



Provision for the Application of the IAEA Safety Standards

Appraisal for Turkey of the Safety of the Transport of Radioactive Material



IAEA

International Atomic Energy Agency

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APPRAISAL FOR TURKEY
OF THE SAFETY
OF THE TRANSPORT
OF RADIOACTIVE MATERIAL

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FOREWORD

Within the family of the United Nations, the IAEA has the specific statutory function of establishing standards of safety for the protection of health against exposure to ionizing radiation. As a result, in 1959 the United Nations Economic and Social Council requested that the IAEA be entrusted with the drafting of recommendations on the transport of radioactive substances. Within its statutory mandate and pursuant to this request, in 1961 the IAEA issued the Regulations for the Safe Transport of Radioactive Material (the Transport Regulations). The Transport Regulations have been periodically reviewed and, as appropriate, amended or revised. Moreover, several guides and technical documents supporting the Transport Regulations have been issued by the IAEA. The latest version of the Transport Regulations was issued in 2000 by the IAEA as Safety Series No. TS-R-1 (ST-1, Revised).

On 25 September 1998 the IAEA General Conference adopted resolution GC(42)/RES/13 on the Safety of Transport of Radioactive Materials. In adopting that resolution the General Conference recognized that *“compliance with regulations which take account of the Agency’s Transport Regulations is providing a high level of safety during the transport of radioactive materials...”*

The IAEA’s Statute also authorizes it to provide for the application of its standards at the request of any State. The IAEA discharges this statutory function through a number of mechanisms, including rendering independent peer review appraisal services to determine the status of compliance with its standards. Consistent with this statutory function, resolution GC(42)/RES/13 requested the IAEA Secretariat to provide for the application of the Transport Regulations by, inter alia, providing a service for carrying out, at the request of any State, an appraisal of the implementation of the Transport Regulations by that State.

In response to this request, on 10 December 1998 the IAEA offered to render such an appraisal service to all States. The service was termed the Transport Safety Appraisal Service (TranSAS). Since then the IAEA General Conference, through resolutions GC(43)/RES/11, GC(44)/RES/17, GC(45)/RES/10, GC(46)/RES/9 and GC(47)/RES/7, has commended the Secretariat for establishing TranSAS, commended those Member States that had requested an appraisal, and encouraged other Member States to avail themselves of an appraisal.

On 12 September 2000 the Permanent Mission of Turkey to the Office of the United Nations and other International Organizations informed the IAEA that the Turkish Atomic Energy Authority had decided to request a TranSAS appraisal. To lay the groundwork for the appraisal, a preparatory mission was

undertaken in October 2001. At that time a preliminary agreement was reached on the scope of the appraisal as well as on the tasks and activities to be undertaken prior to and during the appraisal. Owing to the difficulty in obtaining funding for the appraisal, the actual appraisal, initially planned for May 2002, was postponed until March 2003.

The IAEA Department of Technical Cooperation provided support for this TranSAS appraisal under project number TUR/9/013.

The TranSAS appraisal for Turkey involved four independent experts from the IAEA and Member States of the IAEA and was conducted between 3 and 14 March 2003. This report presents its findings.

EDITORIAL NOTE

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SUMMARY, FINDINGS AND CONCLUSIONS

SUMMARY

Background

S01. On 25 September 1998, the General Conference of the IAEA adopted resolution GC(42)/RES/13 on the Safety of Transport of Radioactive Materials. The General Conference recognized in adopting that resolution, inter alia, that compliance with regulations that take account of the IAEA's Regulations for the Safe Transport of Radioactive Material (the Transport Regulations) is providing a high level of safety during the transport of radioactive material. In addition, it requested the IAEA Secretariat to provide for the application of the Transport Regulations by, inter alia, providing a service for carrying out, at the request of any State, an appraisal of the implementation of the Transport Regulations by that State. In response to this request the IAEA has created and made available to all States the Transport Safety Appraisal Service (TranSAS).

S02. The objective of a TranSAS appraisal is to assist any requesting State to achieve a high level of safety in the transport of radioactive material by reviewing its implementation of the Transport Regulations and by making recommendations for improvement where appropriate.

S03. In a letter dated 12 September 2000 the Permanent Mission of Turkey to the Office of the United Nations and other International Organizations in Vienna informed the IAEA that the Turkish Atomic Energy Authority (TAEK) had decided to request the IAEA Transport Safety Appraisal Service. To lay the groundwork for the appraisal, a preparatory mission was undertaken from 1 to 5 October 2001. At that time a preliminary agreement was developed addressing the scope of the appraisal as well as the tasks and activities to be undertaken prior to and during the appraisal. Owing to the difficulty in obtaining funding for the appraisal, the actual appraisal, initially planned for May 2002, was postponed until March 2003.

Scope of the appraisal

S04. A TranSAS appraisal covers all modes of transport (i.e. road, rail, maritime and air). In accordance with the request from Turkey, the appraisal considered in detail all relevant aspects of the regulation of the transport of

radioactive material in Turkey with regard to the requirements specified in the Transport Regulations [1], the guidance provided in other IAEA publications [2–5] and other relevant international regulatory documents.

TranSAS questionnaire

S05. A detailed TranSAS questionnaire was developed by the IAEA in 1999 in order to facilitate the appraisal process in a consistent manner. The questionnaire has detailed questions in the following eight key areas:

- (a) Legislative and governmental responsibilities;
- (b) The authority, responsibilities and function of the regulatory body;
- (c) The organization of the regulatory body;
- (d) The authorization process;
- (e) Review and assessment;
- (f) Inspection and enforcement;
- (g) The development of regulations and guides;
- (h) Emergency preparedness for transport.

The completed TranSAS questionnaire is a working document for the appraisal and may be used by representatives of the host organization to prepare for interviews and to develop presentations.

Tasks and activities prior to the appraisal

S06. Turkey provided the IAEA with a completed TranSAS questionnaire. The IAEA assembled a team of experts for the appraisal, the members of which were subject to approval by Turkey. The approved experts were provided with guidelines for the appraisal, information from the preparatory mission and the completed TranSAS questionnaire submitted by Turkey.

Appraisal team

S07. The team for the TranSAS appraisal was composed of four independent experts. The members of the team represented regulatory authorities responsible for the transport of radioactive material in three States and were led by a transport safety expert from the IAEA.

Appraisal process

S08. The appraisal process included the following:

- (a) A preparatory session for the appraisal team;
- (b) An entrance meeting involving presentations by key representatives from the TAEK and other authorities concerning their responsibilities for the safe transport of radioactive material;
- (c) Discussions with Turkish representatives to obtain clarifications and additional or more detailed information;
- (d) Updating the TranSAS questionnaire and preparing the draft report with findings;
- (e) Ongoing feedback on the updated questionnaire and the draft report with findings;
- (f) A visit to the Çekmece Nuclear Research and Training Centre (ÇNAEM);
- (g) Visits to the Turkish Airlines cargo departments at the Ankara Esenboga airport and the Istanbul Ataturk airport;
- (h) An exit meeting to present and discuss the findings.

Appraisal report

S09. The appraisal report provides background information on TranSAS in general as well as more detailed information on the appraisal process in the host country. It also presents the findings for each area considered in the appraisal, together with a background discussion and a basis for any finding (tied to an international regulatory requirement or recommendation). The findings are presented as recommendations, suggestions and good practices.

FINDINGS OF THE TRANSAS APPRAISAL FOR TURKEY

S10. Background information and the basis for the findings are presented together with the findings in Section 4 of this report. Each finding has a basis in the Transport Regulations, in the modal international regulations and/or in other relevant international regulatory documents and standards.

S11. The findings for each key area of review are presented in the order in which they appear in Section 4 of this report.

S12. The findings of the appraisal include three recommendations and 17 suggestions for areas in which the implementation of the Transport Regulations can be streamlined or improved. The appraisal also identified three good practices that can serve as a model for other competent authorities in the radioactive material transport sector to emulate.

S13. The findings are presented for the eight key areas of review in the TranSAS questionnaire and are followed by the general conclusions.

S14. General conclusions concerning the findings are also presented in Section 5 of this report.

Legislative and governmental responsibilities

S15. Recommendation: The process of formalizing the draft Turkish regulation on the safe transport of radioactive material should be completed as soon as possible.

S16. Suggestion: It is suggested that in the areas of overlapping responsibilities, memoranda of understanding be developed between the authorities involved.

Authority, responsibilities and functions of the regulatory body

S17. Suggestion: It is suggested that memoranda of understanding be prepared to manage interfaces between the different authorities involved in the transport of radioactive material. Such memoranda of understanding would detail the procedures to be followed in the authorization process and might include provisions for the training of personnel in radiation safety, as well as provisions regarding inspection and enforcement.

S18. Suggestion: Cooperation agreements between the different parties involved could help to achieve harmonization of the applicable national and international regulations for the transport of dangerous goods by different modes.

S19. Suggestion: It is suggested that the regulatory functions be more clearly separated from the operational and promotional functions. This separation would be evident from the organizational chart.

S20. Suggestion: In order to clarify the duties and responsibilities of the specialized departments and the affiliated institutions in accordance with the Turkish Atomic Energy Authority Act, it might be envisaged to set up a section of the Radiation Health and Safety Department (RHSD) in Istanbul. This section would carry out the work actually done by the Health Physics Department of ÇNAEM. As an alternative, part of the Health Physics Division of ÇNAEM would continue to carry out the work but would formally become part of the RHSD.

