-5.1 para 3.7. states that** *"The regulatory body should establish safety requirements and guidelines for the planning, approval and conduct of clean-up activities, for the management of contaminated material and the waste that arises from this process, and for the release of land, buildings and structures from regulatory control. The responsibilities of the regulatory body should also include: a. Establishing, promoting and adopting criteria and guidance for the clean-up and release of sites as a part of decommissioning activities;"*
R20	**Recommendation: NDK should extend the scope of the Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control to make it applicable to all activities and facilities.**

Interdependences are dealt with in article 9 of the "Regulation on Radioactive waste management".

The "Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities" deals with the approval of Waste Acceptance Criteria (WAC) by NDK and states that "radioactive wastes and waste packages are accepted to the facility in accordance with waste acceptance criteria". The IRRS team was informed that waste acceptance criteria for the near surface repository will be developed by TENMAK and approved by NDK by licensing the operation of the facility. Presently the WAC applied for the waste processing and storage facility in Istanbul, authorized at present as radiation facility, are developed by TENMAK and mentioned in the NRWMP Section E-2.3. Previous regulations on radiation safety did not require an approval of WAC by NDK. The IRRS team was informed that the approval of WAC for these installations by NDK will be dealt with in the renewal of the license application for these facilities (scheduled before March 2023).

9.5. REGULATIONS AND GUIDES FOR RADIATION SOURCES FACILITIES AND ACTIVITIES

The legal framework for radiation safety is based mainly on NRL 7381 and on the Presidential Decree No 95. The NDK Department of Legal Services is responsible for developing regulations assisted by the Department of Radiation Practices and Department of Inspection. There are regulations specific to radiation sources like the 'Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices' and regulations that apply to both nuclear and radiation safety such as 'Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation Activities'. There are lower-level regulations called 'Procedures and Principles', for example, the 'Procedures and Principles Regarding License to Use and Possess Radiation Sources'. Guides for radiation sources facilities and activities are developed by the Department of Radiation Practices or Department of Inspection and sent for approval to the NDK Board. A lot of regulations and guides applicable to radiation sources facilities and activities are under revision due to NDK being recently established, however, there is no provisions taken into account for prioritizing necessary revisions (see suggestion S13 in section 9.1).

There are some general provisions included in regulatory requirements for safety assessment of radiation sources facilities and activities, e.g., evaluation report has to be submitted by applicant for commissioning permit. Lower-level risk facilities and activities (categorized as 'third group' by NDK) have to develop radiation protection programme covering elements of safety assessment. There are no requirements and guidance for safety assessment in accordance with IAEA Safety Standard GSR Part 4 to be carried out by the applicant for 'first and second group' radiation sources facilities and activities authorization. NDK has recognized and included in its action plan the introduction of explicit requirements in relevant regulations on responsibility of the applicant to demonstrate safety.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *There are no requirements and guidance for safety assessment to be carried out by the applicant for first and second group radiation sources facilities and activities as categorized by NDK.*	
(1)	**BASIS: GSR Part 1 (Rev 1) Requirement 24 states that** *"The applicant shall be required to submit an adequate demonstration of safety in support of an application for the authorization of a facility or an activity".*
(2)	**BASIS: GSR Part 1 (Rev 1) para. 4.33. states that** *"Prior to the granting of an authorization, the applicant shall be required to submit a safety assessment, which shall be reviewed and assessed by the regulatory body in accordance with clearly specified procedures"*
(3)	**BASIS: GSR Part 1 (Rev 1) para. 4.34. states that** *"The regulatory body shall issue guidance on the format and content of the documents to be submitted by the applicant in support of an application for an authorization".*
(4)	**BASIS: GSR Part 4 Requirement 2 states that** *"A safety assessment shall be carried out for all applications of technology that give rise to radiation risks; that is, for all types of facilities and activities"*
R21	**Recommendation: NDK should establish requirements for safety assessment for first and second group radiation sources facilities and activities and prepare guidance on the content of safety assessment reports.**

9.6. REGULATIONS AND GUIDES FOR DECOMMISSIONING ACTIVITIES

At present there is no specific regulation for decommissioning, but is under development. At present, applicable regulations dealing with decommissioning are:

- Regulation on Radioactive Waste Management
- Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities
- Regulations on Clearance in Nuclear Facilities and Release of Site from Regulatory Control
- Decree on Licensing of Nuclear Installations
- Regulation on Wastes from the Use of Radioactive Materials
- Regulation on Safety Principles of Fuel Cycle Facilities
- Regulation on Specific Safety Principles for NPPs
- Regulation on Design Principles for NPPs
- Regulation on Authorisation on Radiation Facilities and Applications.

The following draft regulations deal with radioactive waste management and decommissioning and are in the process of approval:

- Regulation on Authorization regarding Nuclear Facilities
- Regulation on Radioactive Waste and Spent Fuel management
- Regulation on Decommissioning
- Regulation on Nuclear Safety

The Regulation on Authorization Regarding Nuclear Facilities and the Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities (published in 2022) will completely replace the Decree on Licensing of Nuclear Installations.

9.7. REGULATIONS AND GUIDES FOR TRANSPORT

NDK has issued a regulation on the safe transport of radioactive material based on IAEA TS-R-1 (2009), which has since been replaced by SSR-6, rev. 1 (2018). The changes in SSR-6 can have an impact on international transport activities, for example the regulation of authority approval of package designs may differ.

The international regulatory basis for road carriage of all classes of dangerous goods is ADR and the most recent ADR (2021) is based on SSR-6, rev. 1 (2018). The Ministry of Transportation and Infrastructure is responsible for the review and assessment of requirements within the scope of ADR for road transport, RID for rail transport, the IMDG-code for sea transport and ICAO-TI for air transport. The IRRS team was informed that Türkiye has made an accession to sign the ADR-agreement for road transport in 2010. The Ministry has the same responsibility within the scope of RID, for rail transport of dangerous goods, but no radioactive material is presently transported by rail. Sea transport and air transport of radioactive material is regulated by the IMDG-code and ICAO Technical Instructions, according to international agreements.

There is a discrepancy between the internationally agreed regulations for transport of dangerous goods and the national regulations for radioactive material. In the international regulations, class 7 radioactive material, is based on SSR-6, rev.1 (2018), but the national regulations are based on TS-R-1 (2009). Some of the changes can have serious implications that, for example a package design of Type B(U) approved in Türkiye might not be accepted as a unilateral approval in accordance with SSR-6 (Rev. 1).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The current national regulations for transport of radioactive material are not compliant with SSR-6 (Rev. 1).*	
(1)	**BASIS: GSR Part 1 (Rev. 1), requirement 33 states that** *"Regulations shall be reviewed and revised as necessary to keep them up to date, with due consideration of relevant international safety standards and of relevant experience gained".*
(2)	**BASIS: SSR-6 (Rev. 1) para. 307 states that** *"The competent authority shall assure compliance with these Regulations".*
R22	**Recommendation: NDK should update the national regulations on transport of radioactive material in line with SSR-6 (Rev. 1).**

9.8. REGULATIONS AND GUIDES FOR OCCUPATIONAL EXPOSURE

The main regulations regarding occupational exposure in the Turkish regulatory framework are:

- Radiation Safety Decree
- Regulation on Radiation Safety
- Regulation on Radiation Protection in Nuclear Facilities
- Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices
- Regulation on Protection of Outside Workers from Risks of Ionizing Radiation in Controlled Areas

NDK has an extensive set of guides published, covering aspects related to occupational exposure, such as guidelines on preparing the radiation protection program for different types of facilities, classification of areas, use of protective equipment, Radon in indoor environments, dose calculations for flight personnel, etc

Many of these guides are currently under revision to adapt them to the new regulatory framework (see recommendation R20 in section 9.1).

9.9. REGULATIONS AND GUIDES FOR MEDICAL EXPOSURE

Responsibility for regulatory oversight of medical exposure and patient protection was legally transferred from NDK to the MoH through PD95 that established the NDK.

The laws and regulations related to medical exposure that MoH enforces are the "Law on radiology, radiotherapy, and electromagnetic therapy and other physiotherapy establishments, number 3153 (issued in 1937)", "Regulation on radiology services, Official Gazette, number 31821 (issued in 2022)" and "Regulation on health services provided using ionizing radiation on radionuclides, Official Gazette, number 31821 (issued 2022)". The Turkish Medicines and Medical Devices Agency, under the jurisdiction of the MoH, has issued a regulation "Regulation on quality conformity and quality control tests of diagnostic radiology, nuclear medicine and radiotherapy group medical devices (issued 2021)".

The regulations issued by the MoH are not entirely in line with the relevant IAEA safety standards, and the following areas, among others, are not addressed fully:

- principles of justification and optimization of medical exposures;
- that relevant parties regarding medical exposure (e.g., radiological medical practitioners, referring medical practitioners, medical physicists and medical radiation technologists) are notified of their duties in relation to protection and safety for individuals undergoing medical exposure;

- dose constraints for carers and comforters and volunteers for biomedical research;
- criteria and guidelines for the release of patients who have undergone therapeutic radiological procedures using unsealed sources or patients who still retain implanted sealed sources;
- that no individual incurs a medical exposure as a carer or comforter unless he or she has received, and has indicated an understanding of, relevant information on radiation protection and information on the radiation risks prior to providing care and comfort to an individual undergoing a radiological procedure;
- that for therapeutic radiological procedures, calibration, dosimetry and quality assurance, including the acceptance and commissioning of medical radiological equipment, are fulfilled by or under the supervision of a medical physicist;
- that for diagnostic radiological procedures and image-guided interventional procedures, medical imaging, calibration, dosimetry and quality assurance, including the acceptance and commissioning of medical radiological equipment, as specified in are fulfilled by or under the oversight of or with the documented advice of a medical physicist;
- justification for radiological procedures to be performed as part of a health screening programme for asymptomatic populations;
- requirement on arrangements for a pregnant or breast-feeding female patients; and
- requirements to investigate and report unintended medical exposure

The MoH has drafted regulations on "Regulation on Nuclear Medicine Services" and "Regulation on Radiation Oncology Services". These draft regulations are like "Regulation on Radiology Services" in their content and scope, and therefore do not fully address the issues listed above.

The IAEA team was informed that the MoH is updating its regulatory system for patient exposure in line with the new regulations, such as its checklists for inspection to ensure that patient exposure is appropriately addressed in its regulatory system.

NDK regulation "Radiation Safety Regulation (24.3.2000)" lays down generic provisions on justification and optimization of medical exposure, devices used in medical practices, quality assurance, diagnostic reference levels, biomedical research, carers and comforters, release criteria for patients treated radioactive substances and on minimization of unintended medical exposure. Additionally, on the draft regulation "Radiation Protection Regulation" developed by NDK has some provisions on medical exposure. However, as the responsibilities for regulatory oversight for medical exposure are transferred from NDK to MoH, these regulations are not enforced by the NDK. A recommendation related to conflicting requirements is given in section 9.1 Requirement XX.

The IRRS team has noted that NDK has recognised in its self-assessment the need for further improvement in regulations related to justification for radiological procedures to be performed as part of health screening programme, arrangements for appropriate radiation protection of female patients and diagnostic reference levels.

NDK has guides for medical facilities, for the safe use of medical equipment (e.g., for dental practices) and preparation of documents for authorization. The MoH is also involved in the supervision of medical exposure but has not issued a comprehensive set of guides on all the requirements on medical exposure as established in GSR Part 3.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *The current national regulations that form the basis for NDK's and MoH regulatory oversight of medical exposure do not fully address the requirements established in GSR Part 3. Moreover, there is no comprehensive guidance on how meet the requirements on the safety of medical radiation sources with regard to patients, workers, carers and comforters, volunteers in biomedical research and the public in medical uses in the regulation.*	
(1)	**BASIS: GSR Part 3 para. 2.1. states that** *"The government shall establish and maintain an appropriate and effective legal and regulatory framework for protection and safety in all exposure situations. This framework shall encompass both the assignment and the discharge of governmental responsibilities, and the regulatory control of facilities and activities that give rise to radiation risks. The framework shall allow for the fulfilment of international obligations."*
(2)	**BASIS: GSR Part 1 (Rev. 1) Requirement 32 states that** *"The regulatory body shall establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based."*
(3)	**BASIS: GSR Part 3 Requirement para. 2.29. states that** *"The regulatory body shall establish requirements for the application of the principles of radiation protection specified in paras 2.8–2.12 for all exposure situations and shall establish or adopt regulations and guides for protection and safety."*
(4)	**BASIS: SSG-46 states that** *"… This Safety Guide recommends how medical uses of ionizing radiation should be carried out safely within the framework of GSR Part 3."*
R23	**Recommendation: NDK and MoH should review current regulations on medical exposure to address all requirements fully as established in GSR Part 3 and continue developing guides for the safe use of radiation sources in medical applications with regard to patients, workers, carers and comforters, volunteers in biomedical research and the public in medical uses in line with SSG-46.**

9.10. REGULATIONS AND GUIDES FOR PUBLIC EXPOSURE

NDK has published regulations on the responsibilities of Licensees with regards to public exposure on following topics.

- radioactive materials clearance,
- release from the regulatory control,
- authorized limits on discharges to the environment,
- regulation on source monitoring,
- environmental monitoring and
- reporting public exposure.

NDK regulations have requirements on justification on remedial action plans and protective actions in existing exposure situations. Additionally, NDK has also published following guides on consumer products. indoor radon. However, NDK has no regulations on reference values for Commodities.

NDK uses the terminology of "critical groups" in the existing regulatory documents, to assess public dose. The IRRS team was informed that this term "Critical group" is now being revised to "representative person" in the draft "Regulation on Radiation Protection" document (see Rxx in section 9.1).

Allowable Radioactivity levels in drinking water, are specified by Ministry of Health, however, the IRRS team was informed, that the reference values in food, feed and other commodities are not established. Presently TENMAK is analysing the radioactivity in commodities on request by interested parties by using the Codex Alimentarius Standards.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *Reference levels for exposure due to radionuclides in commodities are not established by the regulatory body or other relevant authorities*	
(1)	**BASIS: GSR Part 3 Requirement 51 states that** *"The regulatory body or other relevant authority shall establish reference levels for exposure due to radionuclides in commodities."*
R24	**Recommendation: NDK should establish reference levels for exposure due to radionuclides in commodities.**

9.11. SUMMARY

The basic requirements for nuclear safety and radiation safety are regulated in law NRL7381. More detailed provisions are included in the legally binding regulations of NDK. There are also non-binding guides on NDK's field of activity.

The regulations of the NDK are prepared and revised according to the provisions of the "Regulation on the Procedures and Principles of Legislation Preparation", and internal procedures, however there are several shortcomings in the current regulation. A comprehensive review of existing regulatory documents needs to be carried out to identify and implement:

- provisions in the current regulations and guides of NDK conflicting with higher level legislation,
- gaps regarding the IAEA standards, and
- relevant experience gain.

This was partially acknowledged in the NDK action plan.

The basis for establishing regulations on medical exposure is in "Law on radiology, radiotherapy, and electromagnetic therapy and other physiotherapy establishments, (issued in 1937)", that is enforced by the Ministry of Health (MoH). In the field of the safe use of radiation sources in medical application, the current national regulations do not cover fully IAEA GSR Part 3 requirements. The NDK and MoH should review current regulations on medical exposure to address all requirements fully as established in GSR Part 3.

10. EMERGENCY PREPAREDNESS AND RESPONSE – REGULATORY ASPECTS

10.1. AUTHORITY AND RESPONSIBILITIES FOR REGULATING ON-SITE EPR OF OPERATING ORGANIZATIONS

By PD 95 NDK is authorized to regulate on-site radiation emergency management of operating organizations of regulated facilities or activities that could necessitate emergency response actions. Issues regarding off-site management are arranged by the Disaster and Emergency Management Presidency (AFAD), with the approval of the NDK.

NRL 7381 defines the organization, duties and authorities of NDK, and the responsibilities of the authorized person in relation to on-site management of radiation emergencies.

The Regulation on the Management of Radiation Emergencies details the regulations, procedures and principles for the on-site management of radiation emergencies that may occur during the activities subject to regulatory control regarding nuclear energy and ionizing radiation, and to determine the duties and responsibilities of operating organizations.

PD 95 confirms NDK as the Authority for the regulation of radioactive transport activities. The regulation of radioactive transport activities is addressed by the Regulation on Safe Transport of Radioactive Materials, which covers the transportation of radioactive material via road, railway, air and sea transportation means. Within this regulation, there is a requirement to have arrangements in place for emergency procedures and response.

10.2. REGULATIONS AND GUIDES ON ON-SITE EPR OF OPERATING ORGANIZATIONS

Regulation on the Management of the Radiation Emergencies lays out the requirement that authorized person prepares the radiation emergency plan regarding the facilities and applications and submits it to the Authority at the authorization stages, as determined by the Authority.

The Regulation on the Management of the Radiation Emergencies details the requirements of the contents of the radiation emergency plan and that it includes all the information that clearly lays out the response approach to be applied on-site, the mitigatory and protective actions and other response actions to be implemented, the radiation emergency management system, the emergency response organization, and the determination of the duties and responsibilities within the scope of the response. Additional articles of the Regulation lay out the main principals to be considered in preparing the plan and the content of the radiation emergency plan.

On-site emergency plans of the nuclear facilities and radioactive waste management facilities are submitted by the applicant and reviewed by NDK as part of the authorization application process as detailed in the Decree on Licensing of Nuclear Installations and Regulation on Authorizations and Safety Principles for Radioactive Waste Facilities, respectively, with authorisation granted against the totality of the submission.

The Regulation on Authorization of Radiation Facilities and Radiation Practices requires that during the operation of radiation facilities and the execution of radiation practices, the radiation protection programme shall be prepared by the authorized person, to protect employees, public, environment and future generations from radiation.

The Regulation on Authorization of Radiation Facilities and Radiation Practices indicates that radiation protection program shall include a radiation emergency plan based on the type of the radiation facilities and radiation applications.

In addition, the Regulation on Authorization of Radiation Facilities and Applications indicates that prevention of radiation emergencies and providing radiation emergency preparedness and response are among the primary responsibilities of the authorized person or the applicants.

The IRRS team noted there are no guides available for use by the authorized person to support the development of on-site emergency plans or exercise scenarios, and how the plans and exercise are evaluated by NDK.

Within the Regulation on Authorization of Radiation Facilities and Radiation Practices and the Regulation on the Management of the Radiation Emergencies there are requirements that the radiation emergency plan of the radiation facilities and the radiation applications shall be updated when necessary, according to the updates in the accident scenarios formed as a result of the safety assessments, lessons learned from the executed exercises, lessons learned from the similar radiation facilities and the radiation activities. The revised plan is required to be submitted to the Authority in accordance with the provisions of the relevant regulation.

The IRRS team noted that there is no specific periodicity for the review of the on-site emergency plans stated within the regulations, and it is reliant on the authorized person to submit the updated emergency plan as a result of the technical and administrative changes in facilities and applications, updates in accident scenarios after safety assessments, lessons learned after the exercises, experiences gained in similar facilities and activities, lessons learned from the analysis of radiation emergencies and considering other issues deemed necessary by the authorized person and is not linked to any applicable exercise regime periodicity.

The necessity to have an emergency plan has been addressed for various types of facilities in relevant regulations: Regulation on Specific Principles for the Safety of Nuclear Power Plants, Regulation on Specific Principles for the Safety of Research Reactors, the Regulation on Specific Principles for the Safety of Nuclear Fuel Cycle Facilities, Regulation on Radioactive Waste Management, the Regulation on Authorization of Radiation Facilities and Radiation Practices, Regulation on Radiation Protection in Nuclear Facilities, and Regulation on Radiation Safety.