Organization of the regulatory body

S21. Suggestion: In order to make the organization more transparent, it might be envisaged that a specific division be set up within the RHSD to deal specifically with all transport issues. The personnel of this division would be given the opportunity to increase their expertise in order to be able to perform the necessary assessments.

Authorization process

S22. Suggestion: It might be envisaged to replace the system of individual permission by a more generalized system of prior notification (as applies, for example, to movements of radioactive sources for industrial radiography), giving the TAEK the opportunity to perform more specific inspections to verify compliance with the Turkish regulation on the safe transport of radioactive material.

S23. Suggestion: It is suggested that a specific division be set up within the RHSD dedicated specifically to the transport of radioactive material, in particular the evaluation of applications for approval, as mentioned in para. 802 of the 1996 edition of the Transport Regulations, which are not necessarily related to a specific use of the radioactive contents. The personnel of this division would be given the opportunity to improve their expertise in order to be able to perform the necessary assessments. This division would also inform the different divisions of changes in the regulations and ensure coordination between the different divisions with regard to transport issues, and ensure in particular that applications for licences and permits are handled in a consistent way.

S24. Good practice: A database with information on the use, storage and movement of radioactive material in Turkey is updated on a continuous basis.

The system is comprehensive and a well established practical tool for everyday work. It might also be used for more specific inspections.

Review and assessment process

S25. Recommendation: It should be ensured that the consignor has a copy of the instructions, as required in para. 561 of the 1996 edition of the Transport Regulations.

S26. Suggestion: As more packages become eligible for multilateral approval with the introduction of the 1996 edition of the Transport Regulations, and in particular pursuant to paras 816 and 817, some thought could be given to the desirability of a formal assessment of designs of packages in this category and of issuing a validation approval.

S27. Suggestion: It is suggested that checks be made that certified packages have been maintained in accordance with the approved maintenance instructions.

S28. Good practice: Overall control is exercised over radioactive material in Turkey. This overall control includes transport aspects and therefore ensures that packages that normally do not require competent authority certification under the Transport Regulations (i.e. Type IP and Type A packages) are also checked.

Inspection and enforcement

S29. Recommendation: A planned and systematic programme should be implemented for quality assurance and compliance assurance concerning the inspection and audit of packages, as required in paras 310 and 311 of the 1996 edition of the Transport Regulations.

S30. Suggestion: It is suggested that paperwork be completed in SI units and that measuring instruments also display SI units. This will avoid confusion and misinterpretation and will ensure consistency.

S31. Suggestion: It is suggested that memoranda of understanding be produced to determine the responsibilities and interfaces between the various authorities involved in the inspection and enforcement activities carried out in support of authorizations for the transport of radioactive material.

Development of regulations and guides

S32. Suggestion: In order to avoid discrepancies between the implementation of the various editions of the Transport Regulations (and potential safety hazards), it is suggested to simultaneously apply in Turkey the same regulations for the national and international transport of radioactive material (i.e. to formally promulgate the Turkish translation of the 1996 edition of the Transport Regulations as soon as possible).

S33. Suggestion: It is suggested to change Article 61 of the radiation safety regulation so that authorizations are issued in a more generic way, for example to issue permits covering the same material in the same package, for a given time frame (e.g. 6 months or 12 months).

S34. Suggestion: It is suggested for the ongoing revision of the radiation safety decree to use only SI units, so as to be in line with the international regulations in the field of radiation protection, especially with the Transport Regulations and the Turkish radiation safety regulation.

S35. Suggestion: In order to be in line with the other international standards for radiation safety and radiation protection (e.g. the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources), it is suggested that the transport of radioactive material be incorporated into the radiation safety decree.

S36. Suggestion: It is suggested that expanded responsibilities may justify the creation of a separate division within the RHSD that would be dedicated exclusively to the transport of radioactive material.

Emergency preparedness for transport

S37. Good practice: The emergency capabilities for the transport of radioactive material have been incorporated into the overall emergency preparedness structure across the country. The regulations of Turkey in the area of the transport of radioactive material, and the nuclear and radiological emergency plan, which is updated by the TAEK every year, are a good basis for emergency response, which also extends to the transport area.

GENERAL CONCLUSIONS

S38. The TranSAS appraisal team completed a thorough appraisal of the implementation of the Transport Regulations in Turkey. The cooperation of the Turkish authorities, and of all those who participated in the discussions, was excellent and contributed much to the value of the appraisal.

S39. The transport of the relatively small number of packages of radioactive material in Turkey is well controlled. Customs regulations specify permission of the TAEK for the import of radioactive material. Only companies licensed by the TAEK can import, export, transit and transport radioactive material. Each shipment of radioactive material is subject to a permit from the TAEK. A comprehensive database with information on the use, storage and movement of radioactive material is updated on a continuous basis. This high level of control and monitoring enhances the safety of the transport of radioactive material in Turkey.

S40. A draft revision of the national transport regulations based on the 1996 edition of the Transport Regulations [1] has been used in Turkey since the requirements of these Transport Regulations became effective for international transport in 2001. It is recommended that these draft regulations be approved formally as soon as possible.

1. INTRODUCTION

BACKGROUND

1.1. In order to facilitate safety in the transport of radioactive material throughout the world, the IAEA, pursuant to its statutory authority, has established the Regulations for the Safe Transport of Radioactive Material (the Transport Regulations). The latest edition of the Transport Regulations was published in 1996 and revised in 2000 [1]. In addition to publishing the Transport Regulations, the IAEA also issues various guidance publications [2-5].

1.2. Details regarding the manner in which the Transport Regulations are incorporated into international regulatory documents are provided in Section 2 of this report. Effective implementation of the Transport Regulations at the State level is essential for ensuring a high level of safety in the transport of radioactive material. Other key documents that should be considered by a State in regulating its transport of radioactive material are discussed in Section 2.

1.3. On 25 September 1998 the General Conference of the IAEA, which meets annually, adopted resolution GC(42)/RES/13 on the Safety of Transport of Radioactive Materials. In adopting that resolution, the General Conference recognized that “*compliance with regulations that take account of the Agency’s Transport Regulations is providing a high level of safety during the transport of radioactive materials...*” In addition, it requested the IAEA Secretariat to provide for the application of the Transport Regulations by, inter alia, providing a service for carrying out, at the request of any State, an appraisal of the implementation of the Transport Regulations by that State.

1.4. In response to this request the Director General offered the Transport Safety Appraisal Service (TranSAS) to all States in letter J1.01.Circ., dated 10 December 1998.

1.5. The first TranSAS was undertaken and completed at the request of Slovenia in 1999. Turkey was the third State to request a TranSAS.

1.6. In each of the General Conferences since 1998 resolutions focused on transport safety have commended the Secretariat for establishing TranSAS, commended those States that have requested this service and encouraged other

States to avail themselves of this service (see GC(43)/RES/11, GC(44)/RES/17, GC(45)/RES/10, GC(46)/RES/9 and GC(47)/RES/7).

REQUEST FROM TURKEY

1.7. In a letter dated 12 September 2000 the Permanent Mission of Turkey to the Office of the United Nations and other International Organizations in Vienna informed the IAEA that the Turkish Atomic Energy Authority (TAEK) had decided to request the IAEA Transport Safety Appraisal Service. The points of contact in Turkey and the IAEA exchanged initial information and arranged a preparatory mission that was conducted at the TAEK offices in Ankara from 1 to 5 October 2001. During the preparatory mission, a preliminary agreement was developed, which covered the scope of the appraisal and the tasks and activities to be completed prior to and during the appraisal.

1.8. The preliminary agreement addressed the following:

- (a) The scope of the appraisal;
- (b) The tentative dates of the appraisal;
- (c) The activities to be completed by the IAEA and by the Turkish authorities during the period leading up to the appraisal;
- (d) A preliminary list of activities to be undertaken during the appraisal;
- (e) The facilities required during the appraisal.

SCOPE OF THE APPRAISAL FOR TURKEY

1.9. The general scope of any TranSAS includes:

- (a) An appraisal of the State's regulatory practices for transport safety with respect to the requirements of the Transport Regulations and related international standards and guidelines;
- (b) Recommendations or suggestions, as appropriate, in areas in which the State's transport safety regulatory programme might be improved.

1.10. The more specific scope for Turkey, as requested, included the following:

- (a) An evaluation of the national transport legislation and regulations, taking into account applicable international practices;
- (b) A review of the implementation of the requirements of the 1996 edition of the Transport Regulations [1] into the Turkish regulations for national and international transport for all modes of transport;
- (c) A review of the authorities, responsibilities and functions of the regulatory body with regard to the transport of radioactive material;
- (d) A review and evaluation of the efficiency of the inspection and enforcement programme related to the transport of radioactive material;
- (e) An evaluation of the cooperation arrangements with key governmental organizations, with specific attention to areas of overlapping responsibilities;
- (f) A review of compliance practices, for example of a major importer.

ACTIVITIES COMPLETED PRIOR TO THE APPRAISAL

1.11. Preparations completed by Turkey included the following:

- (a) The completion and transmittal to the IAEA of the detailed TranSAS questionnaire;
- (b) Ensuring the availability of key personnel from the TAEK and other authorities during the appraisal;
- (c) The arrangement of the logistics for the appraisal, including accommodation and local transport for the team members, and some services for the translation of documents during the appraisal.

1.12. Preparations completed by the IAEA included the following:

- (a) The recruitment of the appraisal team (this included arranging for the necessary approvals for the recommended team members);
- (b) Providing the appraisal team with the relevant documentation and the TranSAS guidelines;
- (c) Arranging for the travel of the team members to and from Turkey.