The Regulation on Safe Transport of Radioactive Materials requires emergency procedures and arrangements to be in place. However, there are no specific guides for use by the authorized person to develop emergency plan in line with the requirements of these regulations.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *There are no established guides for the use by authorised persons in relation to the development of emergency plans, and requirements of emergency exercises on which regulatory judgments, decisions and actions are to be based.*	
(1)	**BASIS: GSR Part 7 para. 4.12. states that** *"The regulatory body is required to establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based [..]. These regulations and guides shall include principles, requirements and associated criteria for emergency preparedness and response for the operating organization".*
(2)	**BASIS: GSR Part 7 para. 6.33. states that** *"The conduct of exercises shall be evaluated against pre-established objectives of emergency response to demonstrate that identification, notification, activation and response actions can be performed effectively to achieve the goals of emergency response"*
(3)	**BASIS: GSR Part 7 para. 6.30 states that** *"... The exercises shall be systematically evaluated ... and some exercises shall be evaluated by the regulatory body."*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(4)	**BASIS: GSR Part 7 para. 4.10 states that** *"… to ensure that that appropriate and coordinated programmes of training and exercises are in place and implemented, and that training and exercises are systematically evaluated."*
R25	**Recommendation: NDK should develop guides in line with regulations and relevant IAEA safety standards:** **i. to provide detailed guidance in the development of emergency plans, and content of the associated emergency exercise plans, for all Nuclear Facilities, Radiation Facilities and associated activities;** **ii. to document the evaluation criteria used by NDK for the evaluation of emergency plans and emergency exercises;** **iii. for use by NDK staff on the internal evaluation of emergency plans, and the evaluation of emergency exercises to include how pre-established objectives are determined.**
Observation: *Within the Regulation on Management of Radiation Emergencies there is the requirement for emergency exercises to be periodically tested, however, there is no specific requirement for authorised persons to periodically review their emergency plans.*	
(1)	**BASIS: GSR Part 7 para. 6.18. states that** *"The appropriate responsible authorities shall ensure that: … (e) Emergency plans and procedures are periodically reviewed and updated".*
(2)	**BASIS: GSR Part 7 para. 6.36. states that** *"Arrangements shall be made to maintain, review and update emergency plans, procedures and other arrangements and to incorporate lessons from research, operating experience (such as in the response to emergencies) and emergency exercises".*
(3)	**BASIS: GSR Part 7 para. 6.38. states that** *"The operating organization and response organizations shall make arrangements to review and evaluate responses in actual events and in exercises, in order to record the areas in which improvements are necessary and to ensure that the necessary improvements are made".*
R26	**Recommendation: NDK should establish requirements for nuclear and radioactive waste facilities to periodically review and revise emergency plans.**

10.3. VERIFYING THE ADEQUACY OF ON-SITE EPR OF OPERATING ORGANIZATIONS

The review and assessment of the adequacy of the on-site EPR is based on the requirements laid out in Regulation on the Management of the Radiation Emergencies, in accordance with the general procedure on review and assessment (NTD-PR07).

Regulation on the Management of the Radiation Emergencies requires that the authorized person shall assess the results of the executed exercises for Category I, II, and III facilities and shall submit the assessment report prepared for full scope exercises to NDK within two months at the latest.

Various types of exercises can be undertaken, drills, table-top exercise, partial exercise, full-scale exercise or field exercise which is combined with a partial or full-scale exercise. The requirements for these to be undertaken are outlined within the Regulation on the Management of the Radiation Emergencies, with Category I facilities required to undertake a full-scale exercise every three years.

The IRRS team noted that there was no explicit requirement for NDK to evaluate the emergency exercises, or guidance on the evaluation criteria.

The recommendation in relation to the requirement for evaluation of emergency exercises has been captured under section 10.2.

The EPR arrangements of operating organizations are within the inspection of NDK according to The Regulation on the Management of the Radiation Emergencies. These inspections are performed according to the Regulation on Inspections Related to the Nuclear Energy and Ionizing Radiation, which regulates the procedures and the principles regarding the inspections made by NDK for the activities related to nuclear energy and ionization radiation that require the authorization, the qualification of the inspectors, the types and the scope of the inspections.

PD 95 requires the integration of emergency arrangements of operating organizations with those of off-site response organizations.

10.4. ROLES OF THE RB IN A NUCLEAR OR RADIOLOGICAL EMERGENCY

Türkiye's Disaster Response Plan which was prepared as mandated in the Regulation on Disaster and Emergency Response Services necessitates the Chemical, Biological, Radiological and Nuclear (CBRN) service group for the management at the national level of radiation emergencies, and for coordination between different organizations. NDK is a member of the CBRN Service Group.

National Radiation Emergency Plan is prepared as an event type plan in accordance with Türkiye's Disaster Response plan. Duties and responsibilities of the institutions which are members of the CBRN Service Group are defined by Regulation on Official Duties Related to the Chemical, Biological, Radiological and Nuclear Threats and Hazards.

The National Radiation Emergency Plan defines the responsibilities of the NDK in the event of a nuclear or radiological emergency.

Responsibilities are assigned to NDK on the legislation basis and contained within PD 95. This includes the requirement to inform the relevant national and international organizations about the extraordinary events. International reporting obligations are addressed within the NDK integrated Management System procedure for conducting relations with national and international organisations relating to radiation emergencies.

Regulation on Official Duties Related to the Chemical, Biological, Radiological and Nuclear Threats and Hazards assigns NDK specific roles.

The IRRS team noted that within the National Radiation Emergency Plan, the role of the NDK is not clear as they reside within the CBRN group.

In addition, there are many assigned duties on the NDK within the National Radiation Emergency Plan, although it is unclear the exact nature of the duty or responsibility.

NDK have recognised they do not have an internal emergency response and preparedness plan to coordinate the response functions and maintain response capability within the NDK Disaster and Emergency Management Group. In addition, the self-assessment action plan identified NDK does not have a formal training and qualification programme for its personnel responding to an emergency.

The Disaster and Emergency Management Group of the NDK is operated under the Department of Radiation Protection. Radiation emergency management teams composed of members from other departments are also established and active. The Group is equipped with necessary tools such as dosimeters, identifiers, radiation detection systems, communication devices, etc., in addition to a Radiation Early Warning Systems with 211 stations nationwide and Decision Support Systems (Hy Split and JRodos) that provide plume dispersion modelling.

The provision of emergency response is via a dedicated emergency phone and the use of an on-call rota system ensuring contact is available 24/7.

The Disaster and Emergency Management Group participates in the exercises conducted by IAEA, NATO, AFAD. A full-scale field exercise was conducted by AFAD in Iğdır province in 2019 with a further full-scale field exercise planned to be held in November 2022 for the Akkuyu region.

NDK advised that the Government of Türkiye will be hosting an IAEA EPREV mission in 2023 to further review the national emergency preparedness arrangements.

According to the Article 21.1 of the NRL 7381, "The Authority cannot be given obligations that will weaken its regulatory activities, contradict these activities or prevent it from carrying out its activities effectively. …" which includes the responsibilities on EPR

As part of the IRRS self-assessment process, NDK have recognised that there are conflicting statements within Article 18 of the Regulation on Management of Radiation Emergencies, regarding the responsibilities of the authorised person and that this has been identified as an action to be resolved. The availability of formal training and qualification programme for personnel responding to an emergency has also identified as a gap in the self-assessment report.

The identified requirement to resolve the conflicting statements as identified by NDK in their action plan is addressed in recommendation R20 in section 9.1.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: *NDK does not have an internal emergency response and preparedness plan to coordinate the response functions and maintain response capability within the NDK Disaster and Emergency Management Group and there is no formal training and qualification programme for its personnel responding to an emergency.*	
(1)	**BASIS: GSR Part 7 para. 6.16. states that** *"Plans, procedures and other arrangements for effective emergency response, including coordinating mechanisms, letters of agreement or legal instruments, shall be made for coordinating a national emergency response [..]"*
(2)	**BASIS: GSR Part 7 para. 6.17. states that** *"Each response organization shall prepare an emergency plan or plans for coordinating and performing their assigned functions as specified in Section 5 and in accordance with the hazard assessment and the protection strategy [..]."*
(3)	**BASIS: GSR Part 7 para. 6.30. states that** *"Exercise programmes shall be developed and implemented to ensure that all specified functions required to be performed for emergency response [..]".*
(4)	**BASIS: GSR Part 7 Requirement 21 states that** *"The government shall ensure that overall organization for preparedness and response for a nuclear or radiological emergency is clearly specified and staffed with sufficient personnel who are qualified and are assessed for their fitness for their intended duties."*
(5)	**BASIS: GSR Part 7 Requirement 25 states that** *"The government shall ensure that personnel relevant for emergency response shall take part in regular training, drills and exercises to ensure that they are able to perform their assigned response functions effectively in a nuclear or radiological emergency."*
R27	**Recommendation: NDK should:** **i. develop and implement an internal emergency plan for the operation of the NDK Disaster and Emergency Management Group in line with relevant regulations,**

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	specifying the roles required to enact the plan; **ii. develop and implement EPR training programme for the regulatory staff in line with competency requirements of NDK emergency response staff as detailed in the emergency plan.**
Observation: *According to the Law, "the NDK cannot be given obligation that will weaken its regulatory activities, contradict these activities or prevent it from carrying out its activities..." whereas, according to PD 95 NDK is responsible for a number of activities such as coordination of planning at the authorized person level etc. Within the National Radiation Emergency Plan it is not clear the role of NDK undertakes, as they are included within the CBRN Service Group.*	
(1)	**BASIS: GSR Part 7 para. 4.7. states that** *"The government shall ensure that all roles and responsibilities for preparedness and response for a nuclear or radiological emergency are clearly allocated in advance among operating organizations, the regulatory body and response organizations."*
(2)	**BASIS: GSR Part 7 para. 4.8. states that** *"The government shall ensure that response organizations, operating organizations and the regulatory body have the necessary human, financial and other resources, in view of their expected roles and responsibilities and the assessed hazards, to prepare for and to deal with both radiological and non-radiological consequences of a nuclear or radiological emergency [...]."*
R28	**Recommendation: The Government should ensure that:** **i. clear roles and responsibilities are assigned to NDK in the area of emergency response;** **ii. the duties, responsibilities, coordination requirements of the supporting ministries, institutions and organizations are clearly covered in the National Radiation Emergency Plan.**

10.5. SUMMARY

The EPR legislation is comprehensive and provides a regulatory framework for all categories of facilities and activities. However, some elements of the GSR Part 7 still need to be clearly demonstrated in the legislative framework of Türkiye.

The IRRS team welcomes the undertaking of a full-scale emergency exercise in November 2022, ahead of fuel arriving on the Akkuyu site, and that the government of Türkiye will be hosting the IAEA EPREV mission in 2023. These will help the further development of national emergency response capabilities, consistent with the IAEA safety standards ahead of the commissioning and operation of the Akkuyu Nuclear Power Plants.

The areas for improvement are:

- NDK should develop guidance:
  - to assist authorised persons in the development of emergency plans, and in the development and content of the associated emergency exercise plans,
  - to detail the evaluation criteria used by NDK for the evaluation of emergency plans and emergency exercises.

- for use by NDK staff on the internal evaluation of emergency plans, and the evaluation of emergency exercises to include how pre-established objectives are determined.

- The requirement for periodic review of the emergency plans within the Regulation on Management of Radiation Emergencies should be included.
- NDK should develop:
  - and implement their internal emergency plan for the operation of the NDK Disaster and Emergency Management Group, including defining the specific roles required to enact the plan.
  - implement EPR training modules to establish formalised training and competency requirements of NDK emergency response staff as detailed in the emergency plan.
- Amendments to be made to the relevant regulations to remove conflicting statements, regarding the responsibilities of the authorized person.
- The need to define roles and responsibilities within regulations addressing emergency response, and the National Radiation Emergency Plan, avoiding duplication by other national organisations.

11. INTERFACE WITH NUCLEAR SECURITY

11.1. LEGAL BASIS

NRL 7381 and PD 95 details the requirements for safety, security and safeguards of the activities regarding nuclear energy and ionizing radiation, materials that are subject to regulatory control, and the enforcement of these requirements by NDK.

The interface of safety with nuclear security is not explicitly addressed in the legal framework, however both are stated together in many places in regulations. In addition, according to the Regulation for Security of Nuclear Facilities and Nuclear Materials it requires the entities who carry out activities related to nuclear facilities and nuclear materials to analyse the nuclear safety, security, and nuclear safeguards elements together and to design and operate a physical protection system in a way that does not weaken each other's effectiveness. Moreover, according to provisions of the Regulation on Nuclear Safeguards, the Facility shall take all necessary measures for the physical protection of nuclear materials.

NDK should consider more explicit requirements regarding the interface of safety and their influence on each other is not detrimental and this should be addressed in a new revision of regulation (see recommendation R20 in section 9.1).

Requirements for cyber security are detailed in the Regulations on Security of Nuclear Facilities and Nuclear Materials on general level. A specific regulation on Cyber security is planned to be issued in the future. This should be considered under the revision of the regulation (see recommendation R20 in section 9.1).

Türkiye has endorsed the IAEA Code of Conduct on the safety and security of radioactive sources, and a security plan and protective measures are expected for category 1, and for category 2 to 3 sources, respectively. There is a draft regulation to address these matters and requirements which will be issued soon. NDK will develop the associated procedures to support this regulation.

Türkiye is a party to the Convention on the Physical Protection of Nuclear Material and its Amendment, and to all relevant non-proliferation and nuclear weapons ban treaties (e.g. Treaty Banning Nuclear Weapon Tests in the Atmosphere, Comprehensive Nuclear Test Ban Treaty). Türkiye has concluded safeguards agreement and additional protocol with the IAEA.

11.2. REGULATORY OVERSIGHT ACTIVITIES

The regulatory oversight activities in the area of nuclear security and safeguards are more or less conducted in cooperation with the NDK team having responsibility for safety oversight, although some of them still require more training. NDK has not established a system for the oversight of these interface arrangements. This issue has also been identified by NDK. NDK is the responsible authority for cyber security and coordinate activities between different authorities in this area. Due to the challenges of cyber security, NDK will seek future external technical support in this area. It is important that NDK remains an intelligent customer in this field when using external technical support.

11.3. INTERFACE AMONG AUTHORITIES

PD 95 identifies relevant ministries and agencies having a role in the security of nuclear and radioactive waste facilities and radioactive materials and requires the necessary cooperation and support between these ministries and agencies. The authorized person has the responsibility for nuclear security on-site while cooperation with law enforcement agencies is established through signed protocols in order to ensure off-site security.

In case of unexpected inadequacies regarding the on-site safety of the nuclear facility and nuclear materials, whose responsibility is that of the authorized person, and upon the request of the authorized person or the

Authority, the Ministry of Interior takes the necessary temporary measures to ensure off-site security. Off-site security of nuclear facilities and nuclear materials is carried out by the Ministry of Interior with the support of the authorized persons and relevant public institutions and organizations. The IRRS team was informed that NDK also coordinates with relevant ministries and agencies on nuclear security matters.

11.4. SUMMARY

Türkiye has established the legal framework for oversight and enforcement for the interface between safety and nuclear security defining roles and responsibilities of the competent authorities, however some improvement in legislation is still needed. There is good liaison between all relevant competent authorities responsible for nuclear and radiation safety and with those for nuclear security.

12. REGULATORY IMPLICATIONS OF PANDEMIC SITUATIONS

The IRRS Mission also covered the national regulatory implications of the COVID-19 pandemic with a focus on business continuity to maintain delivery of statutory duties and responsibilities for safety. This section presents relevant feedback and main conclusions drawn by the IRRS team from the discussions and evaluations made in the course of the mission, with the objective to identify ways to strengthen governmental, legal and regulatory frameworks for safety.

12.1 GOVERNMENTAL AND LEGAL FRAMEWORK FOR SAFETY

When the COVID 19 outbreak manifested itself in Türkiye, the Presidency established an advisory body to manage the pandemic nationwide, which included measures to reduce the impact of the pandemic on the population. One of the first measures required to be taken was working online in national authorities in addition to usual measures of mask wearing, social distance, and hygiene.

12.2 REGULATORY FRAMEWORK

Since the IT infrastructure of NDK was equipped with external access to the intranet and document management system, the arrangements for working from home did not pose a difficulty or have an impact on the regulatory framework. NDK implemented the measures and took additional precautions to ensure the continuance of its regulatory functions, such as imposing a rule to have at least one staff to be in the office per room. Since the rooms are usually occupied by two experts, only half of the NDK staff alternately worked online during the pandemic and the rotation was on a daily bases to keep staff alert of any urgent business. This ensured the handling of any regulatory work that needs presence and complied with the all measures imposed by the government.

NDK also reorganized its food services and meeting procedures to minimize the impact of the pandemic, provided masks and disinfectants to its workers, and imposed isolation for individual staff positive COVID-19 cases. Based on these measures, the regulatory framework was minimally impacted from the pandemic, if at all.

12.3 REGULATORY FUNCTIONS

Based on the measures taken by the government in general and NDK specifically, the regulatory activities of NDK were impacted by the pandemic but the Authority remained fully functional. Previous experience of NDK, particularly on having online meetings with its external (international) technical support organizations, facilitated the transition to online working. Similarly, an already established automated document system, which allows electronic signing of official documents, helped this transition.

No budget cuts were imposed to the NDK by the government during the pandemic, since NDK was self-reliant in terms of budget. However, training of the staff and the inspection activities on site and abroad were the most impacted areas of the regulatory activities.

Local training was transformed to online training, similar to the international ones. But the effectiveness of the training was found to be decreased, based on the feedback received from the trainees due to lesser interactions with the trainers.

When the COVID-19 pandemic started, NDK was performing extensive inspection regarding Akkuyu Nuclear Power Plant, on site for construction and abroad for the manufacturing of safety significant items. The activities regarding Akkuyu NPP were subject to inspection by NDK which were carried out by inspectors from NDK and its technical support organization NUTED, and third-party inspection companies on behalf of the licensee, which are authorized by NDK.

The inspections of NDK, and its technical support NUTED were impacted by the pandemic due to the travel bans abroad and occasional cancellation of planned inspections due to illness of the inspectors. The

inspections of third-party inspectors were not impacted that much since the inspectors were already onsite and/or they were local to the sites.

To minimize the impact of pandemic on NDK inspections, NDK

1. Initiated remote inspections on manufacturing of any equipment of primary cycle, procured external (usually local) services of chosen professionals to implement walkthroughs or witnessing under the remote supervision of NDK inspectors. As an example, manufacturing of the main heat exchangers was completed under the supervision of NDK using this approach.
2. Re-evaluated its inspection plans and changed the type of some inspections from hold or witness point to witness point by review of documents, using a graded approach. NDK considered the safety classification of the item manufactured, relation of the item to safety systems, whether it was final or semi product, type of original inspection and the schedule of the project in its graded approach.
3. Reduced the reporting periods of third-party inspection companies that carry out inspection on behalf of the licensee to a weekly basis to ensure that they increase their inspections and to ensure the oversight of NDK on activities. Based on these weekly reports, over a 1000 inspections were found to be adequate while additional information and/or clarification was requested from the third party inspectors on 177 cases.

NDK took precautions to procure the services of local experts, where the manufacturing activities are carried out, to prevent any other or similar event to hinder the inspection capabilities of NDK. Currently, 15 external experts work as NDK representatives in regional offices of NDK abroad which are established and maintained by NUTED.

The pandemic restrictions did not affect the authorization of transport of radioactive material. The application is electronic and most employees worked from home. The inspections and controls before issuing a licence continued as before. Of course, transport activities were minimal during the pandemic, but the government issued a special exception for transport of medical supplies to hospitals, including radioactive material.

The IRRS team was informed that there was no legal basis to perform remote or virtual inspections in hospital and medical facilities. The inspectors were provided with protective equipment for the inspections.

A general experience is that regulatory body staff responded well and with commitment to the need for remote working. Inspection of local facilities and activities were carried out, after re-assessment of the inspection plans, by NDK inspectors with necessary measures taken for the travel and interactions. NDK provided its own means of transportation to the extent possible to minimize the interaction of its inspectors with crowds.

Fortunately, there were no incidents in facilities or activities that would require activation of the emergency response mechanisms.

12.4 EMERGENCY PREPAREDNESS AND RESPONSE

During the COVID-19 pandemic, NDK maintained the existing provision of emergency response via a dedicated emergency phone and the use of an on-call rota system ensuring contact was available 24/7.