APPRAISAL TEAM

1.13. The appraisal team was composed of four independent experts. These experts were representatives of regulatory authorities of Belgium, Germany

and the United Kingdom responsible for the transport of radioactive material, and the team leader, a transport safety expert from the IAEA. The expertise of the appraisal team was broad and covered all aspects of the implementation of regulations for the safe transport of radioactive material. Specific experience was taken into account for the assignment of the lead responsibilities for appraising the eight areas addressed in the TranSAS questionnaire.

APPRAISAL PROCESS

1.14. The appraisal process included the following:

- (a) A preparatory session for the appraisal team;
- (b) An entrance meeting involving presentations by key representatives from the transport authorities and industry concerning their responsibilities for the safe transport of radioactive material;
- (c) Discussions with Turkish representatives to obtain clarifications and additional or more detailed information;
- (d) Updating the TranSAS questionnaire and preparing the draft report with findings;
- (e) Ongoing feedback on the updated questionnaire and the draft report with findings;
- (f) A visit to the Çekmece Nuclear Research and Training Centre (ÇNAEM) near Istanbul;
- (g) Visits to the Turkish Airlines cargo departments at the Ankara Esenboga airport and the Istanbul Ataturk airport;
- (h) An exit meeting to present and discuss the findings.

More details on the appraisal process are provided in Section 3 of this report.

APPRAISAL REPORT

1.15. This report documents the results of the TranSAS appraisal conducted in Turkey from 3 to 14 March 2003. It includes, in Section 4, the findings for each area considered in the appraisal, together with a background discussion and a basis for any finding (tied to an international regulatory requirement or recommendation). The findings are presented as recommendations, suggestions and good practices, which for the purposes of a TranSAS appraisal have been defined as follows:

- (a) A recommendation is advice on improvement in the reviewed area. It can, but need not, be an indication of shortcomings either in the national statutory legislative and regulatory regime or in the methods of fulfilling the regulatory requirements.
- (b) A suggestion is either an additional proposal in conjunction with a recommendation or it may stand on its own. A suggestion should stimulate the regulatory body's management and staff to consider ways and means of enhancing performance.
- (c) A good practice is a recognition of a current practice that is superior enough to be worth bringing to the attention of other nuclear regulatory bodies as a model in the general drive for excellence.

Final remarks concerning the findings are presented in Section 5 of this report.

2. DOCUMENTS RELEVANT FOR THE TRANSAS APPRAISAL

IAEA SAFETY STANDARDS

2.1. The Transport Regulations are key to the development of a regulatory regime for the safe transport of radioactive material. These regulations were first developed in the late 1950s at the request of the United Nations Economic and Social Council. The first edition of the Transport Regulations was published in 1961, and has been updated regularly. The latest edition of the Transport Regulations was issued in 1996, and revised in 2000 to accommodate editorial changes [1]. The previous edition, upon which some States still base their national transport regulations, was issued in 1985 and amended in 1990 [6]. There are also additional guidance publications issued by the IAEA to support the application of the Transport Regulations by regulators and users [2-5]. Explanatory material [7] and advisory material [8] related to the 1985 edition of the Transport Regulations is relevant where that edition is still being applied.

2.2. These publications provide a sound basis for competent authorities in States to regulate the transport of radioactive material. Specifically, the Transport Regulations [1], and their preceding editions (e.g. the previous 1985 edition (as amended in 1990) [6]), have provided and continue to provide a

model to be followed by relevant international organizations and States in developing binding regulations for the international and national transport of radioactive material. The guidance publications [2–5] also are valuable tools for competent authorities, consignors, carriers and consignees for describing how they may apply specific requirements of the regulations. For example, the general advisory publication [2] and its predecessor publications [7, 8] provide insight into why various regulatory requirements have been established and define ‘a way’, or ‘ways’, but not ‘the way’ in which specific requirements may be satisfied in practice. Guidance is also provided in specific key areas, inter alia planning and preparing for emergencies [3], compliance assurance [4] and quality assurance [5].

2.3. The Transport Regulations have a foundation, from a radiation protection standpoint, in the IAEA Safety Fundamentals publication Radiation Protection and the Safety of Radiation Sources [9] and in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources [10] (the Basic Safety Standards).

2.4. Finally, a key publication for the application of the Transport Regulations in a State is the publication Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety [11], which discusses in detail the legislative and governmental responsibilities of a State and the responsibilities, functions, organization and activities of a regulatory body.

2.5. These IAEA publications serve as a basis for appraising the regulatory activities for the transport of radioactive material. However, it must be recognized that these publications are not backed by the rule of law, that they are generally not mandatory for a State and that they are advisory in nature. For example, the Transport Regulations [1, 6] serve as models for a State’s national transport regulations.

2.6. In striving to foster a consistent basis for communicating these recommended requirements to its Member States, the IAEA also issues a safety glossary [12].

INTERNATIONAL REGULATORY DOCUMENTS AND STANDARDS

2.7. The Transport Regulations serve as the model for the radioactive material portions of international regulations for the transport of dangerous goods by the various modes of transport.

2.8. The first step in applying the Transport Regulations to the international transport of radioactive material was the incorporation of their requirements into the recommendations on the transport of dangerous goods drawn up by the United Nations Committee of Experts on the Transport of Dangerous Goods [13], which provide a detailed set of ‘model regulations’ for all nine classes of dangerous goods. Radioactive material is Class 7 in these regulations. These model regulations of the United Nations serve as a basis for national and international regulations for the transport of dangerous goods by the various modes of transport.

2.9. Accordingly, the International Civil Aviation Organization (ICAO) publishes its regulations as the Technical Instructions for the Safe Transport of Dangerous Goods by Air [14] (the ICAO Technical Instructions). These Technical Instructions are mandatory upon all member States of the ICAO. In addition, the International Air Transport Association (IATA) publishes its Dangerous Goods Regulations [15], which incorporate all the requirements of the ICAO Technical Instructions as well as additional operator variations.

2.10. The International Maritime Organization (IMO) publishes the International Maritime Dangerous Goods Code [16] (IMDG Code) for the transport of dangerous goods by sea. Many of the detailed requirements of the IMDG Code became mandatory for all Contracting Parties to the International Convention for the Safety of Life at Sea (SOLAS Convention) on 1 January 2004.

2.11. For States in Europe, the United Nations Economic Commission for Europe (UNECE) and the Intergovernmental Organization for International Carriage by Rail (OTIF) publish dangerous goods regulations (including requirements derived from the Transport Regulations [1]) for road (Annexes A and B of ADR) [17] and rail (RID) [18]. These regulations apply through agreements and conventions (respectively ADR and COTIF) that make their application to the international carriage of dangerous goods by road and rail between Contracting Parties mandatory. The ADR/RID requirements are also mandatory for domestic transport in States that are members of the European Union (EU), through EU directives. A number of non-EU countries have also

adopted the ADR and RID requirements as the basis for their national legislation.

2.12. Similarly, another agreement concerning the international carriage of dangerous goods by inland waterways (ADN) was adopted in 2000 under the auspices of the UNECE and the Central Commission for Navigation of the Rhine. The conditions for entry into force (seven Contracting States) had not been met in February 2004 (ten Signatory States, two Contracting States), but the annexed regulations, which also incorporate the Transport Regulations, are already of mandatory application on the Rhine and have been adopted by several Danubian States.

3. APPRAISAL PROCESS IN TURKEY

OVERVIEW OF THE APPRAISAL PROCESS

3.1. The appraisal process included the following:

- (a) A preparatory session for the appraisal team;
- (b) An entrance meeting involving presentations by key representatives from the transport authorities and industry concerning their responsibilities for the safe transport of radioactive material;
- (c) Discussions with Turkish representatives to obtain clarifications and additional or more detailed information;
- (d) Updating the TranSAS questionnaire and preparing the draft report with findings;
- (e) Ongoing feedback on the updated questionnaire and the draft report with findings;
- (f) A visit to the Çekmece Nuclear Research and Training Centre (ÇNAEM) near Istanbul;
- (g) Visits to the Turkish Airlines cargo departments at the Ankara Esenboga airport and the Istanbul Ataturk airport;
- (h) An exit meeting to present and discuss the findings.

PREPARATORY SESSION

3.2. A preparatory session preceding the formal part of the appraisal was held in order for the team members to meet with their counterparts from Turkey, and to review the programme for the appraisal, the procedures to be followed, the reference material to be used and the work to be carried out.

3.3. The members of the team had broad experience and expertise in the implementation of regulations for the transport of radioactive material. They represented regulatory authorities in Belgium, Germany and the UK, and were led by a transport safety expert from the IAEA. Further details on the team members are provided in Appendix II.

3.4. Specific experience was taken into account for the assignment of lead responsibilities for appraising the eight areas addressed in the TranSAS questionnaire.