Staff were able to maintain contact through virtual meetings (MS Teams) and this included participating in emergency exercises through a hybrid approach, with staff working from home and some attending the office. Staff that attended the offices maintained social distancing and were limited to single office occupancy, which limited numbers that could physically attend the offices.

NDK reported there were no remote connectivity issues and the ability to access internal systems.

The NDK EPR team comprises seven dedicated members, and during the pandemic, this number was challenged due to sickness. Additional staff from within NDK could be called upon if necessary to support the emergency response.

The national radiation early warning system relies on traditional phone lines for data transfer back to NDK. NDK advised there were some challenges in maintenance times of some phone lines by phone provider during the pandemic.

External calibration of the NDK radiological protection instrumentation was sighted as an additional challenge during the period, with this being resolved at the earliest opportunity.

The EPR team sighted a number of real examples where the emergency response team were actioned, included the physical attendance to an apartment block to investigate a suspected radioactive package, and the concerns associated with forest fires around thermal powerplants which contained a large number of radioactive sources.

The responses provided confirmed the ability of the NDK to maintain an appropriate emergency response capability through the pandemic.

APPENDIX I – LIST OF PARTICIPANTS

INTERNATIONAL EXPERTS:		
SCHWARZ Georg	Swiss Federal Nuclear Safety Inspectorate (ENSI)	georg.schwarz@ensi.ch
MANSOOR Faizan	Pakistan Nuclear Regulatory Authority (PNRA)	f.mansoor@pnra.org
AIZPURIETE Agnese	Radiation Safety Centre of State Environmental Service (VVD)	agnese.aizpuriete@vvd.gov.lv
BLOMMAERT Walter	ret. from Federal Agency for Nuclear Control (FANC)	blommaertwalter@gmail.com
CALAVIA GIMENEZ Ignacio	Nuclear Safety Council (CSN)	ignacio.calaviagimenez@csn.es
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KAIJALUOTO Sampsa	Radiation and Nuclear Safety Authority (STUK)	sampsa.kaijaluoto@stuk.fi
MORGAN-BROWN Phil	Office for Nuclear Regulation (ONR)	phil.morgan-brown@onr.gov.uk
PODJAVORSEK Matjaz	Slovenian Nuclear Safety Administration (SNSA)	matjaz.podjavorsek@gov.si
RETFALVI Eszter	Hungarian Atomic Energy Authority (HAEA)	retfalvi@haea.gov.hu
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TAYLOR Nick	Nuclear Regulatory Commission (NRC)	nick.taylor@nrc.gov
VANGALA Anuradha	Atomic Energy Regulatory Board (AERB)	rvanuradha2017@gmail.com
WALLIN Michael	Swedish Radiation Safety Authority (SSM)	michael.wallin@ssm.se
YAMADA Tomoho	Nuclear Regulation Authority (NRA)	yamada_tomoho_5uy@nra.go.jp
IAEA Staff		
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HAILU Teodros	Division of Radiation, Transport and Waste Safety	t.hailu@iaea.org
SOARE Gabriel	Division of Nuclear Installation Safety	g.soare@iaea.org
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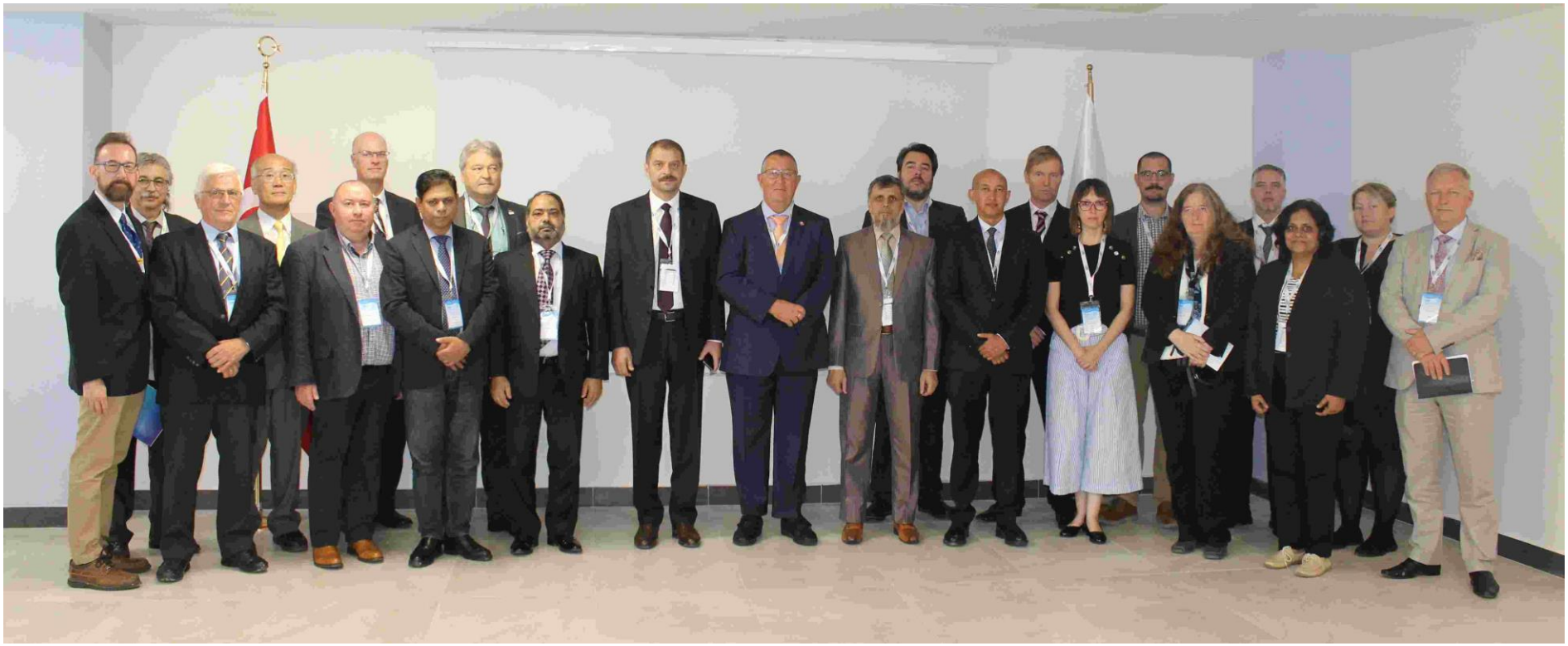
LIAISON OFFICER		
ALTEN Serhat	Nuclear Regulatory Authority (NDK)	serhat.alten@ndk.org.tr

GROUP PHOTO



APPENDIX II – MISSION PROGRAMME

Sunday September 4, 2022		
IRRS Initial Team Meeting		
09:00 – 12:00	Opening remarks by the IRRS Team Leader Introduction by IAEA Coordinator Self-introduction of all attendees Refresher Training	Venue Hotel Participants: IRRS Team
13:00 - 18:00	IRRS Process (IAEA) Report writing (IAEA) Schedule (TL, IAEA) Administrative arrangements (Regulatory Body, host country Liaison Officer, IAEA): Detailed Mission Programme First impression from IRRS Team members arising from the Advance Reference Material (all team members): Presentations Groups preparation for interviews	Venue Hotel Participants: IRRS Team + LO
Monday September 5, 2022		
IRRS Entrance Meeting		
09:30 – 12:00	09:30 Arrival, registration, 10:00 Welcoming Address – (*officials from the host country*) 10:30 IRRS Team Leader – Expectations for the Mission and introduction of the IRRS Team	Venue: NDK Headquarters Participants: High Level Government Official, RB Management and staff, Official from relevant

	10:45 IRRS Team members' and Counterparts' self-presentation 11:00 Host Institutionpresentation – Regulatory Overview, SARIS results (strength, challenges, action plan) 11:45 Group Photo	organizations, IRRS Team + the LO
13:00 - 17:00	Interviews and discussions with counterparts (parallel discussions)	Counterparts and Offices:
17:00 - 18:00	Daily IRRS Team meeting	Venue:NDK Participants: IRRS Team + the LO
Tuesday September 6, 2022		
Daily Discussions / Interviews		
09:00 - 17:00	Interviews and discussions with counterparts (parallel discussions)	Counterparts and Offices:
	Visit to the Ministries: TL, TC, Reviewer Modules 1, 2 and 3	
17:00 - 18:00	Daily IRRS Team meeting	Venue:NDK Headquaters Participants: IRRS Team + the LO
Wednesday September 7, 2020		
Daily Discussions / Interviews		
09:00 - 16:00	Interviews and discussions with counterparts for all modules (except those going on sites visits) and preparation of preliminary findings	Counterparts and Offices:

	(recommendations, suggestions and good practices)	
	Site-visits	Sites
16:00 – 17:00	Preliminary findings delivery and compilation	IRRS Team
17:00 - 18:00	Daily IRRS Team meeting	Venue: NDK HQ Participants: IRRS Team + the LO
Thursday September 8, 2022		
Daily Discussions / Interviews		
09:00 - 12:00	Follow-up Interviews and discussions with counterparts, if necessary (parallel discussions)	Counterparts and Offices:
13:00 – 17:00	Report preparation	IRRS Team
17:00 - 18:00	Daily IRRS Team Meeting: Recommendations, Suggestions and Good Practices	Venue: NDK HQ Participants: IRRS Team + the LO
Friday September 9, 2022		
Daily Discussions / Interviews		
09:00 - 17:00	Follow-up Interviews as needed Preparation of the report	Venue :NDK HQ Participants:
14:00 - 16:00	Policy issue discussions	Venue :NDK HQ Participants :IRRS Reviewers and Counterparts

16:00 - 18:00	Daily IRRS Team Meeting: report preparation: finalize observations, basis, recommendations, suggestions and good practices	Venue: NDK HQ Participants: IRRS Team + the LO
Saturday September 10, 2022		
09:00 - 18:00	• IRRS Team members draft the report and finalize recommendations, suggestions and good practices • Draft report cross reading • Finalization of the report by the entire IRRS Team	Venue : Hotel IRRS Team
20:00 – 22:00	IRRS Team Lead and IAEA Coordinators edit draft report	
Sunday September 11, 2022		
IRRS Team rest day + cultural events		
Monday September 12, 2022		
09:00 - 12:00	Parallel individual review and discussions of the report sections with the counterparts. Report writing	Venue: NDK HQ Participants: IRRS Team, Counterparts
13:00 – 17:00	Report finalising by the IRRS Team	IRRS Team
17:00 – 18:00	IRRS Team Lead and IAEA Coordinators finalize draft report editing	

Tuesday September 13, 2022		
09:00 - 10:00	Finalize report text and submit to the Host Institution	Venue: NDK HQ Participants: IRRS Team + LO
10:00 - 18:00	Host Institution organises the review of the draft by all national counterparts and start review	
10:00 – 18:00	IRRS Team Lead and IAEA Coordinators draft: executive summary and prepare exit presentation	
Wednesday September 14, 2022		
09:00 - 12:00	Host Institution finalises the review of the draft report and submit written comments to the IRRS Team	
13:00 -18:00	IRRS Team reviews Host's comments and finalizes draft report.	Venue: NDK HQ Participants: IRRS Team
Thursday September 15, 2022		
09:00 - 12:00	Discussions with Hosts on findings	Venue: NDK HQ Participants: IRRS Team and Host counterparts

13:00 - 17:00	Team meeting for report finalization based on discussions with the Hosts Submission of the Final Draft Report to the Hosts	Venue: NDK HQ Participants: IRRS Team
17:00 - 18:00	Briefing of the IAEA official Press release finalization	Venue: NDK HQ IRRS Team Lead and IAEA Coordinators, IAEA Press-Officer
Friday September 16, 2022		
09:00 - 10:00	IRRS Exit meeting	Venue : NDK HQ Participants: Government Officials, RB Management and staff, the IRRS Team + the LO
	Main findings of the IRRS mission (Team Leader)	
	Remarks by the Host Institution in response to the mission findings.	
	IAEA Official: Closing	

APPENDIX III – SITE VISITS

1. Medicana Hospital Management JSC, Medicana International Ankara private hospital
    a. Radiology Unit
    b. Radiotherapy Unit
    c. Nuclear Medicine Unit
2. Türkiye Energy, Nuclear and Mineral Research Agency
    a. Nuclear Energy Research Institute, Proton Accelerator Plant
    b. Radioactive Waste Management Unit
3. Akkuyu Nuclear JSC, Akkuyu NPP site in Mersin Province

APPENDIX IV – LIST OF COUNTERPARTS

	IRRS EXPERTS	Lead Counterpart	Support Staff
1.	**RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT**		
	Mr Matjaž PODJAVORŠEK	Mr Serhat ALTEN	Ms Rümeysa Nur KIZILKAYA Mr Ahmet Burak AKSOY Mr Kemal DOĞAN Ms Neşe YURTTAŞ
2.	**THE GLOBAL SAFETY REGIME**		
	Mr Matjaž PODJAVORŠEK	Mr Buğra KILINÇ	Ms Pınar ÇANGAL Ms Ezgi Tanrıkulu DEMİR Ms Ahu Tuba ÇEVİK Ms Neşe YURTTAŞ
3.	**RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY**		
	Mr David CURTIS	Mr Anıl Bekir BÖLME	Mr Erdem ÇAKIR Ms Ayşen TONGAL Mr Utku ŞİMŞEKÇİ Ms Ezgi Tanrıkul DEMİR
4.	**MANAGEMENT OF THE REGULATORY BODY**		
	Mr Gabriel SOARE	Mr Mehmet ÖZTÜRK, Mr. Erdem ÇAKIR	Mr Selçuk CİBA Ms Merve ÇETİN Mr Utku ŞİMŞEKÇİ
5.	**AUTHORIZATION**		
	Mr Tomoho YAMADA (NPP)	Mr Ediz TANKER	Mr Haluk ATAK Ms Neşe YURTTAŞ
	Mr Satyajit GHOSE (RR)	Ms Oya ÖZDERE GÜLOL	Ms Habibe Merve DURDU Mr Mehmet MERCİMEK Ms Meltem Koç AKTEMUR

	IRRS EXPERTS	Lead Counterpart	Support Staff
			Mr Sertan YEŞİL Mr Kemal DOĞAN Ms Meltem Nihan KILINÇ
	Mr Walter BLOMMAERT (Waste Facilities)	Ms Latife Özge Ünver	Mr Ahmet Burak AKSOY Ms Cangül AKTÜRK
	Ms Agnese AIZPURIETE (Radiation Sources, facilities and activities)	Mr Utku ŞİMŞEKÇİ	Ms. Tuğçe TÜRKAL Mr. Ömer ENNİ Mr. Sertan YEŞİL Mr. Sinan ÖZGÜR
	Ms Camila Salata (Radiation Sources, facilities and activities)	Ms Beyza ALPER	Ms Tuğçe TÜRKAL Mr Ömer ENNİ Mr Sertan YEŞİL Mr Sinan ÖZGÜR
	Mr Michael WALLIN (Transport)	Ms Safiye Tuba ECEVİT	Ms Ahu Tuğba ÇEVİK Mr Abdullah İlker İZMİR
	Mr Walter BLOMMAERT (Decommissioning)	Mr Kemal Doğan	Ms Cangül AKTÜRK
	Mr Ignacio Calavia GIMENEZ (Occupational exposure)	Mr Haluk ATAK	Ms Meltem Nihan KILINÇ
	Mr Sampsa KAIJALUOTO (Medical exposure)	Ms Tuğçe TÜRKAL	Ms Tuğçe TÜRKAL Mr Sinan Aytekin TÜRKÖZ
	Ms Annuradha VANGALA (Public esposure)	Ms Meltem Nihan KILINÇ	Mr Haluk ATAK
6.	**REVIEW AND ASSESSMENT**		
	Mr Tomoho YAMADA (NPP)	Ms Firdevs KILIÇ POLAT	Ms Burcu Taş

	IRRS EXPERTS	Lead Counterpart	Support Staff
			Mr Tunç Buğra DEMİR Mr Burak ALTINTAŞ Ms Pınar ÇANGAL Mr Ali ÖZKARA
	Mr Satyajit GHOSE (RR)	Ms Oya ÖZDERE GÜLOL	Ms Habibe Merve DURDU Mr Mehmet MERCİMEK Ms Meltem Koç AKTEMUR Mr Sertan YEŞİL Mr Kemal DOĞAN Ms Meltem Nihan KILINÇ
	Mr Walter BLOMMAERT (Waste Facilities)	Ms Latife Özge Ünver	Mr Ahmet Burak AKSOY Ms Cangül AKTÜRK
	Ms Agnese AIZPURIETE (Radiation Sources, facilities and activities)	Mr Utku ŞİMŞEKÇİ	Ms. Tuğçe TÜRKAL Mr. Ömer ENNİ Mr Sertan YEŞİL Mr Sinan ÖZGÜR
	Ms. Camila Salata (Radiation Sources, facilities and activities)	Ms. Beyza ALPER	Ms Tuğçe TÜRKAL Mr Ömer ENNİ Mr. Sertan YEŞİL Mr. Sinan ÖZGÜR
	Mr Michael WALLIN (Transport)	Ms Safiye Tuba ECEVİT	Ms Ahu Tuğba ÇEVİK Mr Abdullah İlker İZMİR
	Mr Walter BLOMMAERT (Decommissioning)	Mr Kemal Doğan	Ms Cangül AKTÜRK
	Mr Ignacio Calavia GIMENEZ (Occupational exposure)	Mr Haluk ATAK	Ms Meltem Nihan KILINÇ

	IRRS EXPERTS	Lead Counterpart	Support Staff
	Mr Sampsa KAIJALUOTO (Medical exposure)	Ms Tuğçe TÜRKAL	Ms Tuğçe TÜRKAL Mr Sinan Aytekin TÜRKÖZ
	Ms Annuradha VANGALA (Public esposure)	Ms Meltem Nihan KILINÇ	Mr Haluk ATAK
7.	**INSPECTION**		
	Mr Nicholas TAYLOR (NPP)	Mr Yasin ÇETİN	Mr Arda İNAL
	Mr Satyajit GHOSE (RR)	Ms Oya ÖZDERE GÜLOL	Mr N. Murat KAZANÇ
	Mr Walter BLOMMAERT (Waste Facilities)	Ms Latife Özge Ünver	Mr Ahmet Burak AKSOY Ms Cangül AKTÜRK
	Ms Agnese AIZPURIETE (Radiation Sources, facilities and activities)	Mr Utku ŞİMŞEKÇİ	Mr N. Murat KAZANÇ
	Ms Camila Salata (Radiation Sources, facilities and activities)	Ms Beyza ALPER	Mr N. Murat KAZANÇ
	Mr Michael WALLIN (Transport)	Ms Ahu Tuğba ÇEVİK	Ms Safiye Tuba ECEVİT Mr Abdullah İlker İZMİR
	Mr. Walter BLOMMAERT (Decommissioning)	Mr Kemal Doğan	Ms Cangül AKTÜRK
	Mr Ignacio Calavia GIMENEZ (Occupational exposure)	Mr Haluk ATAK	Ms Meltem Nihan KILINÇ
	Mr Sampsa KAIJALUOTO (Medical exposure)	Ms Tuğçe TÜRKAL	Mr Özcan ŞAHİN
	Ms Annuradha VANGALA	Ms Meltem Nihan KILINÇ	Mr Haluk ATAK

	IRRS EXPERTS	Lead Counterpart	Support Staff
	(Public exposure)		
8.	**ENFORCEMENT**		
	Mr Nicholas TAYLOR	Ms Feyza Nur BAYKUT	
9.	**REGULATIONS AND GUIDES**		
	Ms Ezter RETFALVI	Mr Arda İNAL	
10.	**EMERGENCY PREPAREDNESS AND RESPONSE – REGULATORY ASPECTS**		
	Mr Phil MORGAN-BROWN	Mr Sertan YEŞİL	Ms Meltem Nihan KILINÇ Ms Selen SERİN
11.	**INTERFACE WITH NUCLEAR SECURITY**		
	Mr Matjaž Podjavoršek	Mr. Taha Hüseyin MERMER Ms Nilgun Gerceker	Ms Miray COŞAR ORHAN