ENTRANCE MEETING

3.5. The entrance meeting involved key representatives of the regulatory authorities and of an import organization.

3.6. The agenda of the entrance meeting covered the following items:

- (a) Welcome address by the President of the TAEK (M. Tomak);
- (b) Outline of the objectives of the appraisal by the TranSAS team leader (G.J. Dicke);
- (c) Introduction of the TranSAS team members;
- (d) Introduction of the Turkish participants in the appraisal;
- (e) Overview of the organization of the Radiation Health and Safety Department (RHSD) of the TAEK by its director (I. Uslu);
- (f) Overview of the responsibilities of divisions in the RHSD concerning the transport of radioactive material (G. Arslan);
- (g) Overview of the organization and functions of the Committee for the Preparation and Application of Legislation (K. Ertürk);
- (h) Overview of the legal and technical processes for implementing changes to the Turkish regulations (K. Ertürk);
- (i) Overview of work carried out by an importer to comply with the Transport Regulations (I. Soytemiz, Tibbi Endüstriyel Sistemler Sanayi ve Ticaret Ltd ti (TESST));

- (j) Overview of cooperation with the General Directorate of Civil Aviation (E. Ertus, Department of Transport);
- (k) Overview of cooperation with the Undersecretariat of Customs (F. Damancioglu, Division of Environment);
- (l) Overview of cooperation with the Undersecretariat for Maritime Affairs (UMA) (S. Onur, Navigation Safety Department);
- (m) Overview of cooperation with the Ministry of Environment (A. Nuray, Waste Management Department), General Directorate for the Prevention of Pollution to the Environment;
- (n) Overview of transport related emergency response procedures (I. Arikani);
- (o) Overview of inspection procedures (G. Arslan).

INTERVIEWS, UPDATING THE QUESTIONNAIRE AND DEVELOPING THE REPORT

3.7. In addition to the discussions following the presentations, the team invited several of the Turkish representatives to discuss in more detail the information provided in the questionnaire. Subsequently, the team members pursued further information specific to the areas for which they had the lead responsibility. The additional information was used to update the questionnaire. On 5 March 2003 the team visited the Turkish Airlines cargo department at the Ankara Esenboga airport. On 6 March the updated questionnaire was made available to the Turkish representatives for their review, and in the afternoon the team flew to Istanbul and prepared for visits to the Turkish Airlines cargo department at the Istanbul Ataturk airport on 7 March and to ÇNAEM on 10 and 11 March. In the afternoon of 11 March the team flew back to Ankara. The following two days were used to prepare the draft report for the exit meeting, taking into account the comments received and the information gained from the Istanbul visit. The draft report of the findings was presented at the exit meeting on Friday 14 March.

VISIT TO THE ÇEKMECE NUCLEAR RESEARCH AND TRAINING CENTRE

3.8. The agenda for the visit to ÇNAEM involved the following:

- (a) Welcome by the Director of the Centre (G. Köksal);
- (b) Overview of activities of the Health Physics Division (N. Chelebi);

- (c) Overview of activities at the Çekmece Waste Processing and Treatment Facility (A. Kahraman);
- (d) Visit to the facilities of the Radioisotope and Radiopharmaceuticals Division (F. Akgün);
- (e) Review meeting involving all presenters as well as E.M. Köksal (Head of the Radiobiology Division) and K. Ertürk, B. Onat and T. Özdemir from the RHSD in Ankara.

EXIT MEETING

3.9. The findings of the team were presented by the team members for the areas in which they had the lead responsibility. These findings are summarized in the Summary, Findings and Conclusions section of this report. The findings, together with the relevant background information and the basis for the findings, are presented in detail in Section 4.

4. APPRAISAL OF THE IMPLEMENTATION OF THE TRANSPORT REGULATIONS IN TURKEY

INTRODUCTION

4.1. This section of the report is structured around the key topic areas covered in the TranSAS questionnaire. These key areas are:

- (a) Legislative and governmental responsibilities;
- (b) The authority, responsibilities and functions of the regulatory body;
- (c) The organization of the regulatory body;
- (d) The authorization process;
- (e) Review and assessment;
- (f) Inspection and enforcement;
- (g) The development of regulations and guides;
- (h) Emergency preparedness for transport.

This section provides, for each of these areas, an overview of relevant information, followed by the findings for that area. Each finding is preceded by a basis from appropriate international regulatory and guidance documents. The

findings are presented in terms of recommendations, suggestions and good practices, as applicable.

LEGISLATIVE AND GOVERNMENTAL RESPONSIBILITIES

Overview

4.2. The legal documents relevant to the implementation of the Transport Regulations focus primarily upon three areas:

- (a) Documents concerning responsibilities and regulations with regard to the transport of radioactive material;
- (b) Documents concerning responsibilities and regulations for the transport of dangerous goods, which include radioactive material;
- (c) Documents concerning some specific aspects, other than safety, of the transport of radioactive material.

Legal documents concerning responsibilities and regulations for the transport of radioactive material

4.3. The following legal documents provide the basic framework for the implementation of the Transport Regulations in Turkey:

- (a) The Turkish Atomic Energy Authority Act, Act No. 2690 of 13 July 1982;
- (b) The radiation safety decree of 7 September 1985;
- (c) The radiation safety regulation of 24 March 2000;
- (d) The regulation for the safe transport of radioactive material (the Turkish version of Ref. [6]) of 10 September 1997;
- (e) The draft revision of this Turkish transport regulation based on the 1996 edition of the Transport Regulations [1], applied as of 1 July 2001.

Turkish Atomic Energy Authority Act, Act No. 2690

4.4. The TAEK was established by the Turkish Atomic Energy Authority Act, Act No. 2690 of 13 July 1982. The objective of this act was to: provide for the peaceful use of atomic energy in Turkey for the benefit of the country in conformity with the national development plans; define and recommend the basic principles and policies; and implement, inspect, organize, support and coordinate scientific, technical and administrative studies and affairs. More

specifically, in Chapter 1, on objectives, scope and establishment, and further in Article 3, Act No. 2690 establishes the TAEK as a public legal entity reporting directly to the Prime Minister, and it identifies the major organs of the TAEK, which are:

- (a) The Atomic Energy Commission;
- (b) The Advisory Committee;
- (c) Specialized departments;
- (d) Affiliated institutions.

4.5. In Article 4, Chapter 2, of Act No. 2690, the overall duties and responsibilities of the TAEK are addressed in more detail. These include specifically for transport:

- (a) *“to determine the general principles to be complied with and to make recommendations”* (Article 4, para. (b));
- (b) *“to prepare decrees and regulations”* (Article 4, para. (d));
- (c) *“to take the necessary measures”* (Article 4, para. (f)).

4.6. Other general requirements in Article 4 also apply to transport. For example, in Article 4, para. (h): *“to train personnel who will work in the nuclear field or to assist their training if necessary and to co-operate with the organizations and higher educational institutions working for this purpose.”*

4.7. In Chapter 3, on organs, duties and jurisdictions, the duties of the Atomic Energy Commission include in Article 6, para. (b): *“to prepare the draft acts and decrees related to the nuclear field and submit them to the Prime Minister, and to approve the regulations related to the Turkish Atomic Energy Authority.”*

4.8. Article 8 establishes the various departments in the TAEK. The duties of the RHSD are provided under para. (b) as follows: *“Among the duties laid down in Article 4 of this Act: to carry out services for licensing, determination of the regulations and principles of radiation protection, transport and storage of radioactive materials, and inspection of radiation emitting devices and systems; and to perform other related tasks.”*

4.9. Article 9 gives the TAEK the authority to establish affiliated institutions to carry out fundamental and applied research in the nuclear field and to establish their working procedures by regulation.

Radiation safety decree

4.10. The relevant sections of the radiation safety decree include the following. Article 1 states that the provisions to be observed for the transport of ionizing radiation sources are spelled out in the decree. Article 3 states that the RHSD is responsible for carrying out the necessary services for radiation safety. Article 4 defines the functions of the RHSD, including that of issuing licences for the purpose of allowing the transport of sources of ionizing radiation, issuing permits for import, export, transport or transit passage, defining the necessary measures to be taken in the event of a radiation accident and the mode of cooperation with the governmental offices and organizations concerned with radiation safety. Article 7 states that the possession, use, production, import, export, purchase, sale, transport and storage of radiation sources require a licence from the TAEK, and that if such operations require any other permit, licence or documentation from other governmental offices and organizations, the issuance of such documents is subject to a licence from the TAEK. Articles 14 and 16 of the radiation safety decree provide additional requirements for the TAEK to issue permits for the transport of radioactive sources.

Radiation safety regulation

4.11. The requirements of the radiation safety regulation relevant to the transport of radioactive material are provided in particular in Part IV, on licences, permits, inspections and records; specific details are provided in Articles 50–70.

Turkish regulation for the safe transport of radioactive material

4.12. The Turkish version of the Transport Regulations is essentially a translation. The version published on 10 September 1997 is based on the 1985 edition of the Transport Regulations [6]. A draft version of the Turkish regulation, which is essentially a translation of the 1996 edition of the Transport Regulations [1], has been applied based on an 11 October 2001 letter from the TAEK to the competent organizations. The draft regulation was attached to the letter. This draft version has not yet been submitted to the Atomic Energy Commission for its approval and subsequent publication in the Official Gazette for formal implementation.

Legal documents concerning the transport of dangerous goods

4.13. The following legal documents provide the basic framework in Turkey for the implementation of the requirements for the transport of dangerous goods (which include radioactive material) in accordance with international and national regulations.

International requirements for transport by air

4.14. The following international regulations apply to the air transport of dangerous goods:

- (a) The ICAO Technical Instructions [14];
- (b) The IATA Dangerous Goods Regulations [15].

4.15. Turkey has been a member of the ICAO since 1944 and ratified the Chicago Convention in 1946. Accordingly, the ICAO Technical Instructions apply to the international air transport of dangerous goods, including radioactive material. The requirements for radioactive material in the ICAO Technical Instructions have been in accordance with the 1996 edition of the Transport Regulations [1] since 1 July 2001.