APPENDIX V – RECOMMENDATIONS (R), SUGGESTIONS (S) AND GOOD PRACTICES (GP)

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
1. LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES	**R1**	The Government should document its national policy and establish a strategy for nuclear and radiation safety that addresses the mechanisms to achieve the Fundamental Safety Objective and to apply the Fundamental Safety Principles in accordance with a graded approach.
	S1	NDK should consider improving and documenting the mechanisms for involvement of interested parties and the public to provide their input to key decisions.
	GP1	The Government established a scholarship programme for selected Turkish students to pursue graduate education in the nuclear field at foreign universities with support from the Ministry of National Education. Within this scope, 132 scholarship students are studying abroad on behalf of NDK as of 2022.
2. THE GLOBAL SAFETY REGIME	**R2**	NDK should establish a system for analysing international operating experiences to identify lessons to be learned and for dissemination of the lessons learned and for their use by authorized parties, the regulatory body and other relevant authorities.
3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	**S2**	NDK should consider requiring new staff to wait for a certain period before permitting them to independently oversee the regulated activities of their previous employer.
	S3	NDK should consider incorporating additional analysis in its Workforce Plan to ensure regulatory competence is maintained when qualified staff depart from the organization.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	R3	NDK should establish a process that requires all staff to be periodically retrained on various subjects, as appropriate, to maintain the necessary competence and skills of those staff.
	S4	NDK should consider enhancing its Training Plan to include new types of facilities or new activities, and the introduction of novel technologies.
	S5	NDK should consider completing their position description analysis and implementing an individual performance management system to evaluate staff competence and provide staff feedback on expectations.
	S6	NDK should consider establishing a systematic process for evaluating the adequacy of advice or services provided by its TSOs to ensure that NDK has a clear understanding and knowledge of the product or service being supplied.
4. MANAGEMENT SYSTEM OF THE REGULATORY BODY	**R4**	NDK should update the management system documentation to address the resolution of conflicts arising in the decision-making process and define criteria on how to apply a graded approach to its regulatory functions.
	S7	NDK should consider incorporating in its Integrated Management System the following processes: - review and assessment of facilities and activities; - communication and consultation with interested parties; and - procurement of items and services related to safety.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	S8	NDK should consider institutionalising management support of the means by which the organization enhances safety and fosters a strong safety culture.
	S9	NDK should consider improving the measurement of the effectiveness of its management system in order to improve safety performance.
	R5	NDK should regularly conduct assessments of leadership for safety and of safety culture.
5. AUTHORIZATION	**R6**	NDK should finalize the draft Regulation on Authorizations Regarding Nuclear Installations and implement it as early as practicable.
	R7	NDK should update the dose limits to ensure compatibility with IAEA Safety Standards.
	R8	NDK should establish regulatory provisions to ensure the consultation of workers by employers, registrants and licensees in the processes of developing the local rules necessary for protection and safety of workers and other persons.
6. REVIEW AND ASSESSMENT	**R9**	NDK should establish requirements for periodic safety review and review criteria for evaluating periodic safety report of nuclear facilities according to a graded procedure.
	R10	NDK should arrange for the periodic assessment of the radiation doses due to the transport of radioactive material, to ensure that the system of protection and safety complies with GSR Part 3.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	R11	NDK should update the approval procedures of Type B(M) package designs, packages for fissile material and low dispersible radioactive material as well as approval of shipment of packages containing fissile material, to comply with SSR-6 (Rev. 1).
	R12	NDK should establish appropriate constraints on dose and risk to be used in the optimization of protection and safety for radiation facilities.
7. INSPECTION	**R13**	NDK should complete the development of the inspector candidate program to allow authorization of inspectors as described in the Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation.
	S10	NDK should consider enhancing written procedures for the NPP inspection programme to describe the different reasons for reactive inspections, and to define a graded approach for their size and scope.
	R14	NDK should develop its inspection programme for NPPs for commissioning and operations phases.
	S11	NDK should consider establishing written guidance on the various functions to be assigned to the resident inspectors at NPPs to provide clarity and consistency.
	S12	NDK should consider developing an inspection procedure and checklist that is compatible with the facility's formal inspection programme and takes account of the graded approach.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	R15	NDK should ensure during the relicensing of the TENMAK waste processing and storage facility that the highest priority is given to personnel safety and safety of radioactive waste and installations and that in the short term an appropriate plan is developed by TENMAK with focus on enhancement of processing and storage of the radioactive wastes and safety of the facility in general.
	R16	NDK should implement its inspection programme comprehensively for all radiation sources facilities and activities.
	R17	The MoH and NDK should establish a formal cooperation and coordination arrangement for regulatory oversight of medical facilities and activities, and ensure that there are no conflicting requirements placed on authorized parties and applicants.
8. ENFORCEMENT	**S13**	NDK should consider revising the criteria for the graded approach to enforcement included in Severity Level guidance in Annex 1 to the Nuclear Regulatory Administrative Sanctions Regulations to provide criteria that are appropriate to the different types of authorized facilities or activities, and documenting the criteria used for the graded approach in determining the deadline for corrective actions for all facilities and activities.
	R18	NDK should make changes to legal or regulatory structures that would allow for enforcement actions such as administrative sanctions to be applied to all of the regulatory requirements in the licensing basis for NPPs, whether they be established in Turkish law or the in regulatory programme provided by the vendor country.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
9. REGULATIONS AND GUIDES	**S14**	NDK should consider further developing the Secondary Regulation Development Plan for a longer period, taking into account a graded approach.
	R19	NDK should fully implement the provisions of NRL 7381 and PD 95 in its regulations and guides. In this respect, an overall review of NDK's regulations and guides should be carried out in order to identify: - provisions in the current regulations and guides of NDK conflicting with higher level legislation, - gaps regarding the IAEA standards, and - relevant experience gain.
	R20	NDK should extend the scope of the Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control to make it applicable to all activities and facilities.
	R21	NDK should establish requirements for safety assessment for first and second group radiation sources facilities and activities and prepare guidance on the content of safety assessment reports.
	R22	NDK should update the national regulations on transport of radioactive material in line with SSR-6 (Rev. 1).
	R23	NDK and MoH should review current regulations on medical exposure to address all requirements fully as established in GSR Part 3 and continue developing guides for the safe use of radiation sources in medical applications with regard to patients, workers, carers and comforters, volunteers in biomedical research and the public in medical uses in line with SSG-46.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	R24	NDK should establish reference levels for exposure due to radionuclides in commodities.
10. EMERGENCY PREPAREDNESS AND RESPONSE – REGULATORY ASPECTS	**R25**	NDK should develop guides in line with regulations and relevant IAEA safety standards: i. to provide detailed guidance in the development of emergency plans, and content of the associated emergency exercise plans, for all Nuclear Facilities, Radiation Facilities and associated activities; ii. to document the evaluation criteria used by NDK for the evaluation of emergency plans and emergency exercises; iii. for use by NDK staff on the internal evaluation of emergency plans, and the evaluation of emergency exercises to include how pre-established objectives are determined.
	R26	NDK should establish requirements for nuclear and radioactive waste facilities to periodically review and revise emergency plans.
	R27	NDK should: i. develop and implement an internal emergency plan for the operation of the NDK Disaster and Emergency Management Group in line with relevant regulations, specifying the roles required to enact the plan; ii. develop and implement EPR training programme for the regulatory staff in line with competency requirements of NDK emergency response staff as detailed in the emergency plan.

AREA	R: Recommendations S: Suggestions G: Good Practices	Recommendations, Suggestions or Good Practices
	R28	The Government should ensure that: i. clear roles and responsibilities are assigned to NDK in the area of emergency response; ii. the duties, responsibilities, coordination requirements of the supporting ministries, institutions and organizations are clearly covered in the National Radiation Emergency Plan.

APPENDIX VI – COUNTERPART'S REFERENCE MATERIAL USED FOR THE REVIEW

List of Documents in ARM

- Nuclear Regulation Law, No 7381, March 2022
- Presidential Decree No 95, Presidential Decree on Organization and Duties of the Nuclear Regulatory Authority, March 2022
- Agreement Between the Government of the Republic of Turkey and the Government of the Russian Federation on Cooperation in Relation to the Construction and Operation of a Nuclear Power Plant at the Akkuyu Site in the Republic of Turkey, May 2010
- National Radiation Emergency Plan
- National Radioactive Waste Management Plan 2021-2025
- Decree on Licensing of Nuclear Installations, December 1983
- Radiation Safety Decree, September 1985
- Regulation on Vocational and Ethical Principles for Nuclear Regulatory Board Members and Staff of the Nuclear Regulatory Authority, June 2022
- Regulation on Management System for Nuclear, Radiation and Radioactive Waste Facilities, April 2022
- Regulation on Authorization of Institutions to Provide Dosimetry Services, December 2021
- Regulation on Administrative Sanctions of NDK, February 2021
- Regulation of Inspections Regarding Nuclear Energy and Ionizing Radiation, March 2021
- Regulation on Authorization of Environmental Remediation Activities of Contaminated Areas, December 2020
- Regulation on Authorizations Regarding Radiation Facilities and Radiation Practices, December 2020
- Regulation on Management of the Radiation Emergencies, June 2020
- Regulation on Nuclear Safeguards, January 2020
- Regulation on Human Resources of NDK, July 2019
- Regulation on Radiation Protection in Nuclear Facilities, May 2018
- Regulation on The Operating Organization, Qualifications and Training of Operating Personnel, and Licenses of Operating Personnel in Nuclear Power Plants, April 2017
- Regulation on Construction Inspections in NPPs, March 2017
- Regulation Regarding Equipment Procurement Process and Approval of Manufacturers for Nuclear Facilities, May 2015
- Regulation on Radioactive Waste Management, March 2013
- Regulation on Clearance in Nuclear Facilities and Release of Site from Regulatory Control, March 2013
- Regulation on Security of Nuclear Facilities and Nuclear Materials, May 2012
- Regulation on Protection of Outside Workers from Risks of Ionizing Radiation in Controlled Areas, June 2011
- Regulation on Special Principles for the Safety of Nuclear Fuel Cycle Facilities, July 2010
- Regulation on Nuclear Power Plant Sites, March 2009
- Regulation on the Control of High Activity Sealed Radioactive Sources and Orphan Sources, March 2009
- Regulation on Notification and Reporting of Unusual Event for Research Reactors, February 2009
- Regulation on Records and Reports in Research Reactors, February 2009
- Regulation on Specific Principles for Safety of Research Reactors, February 2009
- Regulation on Specific Principles for Safety of Nuclear Power Plants, October 2008
- Regulation on Design Principles for Safety of Nuclear Power Plants, October 2008

- The Regulation on Operating Organization, Personnel Qualification and Operating Personnel Licensing for Research Reactors, October 2005
- Regulation on Safe Transportation of Radioactive Materials, July 2005
- Regulation on Wastes from the Use of Radioactive Materials, September 2004
- Regulation on Radiation Safety, March 2000
- Directive on Determination of Licensing Basis Regulations, Guides and Standards and Reference Plant for Nuclear Power Plants
- Guide on Specific Design Principles
- Guide on the Format and the Content of Safety Analysis Reports for Research Reactors

Supportive and IMS Documents Provided Additionally

- Turkish National Report to CNS, 2022
- Regulation on Rules and Procedures for Working of the Nuclear Regulatory Board, June 2022
- EYS.DD.01 NDK IMS Policy
- EYS.PR.01 Document Management Procedure
- EYS.PR.02 Risk and Opportunity Management Procedure
- EYS.PR.03 Communication Procedure
- EYS.PR.04 Change Management Procedure
- EYS.PR.05 Nonconformity and Corrective Action Procedure
- EYS.PR.06 Internal Audit Procedure
- EYS.PR.07 Measurement Assessment and Improvement of Performance Procedure
- EYS.PR.08 Management Review Procedure
- EYS.RH.01 NDK IMS Implementation Guide
- NTD.PR.07 Procedure for Review and Assessment and Reporting for Nuclear Facilities
- NTD.PR.08 Procedure for Authorization of Nuclear Facilities
- NTD.PR.09 Procedure for Authorization Projects
- DHD.PR.08 External Providers Assessment Procedure
- DHD.SR.01 Purchasing Process
- DHD.SR.04 Tender Preparation and Follow Up Process
- License Procedure for Radiation Facilities and Radiation Practices
- Permission and Approval Procedure for Radiation Facilities and Radiation Practices

APPENDIX VII – IAEA REFERENCE MATERIAL USED FOR THE REVIEW

1.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Fundamental Safety Principles, No SF-1, IAEA, Vienna (2006)
2.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, No. GSR Part 1 (Rev. 1), IAEA, Vienna (2016)
3.	**INTERNATIONAL ATOMIC ENERGY AGENCY** – Leadership and Management for Safety, General Safety Requirements Part 2, No. GSR Part 2, IAEA, Vienna (2016)
4.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, IAEA, Vienna (2014).
5.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety assessment for facilities and activities, General Safety Requirements Part 4, No. GSR Part 4 (Rev. 1), IAEA, Vienna (2016)
6.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Predisposal Management of Radioactive Waste, General Safety Requirement Series Part 5, No. GSR Part 5, IAEA, Vienna (2009)
7.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Decommissioning of Facilities, General Safety Requirement Series No. GSR Part 6, IAEA, Vienna (2014)
8.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Preparedness and Response for Nuclear or Radiological Emergency, General Safety Requirement Series No. GSR Part 7, IAEA, Vienna (2015)
9.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Site Evaluation for Nuclear Installations, Specific Safety Requirement Series No. SSR-1, IAEA, Vienna (2003)
10.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Nuclear Power Plants: Design, Specific Safety Requirements Series No. SSR-2/1 (Rev. 1), IAEA, Vienna (2016)
11.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Nuclear Power Plants: Commissioning and Operation, Specific Safety Requirements Series No. SSR-2/2 (Rev. 1), IAEA, Vienna (2016)
12.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Research Reactors, Specific Safety Requirements Series No. SSR-3, IAEA, Vienna (2016)
13.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Nuclear Fuel Cycle Facilities, Specific Safety Requirements Series No. SSR-4, IAEA, Vienna (2017)
14.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Disposal of Radioactive Waste, Specific Safety Requirements Series No. SSR-5, IAEA, Vienna (2011)
15.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Regulations for the Safe Transport of Radioactive Material, 2018 Edition, Specific Safety Requirements Series No. SSR-6 (Rev. 1), IAEA, Vienna (2018)
16.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Classification of Radioactive Waste, General Safety Guide No. GSG-1, IAEA, Vienna (2009)
17.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Criteria for use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide Series No. GSG-2, IAEA, Vienna 2011)
18.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Communication and Consultation with Interested Parties by the Regulatory Body, General Safety Guide Series No. GSG-6, IAEA, Vienna (2017).

19.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Occupational Radiation Protection, Safety Guide Series No. GSG-7 , IAEA, Vienna (2018)
20.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Regulatory Control of Radioactive Discharges to the Environment, Safety Guide Series No GSG-9, IAEA, Vienna (2018)
21.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Organization, Management and Staffing of the Regulatory Body for Safety, General Safety Guide Series No. GSG-12, IAEA, Vienna (2018).
22.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Functions and Processes of the Regulatory Body for Safety, General Safety Guide Series No. GSG-13, IAEA, Vienna (2018).
23.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Guide Series No. GS-G-2.1, IAEA, Vienna (2007)
24.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - The Management System for the Disposal of Radioactive Waste, Safety Guide Series No GS-G-3.4, IAEA, Vienna (2008)
25.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - A System for the Feedback of Experience from Events in Nuclear Installations, Safety Guide Series No. NS-G-2.11, IAEA, Vienna (2006)
26.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Modifications to Nuclear Power Plants, Safety Guide Series No NS-G-2.3, IAEA, Vienna (2001)
27.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Recruitment, Qualification and Training of Personnel for Nuclear Power Plants, Safety Guide Series No NS-G-2.8, IAEA, Vienna (2002)
28.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Environmental and Source Monitoring for Purposes of Radiation Protection, Safety Guide Series No. RS-G-1.8, IAEA, Vienna (2005)
29.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety of Radiation Generators and Sealed Radioactive Sources, Safety Guide Series No. RS-G-1.10, IAEA, Vienna (2008)
30.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Borehole Disposal Facilities for Radioactive Waste, Safety Guide Series No SSG-1, IAEA, Vienna (2009)
31.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Deterministic Safety Analysis for Nuclear Power Plants, Specific Safety Guides Series No. SSG-2, IAEA, Vienna (2010)
32.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Power Plants, Specific Safety Guide Series No. SSG-3, IAEA, Vienna (2010)
33.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants, Specific Safety Guide Series No. SSG-4, IAEA, Vienna (2010)
34.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Licensing Process for Nuclear Installations, Specific Safety Guide Series No. SSG-12, IAEA, Vienna (2010)
35.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Geological Disposal Facilities for Radioactive Waste Specific Safety Guide Series No. SSG-14, IAEA, Vienna (2011)
36.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Storage of Spent Nuclear Fuel, Safety Guide Series No SSG-15 (Rev. 1), IAEA, Vienna (2020)
37.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Periodic Safety Review for Nuclear Power Plants, Safety Guide Series No SSG-25, IAEA, Vienna (2013)
38.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, Specific Safety Guide No SSG-26, IAEA, Vienna, (2014)

39.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Predisposal Management of Radioactive Waste from Nuclear Power Plants and Research Reactors, Safety Guide Series No SSG-40, IAEA, Vienna (2016)
40.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Predisposal Management of Radioactive Waste from Nuclear Fuel Cycle Facilities, Safety Guide Series No SSG-41, IAEA, Vienna (2016)
41.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Management of Waste from the Use of Radioactive Material in Medicine, Industry, Agriculture, Research and Education, Safety Guide Series No SSG-45, IAEA, Vienna (2019)
42.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities, Safety Guide Series No SSG-47, IAEA, Vienna (2018)
43.	**INTERNATIONAL ATOMIC ENERGY AGENCY** – Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants, Safety Guide Series No SSG-48, IAEA, Vienna (2018)
44.	**INTERNATIONAL ATOMIC ENERGY AGENCY** –Decommissioning of Medical, Industrial and Research Facilities, Safety Guide Series No SSG-49, IAEA, Vienna (2019)
45.	**INTERNATIONAL ATOMIC ENERGY AGENCY** – Operating Experience Feedback for Nuclear Installations, Safety Guide Series No SSG-50, IAEA, Vienna (2019)
46.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Accident Management Programmes for Nuclear Power Plants, Safety Guide Series No SSG-54, IAEA, Vienna (2019)
47.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Preparedness and Response for a Nuclear or Radiological Emergency Involving the Transport of Radioactive Material, Specific Safety Guide SSG-65, IAEA, Vienna (2022)
48.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Radiation Protection Programmes for the Transport of Radioactive Material, Safety Guide No TS-G-1.3, IAEA, Vienna, (2007)
49.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - The Management System for the Safe Transport of Radioactive Material Safety Guide No TS-G-1.4, IAEA, Vienna, (2008)
50.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Compliance Assurance for the Safe Transport of Radioactive Material, Safety Guide No TS-G-1.5, IAEA, Vienna, (2009)
51.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Schedules of Provisions of the IAEA Regulations for the Safe Transport of Radioactive Material (2018 Edition), Specific Safety Guide No SSG-33 (Rev. 1), IAEA, Vienna, (2018)
52.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Storage of Radioactive Waste, Safety Guide Series No WS-G-6.1, IAEA, Vienna (2006)
53.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety Assessment for the Decommissioning of Facilities Using Radioactive Material, Safety Guide Series No.WS-G-5.2, IAEA, Vienna (2009)
54.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Storage of Radioactive Waste, Safety Guide Series No. WS-G-6.1, IAEA, Vienna (2006)

APPENDIX VIII – ORGANIZATIONAL CHART