4.16. Airlines are required to comply with the IATA Dangerous Goods Regulations [15], which embrace all the requirements of the ICAO Technical Instructions. The requirements for the transport of radioactive material in the IATA Dangerous Goods Regulations [15] have therefore also been in accordance with the 1996 edition of the Transport Regulations [1] since 1 July 2001. The IATA Dangerous Goods Regulations [15] have some requirements, the ‘operator variations’, which are in addition to the requirements of the ICAO Technical Instructions. An operator variation from Turkish Airlines applicable specifically to the transport of radioactive material is identified as TK-03. This variation states that “*Permission of the Turkish Atomic Energy Authority is necessary for the transport of radioactive elements to/from Turkey.*”

National requirements for transport by air

4.17. The Turkish requirements governing the air transport of dangerous goods are established by:

- (a) Law No. 3348 of 9 April 1987, concerning the establishment and responsibilities of the Ministry of Transport;

- (b) Law No. 2920 of 14 October 1983, the Turkish civil aviation law;
- (c) Aviation circular SHY-150.11, of 13 June 2000, on the rules concerning the responsibilities of air cargo agencies;
- (d) Ground handling regulations for airports, SHY-22 of 28 August 1996, Official Gazette No. 22760;
- (e) A regulation concerning commercial air transport companies, of 13 July 1992, Official Gazette No. 21283;
- (f) Draft Turkish instructions on the air transport of dangerous goods, SHT-18, 17 February 2003.

Law No. 3348 of 1987, concerning the establishment and responsibilities of the Ministry of Transport

4.18. Paragraph (a) of Article 12 of Law No. 3348 provides that the General Directorate of Civil Aviation is responsible for regulating transport by air in Turkey. Paragraphs (c) and (d) address the qualification of personnel and companies and their licensing. This responsibility includes the licensing of cargo agents who deal with the import or export of dangerous goods. This article also states that for the control of safety and security the opinions of other relevant national authorities should be taken into account.

Law No. 2920 of 1983, the Turkish civil aviation law

4.19. Article 6 of this law states that all transport by air in Turkey lies under the responsibility of the Ministry of Transport.

Aviation circular SHY-150.11, of 13 June 2000

4.20. The basis for this circular is the Turkish civil aviation law and Article 14, item (i), of the airports ground handling regulation, SHY-22. Article 2 of the circular defines the scope for responsibilities of cargo agencies, air transporters and ground handling companies. Article 5 forbids the transport of dangerous goods, including radioactive material, unless it is transported in accordance with the requirements of: (a) the General Directorate of Civil Aviation; (b) ICAO Annex 18, document 9284-AN/905; (c) the IATA Dangerous Goods Regulations [15]; and (d) subpart R, Transport of Dangerous Goods by Air, in JAR-OPS 1 [19] of the European Joint Aviation Authority. These requirements apply to both national and international air transport. Item (a) of Article 11 states that all licensed agents have the obligation to train in accordance with the IATA Dangerous Goods Regulations [15] and to certify at least one staff member.

*Regulation concerning commercial air transport companies
(13 July 1992, Official Gazette No. 21283)*

4.21. Article 27 states that all explosives and dangerous goods, including radioactive material, require a special permission for transport from the Ministry of Transport and the competent authorities of other countries.

Draft Turkish air transport of dangerous goods instructions

4.22. Currently in draft form are the air transport of dangerous goods instructions being prepared by the General Directorate of Civil Aviation. Articles 2 and 3 of these instructions state that the ICAO Technical Instructions (except those parts on ammunition and explosives) are to be met by all registered aircraft used by air companies and shippers.

International requirements for the transport of dangerous goods by sea

4.23. Turkey is a member of the IMO. The major IMO conventions, including the SOLAS Convention and the International Convention for the Prevention of Pollution from Ships (MARPOL Convention), have been ratified by Turkey. Additional instruments are in the process of ratification at the Turkish Parliament. The IMO publishes the IMDG Code [16], which since 1 January 2001 includes the requirements of the 1996 edition of the Transport Regulations [1]. A one year transition period allowed the requirements of the 1985 edition of the Transport Regulations [6] to remain applicable until 1 January 2002, after which time only the requirements of the 1996 edition of the Transport Regulations [1] apply pursuant to the IMDG Code. The requirements of the IMDG Code are widely applied but are not yet mandatory. Turkey has applied the general principles of the IMDG Code, but not the detailed requirements. As of 1 January 2004 many of the detailed requirements of the IMDG Code have become mandatory for all IMO member States.

National requirements for the transport of dangerous goods by sea

4.24. The Turkish regulations governing the transport of dangerous goods by sea include the following:

- (a) Law No. 4922, on protecting life and property, issued on 10 June 1946;
- (b) A decree concerning the technical conditions of commercial ships, issued on 11 February 1948, based on Law No. 4922, as amended in 1973;

- (c) Ports Law No. 618, issued on 14 April 1925;
- (d) Government Decree No. 491, on the establishment of the UMA, dated August 1993, as amended by Amendment 602 dated June 2000;
- (e) Regulation No. 3/14831 of 1952 on the transport of dangerous goods by commercial ships;
- (f) The Istanbul port decree of 6 September 1996, Official Gazette No. 22749;
- (g) The maritime traffic regulations for passage through Turkish straits, published in 1994, revised in 1998 and 1999.

4.25. The UMA lies directly under the authority of the Prime Minister. The UMA has three general directorates, including the General Directorate of Maritime Transport, and seven district directorates. The responsibilities of the district directorates include coordination of the actions of harbour masters.

4.26. There are 68 harbour masters for the 130 ports in the four maritime regions along Turkey's 8330 km of coastline. (Approximately 120 million tonnes of dangerous goods, including crude oil and derived products, pass through the Turkish straits per year in about 7000 of the approximately 45 000 ships in transit.) The responsibilities of the harbour masters include some tasks in relation to dangerous goods.

Law No. 4922 of 10 June 1946

4.27. This law provides the principles for maritime safety. It is now only considered a legal framework, providing in particular for penalties in the event of violation. Article 12 defines dangerous goods.

1948 decree concerning the technical conditions of commercial ships

4.28. This decree, which is based on Law No. 4922, aims to set up minimum technical standards for any kind of ship. This decree was amended in 1973. According to the amended decree, international rules apply whenever national regulations are missing or deficient.

Port law and port decrees

4.29. The port law has governed the principles of port organization and management since 1925. It is based on a clear separation between the port authority in charge of the commercial aspects of port operation and the State authority, locally represented by harbour masters and ship surveyors, in charge

of maritime safety. Each harbour master authority has its own port decree within its responsibility area. The general principles are the same, but the most detailed decree is the Istanbul port decree. Article 23 of this decree stipulates the requirements for loading, unloading and stowage. Item (g) defines radioactive material and states that, prior to unloading, all necessary documents must be provided to the port authority. For radioactive material there is also a need for a certificate that should include a statement that the material has been packaged in a manner that does not pose any risk to the environment. In order to obtain port clearance, the captain, owner or agent of a ship carrying dangerous goods must submit details to the harbour master authority on the quantity, nature and packaging of the dangerous cargo at least 24 h before entry into a port. Unloaded radioactive material is not to be stored in the port area.

Maritime traffic regulations for passage through Turkish straits, published in 1994, revised in 1998 and 1999

4.30. The purpose of these regulations is to provide for the safety of navigation, life and property and the protection of the environment in the straits without jeopardizing the principle of freedom of passage as set forth in the Montreux Convention. Along with the introduction of these regulations, the Turkish authorities have also established traffic separation schemes (TSSs) in the straits, in accordance with the provisions of the Convention on the International Regulation for Prevention of Collision at Sea (COLREG). The TSSs were approved by the IMO General Assembly in November 1995, with the associated Rules and Recommendations on Navigation Through the Strait of Istanbul, the Strait of Canakkale and the Marmara Sea. The number of collisions and accidents has been drastically reduced in the straits since the introduction of these regulations.

National and international requirements for the road and rail transport of dangerous goods

4.31. Overall responsibility for the transport by road of dangerous goods lies with the Ministry of Environment in accordance with the Act of Environment, Act No. 2872, issued on 11 August 1983, Official Gazette No. 18132. Section 3 addresses measures and prohibitions for protection of the environment. Article 8 states that it is prohibited to store or transport waste unless the requirements of the relevant regulations are met. The regulation specific to these requirements is the dangerous waste control regulation, issued on 27 August 1995, Official Gazette No. 22387. According to this regulation, all

dangerous waste, including radioactive waste, can only be transported by road by a licensed carrier. Provincial authorities are authorized by the Ministry of Environment to issue licences in this connection. According to Article 132 of the regulation concerning transport of dangerous goods by road, issued on 22 October 1976, Official Gazette No. 15742, obtaining a permit from the TAEK is a prerequisite for applying for a licence to carry radioactive waste by road.

4.32. Overall responsibility for the rail transport of dangerous goods lies with the General Directorate of Turkish State Railways, in accordance with Act No. 3938, issued on 14 December 1993, Official Gazette No. 21788. This act incorporates all the annexes of RID [18] based on the COTIF Protocol of 20 December 1990. The COTIF Protocol was signed on 20 December 1990 and ratified on 28 June 1994, and entered into force on 1 November 1996. The protocol of 3 June 1999, which includes the requirements of the 1996 edition of the Transport Regulations [1], was signed on 30 December 1999, but has not been ratified.

4.33. It should be noted here that many European countries and several countries outside Europe apply the international ADR (road) [17] and RID (rail) [18] regulations for the transport of dangerous goods. Since 1 July 2001 these regulations have included the requirements of the 1996 edition of the Transport Regulations [1].

Legal documents concerning some specific aspects, other than safety, of the transport of radioactive material

4.34. Aspects other than safety may also be subject to requirements for the transport of radioactive material. Such aspects include import or export and physical protection.

Customs regulation

4.35. Customs officers have some responsibilities with regard to the import or export of radioactive material and with regard to the prevention of smuggling of radioactive material. They have made arrangements with the TAEK to be trained in dealing with radioactive material.

4.36. The list of goods imported into Turkey that are subject to authorization in accordance with the legislation in force is included in Annex 27 of the customs regulation issued on 1 July 2002. This annex provides for an 'import

notification' concerning radioactive material that requires permission from the TAEK.

4.37. Import notifications, issued by the Undersecretariat of Foreign Trade, are used to inform other authorities in Turkey of specific requirements related to their area of responsibility. The import notification in Annex 27, issued on 31 December 2001, Official Gazette No. 24627, covers radioactive material and other sources of ionizing radiation. This notification informs the Undersecretariat of Customs of all items that require permission from the TAEK. In order to prevent smuggling of nuclear material, radiation detectors have been installed at airports and borders. All regional directorates have also been provided with handheld radiation detectors.

Physical protection of special nuclear material regulation, issued on 20 July 1979, Official Gazette No. 16702

4.38. Physical protection requirements are not within the scope of the TranSAS appraisal.

Findings

4.39. Basis: The international regulations of the ICAO, IATA and the IMO on the transport of radioactive material incorporated the requirements of the 1996 edition of the Transport Regulations [1] in 2001. Since then the requirements of the 1996 edition of the Transport Regulations [1] have become formally applicable for the international transport of radioactive material. The Turkish regulation on the safe transport of radioactive material is formally still based on the 1985 edition of the Transport Regulations [6]. For harmonization of the transport regulations, it is important to formally update the national regulations and harmonize them with the international regulations.

Recommendation: The process of formalizing the draft Turkish regulation on the safe transport of radioactive material should be completed as soon as possible.

4.40. Basis: Areas of overlapping regulatory responsibilities, as occur, for example, with regulating all aspects concerning radioactive material on the one hand and all aspects of the transport of dangerous goods, including radioactive material, on the other, have the potential for duplication and the creation of regulatory gaps. A memorandum of understanding between the involved

authorities could ensure effective regulation in areas of overlapping responsibilities.

Suggestion: It is suggested that in areas of overlapping responsibilities, memoranda of understanding be developed between the authorities involved.

AUTHORITY, RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

Overview

4.41. The TAEK was established pursuant to Act No. 2690 of 13 July 1982 (the Turkish Atomic Energy Authority Act). The duties, responsibilities and jurisdictions of the TAEK are addressed in Article 4 as follows:

- (a) To determine the bases of the national policy and the related plans and programmes for the peaceful use of atomic energy for the benefit of the country, and to submit them to the Prime Minister for approval; to perform any kind of research, development, study and investigation on the benefit of using atomic energy for the scientific, technical and economic development of the country; to coordinate and support such activities.
- (b) To determine the general principles to be complied with and to make recommendations on and cooperate with any kind of exploration, mining, purification, process, production, distribution, import, export, trade, transport, usage, transfer and storage of raw nuclear material, special fissionable material and other strategic material used in the nuclear field.
- (c) To establish and operate research and training centres, units, laboratories, test centres, and pilot plants not intended for power production, or arrange for the establishment and operation of these installations, within the country wherever necessary; to perform studies for the national industry with a view to acquiring nuclear technology; to make recommendations for the establishment of processing, purification and other necessary facilities relating to the fuel cycle.
- (d) To establish and operate facilities for the production of radioisotopes, for quality control, for measurement and for distribution, in order to:
 - (i) Determine the principles, measures and limits of liability for protection against the damaging effects of ionizing radiation while

using radiation equipment, radioactive material, special fissionable material and other similar sources of ionizing radiation.

- (ii) Grant licences as a basis for operating permits to governmental or private institutions and organizations or persons who keep, use, import, export, transport, store or trade in radioactive material and radiation equipment, and to inspect these institutions and organizations for compliance with radiation safety legislation; to enforce insurance obligations for implementing the above activities; to cancel licences temporarily or permanently in the event of non-compliance with radiation safety legislation; to decide to close down the above institutions and organizations; and to initiate legal investigations in accordance with general legal principles.
 - (iii) Prepare the decrees and regulations determining the principles of insurance obligations, usage, export, import and transport of radioisotopes.
- (e) To issue approvals, permits and licences for site selection, construction, operation and environmental safety of nuclear power reactors, research reactors and nuclear fuel cycle facilities; to carry out the necessary investigations and inspections; to limit the operating authorizations in the event of non-compliance with permits and licences; to cancel permits or licences, permanently or temporarily, and to make recommendations on the closing down of such installations to the Prime Minister; to prepare the necessary technical guides, decrees and regulations for these purposes.
 - (f) To take the necessary measures, or arrange for them to be taken, for the processing, transport and safe temporary or permanent storage of radioactive waste generated in nuclear facilities and radioisotope laboratories.
 - (g) To establish relations and cooperate with the national institutions and organizations concerned with atomic energy; to participate in the scientific studies of, and to contact and cooperate with, foreign and international institutions and organizations in the nuclear field; to programme and administer the assistance obtained from national or foreign sources for any studies in the nuclear field.
 - (h) To train personnel to work in the nuclear field, or to assist in their training if necessary, and to cooperate with the organizations and higher educational institutions working to this purpose; to make recommendations on the distribution of fellowships in the nuclear field supplied by national sources; to distribute fellowships in the nuclear field supplied by foreign sources; to conduct or assist in conducting training courses

within the country; to support students and personnel training abroad; to plan and follow their education and studies.

- (i) To compile, disseminate and introduce the necessary information and the conclusions of national and foreign studies relating to the application of atomic energy; to enlighten the public on nuclear matters.
- (j) To carry out studies relating to national and international legislation in the nuclear field and to propose necessary amendments to regulations.
- (k) To prepare and implement decrees and regulations determining the bases for the protection of nuclear material and facilities, and to carry out inspections towards these aims; to comment on relevant regulations prepared by other institutions.

4.42. Work permits to transport material to and from nuclear installations are given by other ministries, such as the Ministry of Transport for transport by air, the Ministry of Environment for transport by road, and the Undersecretariat for Maritime Affairs for transport by sea. In cases in which radioactive material is involved, the radiation safety decree states in Article 7 that any additional permits or licences can only be obtained after issuance of the necessary licence by the TAEK.

4.43. According to the Turkish Atomic Energy Authority Act, the TAEK reports to the Prime Minister. However, it must be noted that, due to a reorganization of the Government, the TAEK now reports to the Minister for Energy and Natural Resources.

4.44. The TAEK also acts as the operator of nuclear installations (e.g. for the production of radiopharmaceutical products and for the treatment and storage of low level radioactive waste). These activities and the installations involved are to be licensed by the RHSD.

Findings

4.45. Basis: The TAEK has to approve activities in which radioactive material is involved, in some cases in addition to licences or authorizations issued by other authorities. For instance, the General Directorate of Civil Aviation licenses Turkish Airlines for the carriage of dangerous goods, but the TAEK has to issue an additional licence, since Turkish Airlines also transports radioactive material. Only a limited number of formal arrangements exist or are in preparation. For example, Article 9 of a draft aviation instruction issued by the General Directorate of Civil Aviation, SHT-18, issued on 17 February 2003, requires the permission of the TAEK for air transport within Turkey, to

confirm compliance with the Turkish regulation for the safe transport of radioactive material. When two organizations or ministries have overlapping or complementary responsibilities, it is of utmost importance that an agreement be reached on the specific responsibilities and on the management of the interfaces. A memorandum of understanding between the different parties involved could help to clarify the interfaces and overlaps.

Suggestion: It is suggested that memoranda of understanding be prepared to manage interfaces between the different authorities involved in the transport of radioactive material. Such memoranda of understanding would detail the procedures to be followed in the authorization process and might include provisions for the training of personnel in radiation safety, as well as provisions regarding inspection and enforcement.

4.46. Basis: The Ministry of Transport (General Directorates of Civil Aviation and Road Transport), the Undersecretariat for Maritime Affairs, the Ministry of Environment and the General Directorate of the Turkish State Railways are also involved in regulating the transport of dangerous goods, including radioactive material.

Suggestion: Cooperation agreements between the different parties involved could help to achieve harmonization of the applicable national and international regulations for the transport of dangerous goods by different modes.

4.47. Basis: The statutory functions of the TAEK include both the regulation and the licensing of nuclear activities, but the TAEK also has responsibilities as an operator of nuclear facilities (research institutes and other facilities). An affiliated institution (ÇNAEM) is the operator of nuclear installations, but also issues customs clearances and permits and performs inspections. Despite the fact that the affiliated institutions of the TAEK must be licensed just as any other operator, there is a potential conflict of interest, and the independence of the competent authority may be questioned. According to para. 2.2(2) of Ref. [11], the regulatory body shall be effectively independent of organizations or bodies charged with the promotion of nuclear technologies or responsible for facilities or activities.

Suggestion: It is suggested that the regulatory functions be more clearly separated from the operational and promotional functions. This separation would be evident from the organizational chart.

Suggestion: In order to clarify the duties and responsibilities of the specialized departments and the affiliated institutions in accordance with the Turkish Atomic Energy Authority Act, it might be envisaged to set up a section of the RHSD in Istanbul. This section would carry out the work actually done by the Health Physics Department of ÇNAEM. As an alternative, part of the Health Physics Division of ÇNAEM would continue to carry out the work but would formally become part of the RHSD.

ORGANIZATION OF THE REGULATORY BODY

Overview

4.48. The organs of the TAEK are as follows (Turkish Atomic Energy Authority Act, Article 3):

- (a) The Atomic Energy Commission;
- (b) The Advisory Committee;
- (c) Specialized departments;
- (d) Affiliated institutions.

4.49. The structure of the TAEK is illustrated in Fig. 1.

4.50. The Atomic Energy Commission, chaired by the President of the TAEK (or the Prime Minister when he deems necessary), consists of the Vice Presidents of the TAEK, one member each from the National Defence, Foreign Affairs, and Energy and Natural Resources ministries, and four faculty members active in education, training and research in the nuclear field. The members representing the ministries and higher educational organizations are selected by the Prime Minister for a four year term of appointment.

4.51. The duties of the Atomic Energy Commission are:

- (a) To determine the working principles and programmes of the TAEK and to approve the draft budget and submit it to the Prime Minister;
- (b) To prepare draft acts and decrees relating to the nuclear field and submit them to the Prime Minister, and to approve regulations relating to the TAEK;
- (c) To follow and evaluate the works of the TAEK and to prepare the annual work programme and report and submit them to the Prime Minister;

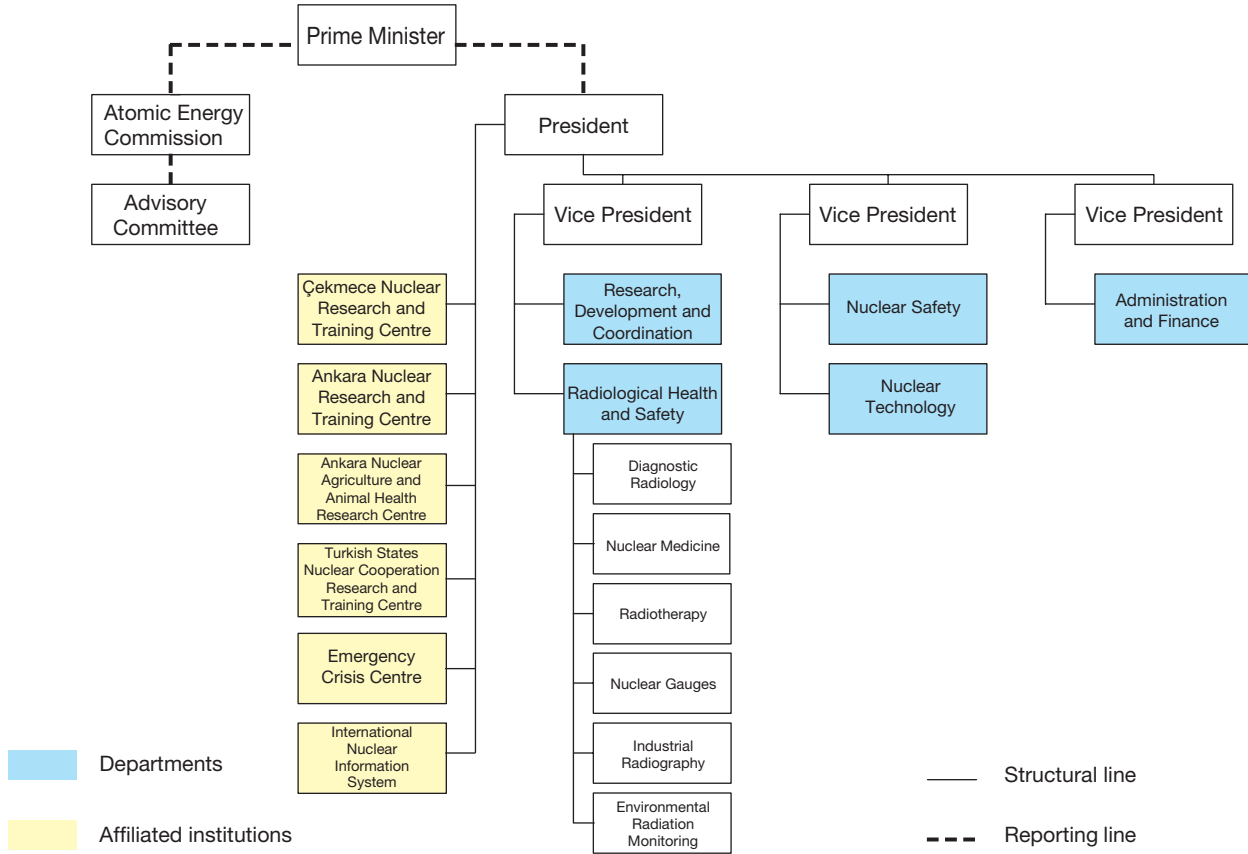


FIG. 1. Organizational chart of the TAEK.

- (d) To submit the necessary arrangements to the Prime Minister for approval by reviewing the personnel and organizational structure of the TAEK in order to meet developing needs.

4.52. The Advisory Committee consists of the faculty members working in the nuclear field and experts from other related institutions and organizations, whose numbers, qualification and selection criteria are determined by a regulation. The members of the Advisory Committee are appointed at the proposal of the Atomic Energy Commission and with the approval of the Prime Minister. The President of the TAEK calls the Advisory Committee for a meeting at least once a year, and chairs the meeting. The Advisory Committee investigates the topics specified by the Atomic Energy Commission and submits its conclusions and recommendations to the Atomic Energy Commission.

4.53. The duties of the RHSD are, inter alia, to carry out services for licensing, to determinate the regulations and principles of radiation protection, to transport and store radioactive material, to inspect radiation emitting devices and systems, and to perform other related tasks.

4.54. The RHSD has six licensing divisions that deal with:

- (a) Diagnostic radiology;
- (b) Radiotherapy;
- (c) Nuclear medicine;
- (d) Nuclear gauges;
- (e) Industrial radiography;
- (f) Environmental radiation monitoring.

4.55. In addition, four standing committees within the RHSD cover the following areas:

- (a) Radiation sources and waste;
- (b) Radiological accident management;
- (c) Legislation;
- (d) Training.

4.56. As can be seen from Fig. 1, there is no specific division for the transport of radioactive material. Transport issues are dealt with by the various divisions, depending on the use that is made of the material. It must be noted that the TAEK acts not only as a regulator but also as an operator of nuclear installa-

tions (e.g. the affiliated institution ÇNAEM produces and distributes radiopharmaceutical products, and its Health Physics Department is responsible for the treatment and storage of low level radioactive waste). It is felt that there is a potential for conflict of responsibilities and for the regulatory departments of the TAEK not to be able to carry out their functions in an effectively independent manner (see para. 4.47 of this report).

Finding

4.57. Basis: The TAEK is recognized as the competent authority for the transport of radioactive material. However, from the organizational chart of the TAEK, it is not clear which division is responsible for this activity.

Suggestion: In order to make the organization more transparent, it might be envisaged that a specific division be set up within the RHSD to deal specifically with all transport issues. The personnel of this division would be given the opportunity to increase their expertise in order to be able to perform the necessary assessments.

AUTHORIZATION PROCESS

Overview

4.58. The radiation safety decree and the radiation safety regulation provide a general framework for the licensing of the import, transit, export and transport of radioactive material. Applications for a licence are not evaluated by a specific transport division, but by the division that is in charge of the licensing of the use of the radioactive material involved. Transport is one of the components of an application for a licence. The evaluation seems to be performed essentially on an administrative basis, with less attention paid to radiation and transport safety issues (e.g. the relevance or validity of transport documents).

4.59. The licences are issued to the consignor. It must be noted here that the importer or exporter is considered to be the consignor, although this is not explicitly stated in the legislation. Eighty-six companies have been licensed for the import, export, transit and transport of radioactive material. The licences are valid for five years.

4.60. Each shipment is subject to a permit, also issued to the consignor. For movements of radioactive sources for industrial radiography, the operator has to notify the TAEK in advance. As a consequence, the TAEK is well informed of movements of radioactive material and of the presence of radioactive material in Turkey. For these purposes, the TAEK has set up a database that is continuously updated.

4.61. It must be noted that permits are normally issued by the Ankara based headquarters of the TAEK. However, the Health Physics Division of the Istanbul based ÇNAEM issues customs clearances and approvals for shipments of radiopharmaceutical products. The Health Physics Division of ÇNAEM forwards to the RHSD, on a monthly basis, an overview of the permits and the associated documentation.

4.62. A typical breakdown of the applications dealt with annually by the TAEK is as follows:

- (a) Transport permissions: 801.
- (b) Special form designs: 0.
- (c) Type B package designs: 0.
- (d) Designs of packages containing fissile material: 0.
- (e) Shipment approvals (as per para. 820 of the 1996 edition of the Transport Regulations [1]): 0.
- (f) Special arrangements: 0.

4.63. The TAEK has very little experience with applications for the approvals referred to in para. 802 of the 1996 edition of the Transport Regulations [1]. Provisions in the (revised) Turkish regulation on the safe transport of radioactive material do, however, deal with these applications. It is not clear which division of the RHSD has been designated to evaluate these applications.

Findings

4.64. Basis: Issuing permits for each movement of radioactive material lays a heavy administrative burden on the TAEK. It could be argued that such a system is not the optimal situation from the point of view of radiological protection and the use of human resources.

Suggestion: It might be envisaged to replace the system of individual permission by a more generalized system of prior notification (as applies, for

example, to movements of radioactive sources for industrial radiography), giving the TAEK the opportunity to perform more specific inspections to verify compliance with the Turkish regulation on the safe transport of radioactive material.

4.65. Basis: Applications for a licence or a permit are handled by one of the divisions of the RHSD, depending on the use of the radioactive material. It must be noted that, as a consequence of the entry into force of the revised regulation on the safe transport of radioactive material, the workload of the RHSD may increase, due in particular to the multilateral approval of packages that are still in use and that were approved in accordance with an earlier edition of the Transport Regulations.

Suggestion: It is suggested that a specific division be set up within the RHSD dedicated specifically to the transport of radioactive material, in particular the evaluation of applications for approval, as mentioned in para. 802 of the 1996 edition of the Transport Regulations, which are not necessarily related to a specific use of the radioactive contents. The personnel of this division would be given the opportunity to improve their expertise in order to be able to perform the necessary assessments. This division would also inform the different divisions of changes in the regulations and ensure coordination between the different divisions with regard to transport issues, and ensure in particular that applications for licences and permits are handled in a consistent way.

Good practice: A database with information on the use, storage and movement of radioactive material in Turkey is updated on a continuous basis. The system is comprehensive and a well established practical tool for everyday work. It might also be used for more specific inspections.

REVIEW AND ASSESSMENT PROCESS

Overview

4.66. There is no radioactive material packaging or special form material production in Turkey, and hence no need to carry out a package design or special form design assessment. There are, however, several imports to and exports from Turkey each year of special form sources for medical and industrial purposes. These are carried in a variety of packagings meeting IP, Type A or Type B requirements, as necessary, and come from countries

worldwide. These packages have to be approved before they can be transported within the country.

4.67. The package approval function is carried out by the RHSD. The power to carry out this review and assessment work is provided in the regulations, especially the regulation on the safe transport of radioactive material and the radiation safety regulation. The latter is based on para. (d) of Article 4 of the Turkish Atomic Energy Authority Act, Act No. 2690. Details of the actual legislative route are covered in paras 4.13–4.37 of this report.

4.68. The review and assessment process is carried out in accordance with Refs [1, 10]. The Turkish regulation on the safe transport of radioactive material currently in force adheres to the 1985 edition of the Transport Regulations [6], but the version that accords with the 1996 edition [1] is in draft form and is currently being applied by the RHSD. The review and assessment process is confined to checking the applicability of paperwork and whether the package and special form certificates are applicable and valid. The check on the special form paperwork and certificates is limited to the ISO designation for use. No verification is made to confirm that the ISO designation is also suitable to meet the requirements of para. 709 of the 1996 edition of the Transport Regulations [1] if this paragraph is used to prove special form acceptance. No mechanical assessment is carried out for packages currently requiring multi-lateral approval, either in their own right or as required in para. 816 of the 1996 edition of the Transport Regulations [1] for packages approved under the 1973 or 1973 (as amended) editions of the Transport Regulations. It should be noted that from 1 January 2004, Type B(U) packages approved under the 1985 or 1985 (as amended 1990) editions of the Transport Regulations also require multilateral approval in accordance with the requirements of the transitional arrangements in para. 817 of the 1996 edition of the Transport Regulations [1]. No checks are carried out to confirm that the packagings comply with maintenance specifications or requirements. Operation and maintenance instructions are not specifically requested. These documents should be available, as they are required for an application for design approval (see para. 807(d) of the 1996 edition of the Transport Regulations [1]).

4.69. Modifications applicable to the design of packages are covered by Article 54 of the radiation safety regulation. No modifications have been seen to date. However, if this aspect arises in the future and thus requires review and assessment, the TAEK will investigate the matter by contacting the relevant competent authorities.

4.70. The main thrust of the assessment process is that RHSD personnel check the paperwork provided by the importer for each shipment of radioactive material. To assist in this work, the regulatory body is also able to use external consultants, if necessary, to complement its review and assessment activities. Relevant international experience gained from the IAEA and this TranSAS appraisal will also be of benefit. In addition, RHSD personnel occasionally visit the import point to check radiation levels, categorization, marking, labelling and placarding. The authority for such visits is provided under Article 67 of the radiation safety regulation. For Type B packages containing ^{60}Co sources for teletherapy use, all imports and exports are checked in this way, as well as the processes carried out at the site of use. During these visits, a comparison verification is also carried out between the TAEK records and those held by the personnel of the airline and the user of the source.

Findings

4.71. Basis: Applications for approval of package designs are required to have maintenance and operating instructions, as specified in para. 807(d) of the 1996 edition of the Transport Regulations [1], in order to gain a package design certificate. Paragraph 561 of the 1996 edition of the Transport Regulations [1] also states that the consignor shall have a copy of each certificate required by these regulations, and a copy of the instructions with regard to the proper closing of the package and other preparations for shipment, before making any shipment under the terms of the certificates.

Recommendation: It should be ensured that the consignor has a copy of the instructions, as required in para. 561 of the 1996 edition of the Transport Regulations.

4.72. Basis: Packages currently approved under the 1973 or 1973 (as amended) editions of the Transport Regulations require multilateral approval, as specified in para. 816 of the 1996 edition [1]. As from 1 January 2004, packages approved in accordance with the 1985 edition [6] will also require multilateral approval, as specified in para. 817 of the 1996 edition [1].

Suggestion: As more packages become eligible for multilateral approval with the introduction of the 1996 edition of the Transport Regulations, and in particular pursuant to paras 816 and 817, some thought could be given to the desirability of a formal assessment of designs of packages in this category and of issuing a validation approval.

4.73. Basis: Applications for the approval of package designs are required to have maintenance and operating instructions, as specified in para. 807(d) of the 1996 edition of the Transport Regulations [1]. It therefore follows that a certified package should be maintained and used in accordance with these instructions.

Suggestion: It is suggested that checks be made that certified packages have been maintained in accordance with the approved maintenance instructions.

4.74. Basis: Turkey has developed a system of close checks and inspection for the transport of every shipment of radioactive material coming into and going out of the country. This work forms part of the overall control of radioactive material while it is in Turkey.

Good practice: Overall control is exercised over radioactive material in Turkey. This overall control includes transport aspects and therefore ensures that packages that normally do not require competent authority certification under the Transport Regulations (i.e. Type IP and Type A packages) are also checked.

INSPECTION AND ENFORCEMENT

Overview of inspection

4.75. The Turkish competent authority does not have a separate section dealing solely with quality assurance or quality compliance matters. All experts that carry out inspections have to combine this aspect of their work with other duties. The consignor's declaration, together with the approval certificate and any other documents provided, is examined for completeness and to confirm that the packages are in conformity with the requirements of the 1996 edition of the Transport Regulations [1]. For the transport of dangerous goods into Turkey by air, reliance is placed on General Directorate of Civil Aviation and Undersecretariat of Customs personnel. Following a visit to the Turkish Airlines cargo department in Istanbul, it was found that Turkish Airlines had an ISO 9002:1994 accreditation issued by the German Technischer Überwachungsverein (Technical Inspection Association). Turkish Airlines was also working towards accreditation to ISO 9002:2000. Each Turkish Airlines department produces its own procedures based on the company's quality assurance manual. These procedures are audited by the company's quality

assurance directorate annually in October. The procedures are also audited by the General Directorate of Civil Aviation annually in August.

4.76. There is no specific planned and systematic programme for monitoring the inspection and maintenance of packaging and the required activities of consignors and carriers, as required in para. 311 of the 1996 edition of the Transport Regulations [1], to provide evidence that the provisions of the regulations are being met in practice. There are no specific inspection procedures to provide evidence that the regulatory requirements related to the applicable consignor's responsibilities as specified in paras 548–561 and 801 of the 1996 edition of the Transport Regulations [1] have been met or that any required certificates are valid and applicable. However, the regulatory body does visit some incoming and outgoing shipments to check radiation levels, categorization, marking, labelling and placarding, to ensure that the shipments conform to the related requirements of the 1996 edition of the Transport Regulations [1]. These visit checks are carried out routinely on all incoming and outgoing shipments of ^{60}Co sources in Type B packages and randomly on all other sources that enter Turkey or leave a user's site. These checks are in addition to other non-transport related compliance work carried out by the regulatory body. Any inspection visits deemed necessary are mostly unannounced, and all expert inspectors are from the TAEK headquarters in Ankara or from the ÇNAEM in Istanbul.

4.77. Inspections are carried out following an application for a licence to use and transport a source. The application needs to be submitted before the source enters Turkey. Details of this application procedure are covered more fully in paras 4.58–4.65 of this report. The inspections are confined to the requested transport only. Although these sources enter Turkey in packagings designed, manufactured, tested and maintained outside the country, there are no procedures to check that there are quality assurance programmes, as required in para. 310 of the 1996 edition of the Transport Regulations [1], to confirm that:

- (a) The manufacturing methods and materials used are in accordance with the approved design specifications;
- (b) All packagings are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications.

4.78. Checks are also carried out on the adequacy of the person responsible for transport, driver training aspects and vehicle suitability, emergency instruc-

tions (planning), package integrity control and personal dosimetry, as required. The inspection requirements are stipulated in Article 67 of the radiation safety regulation, which states that *“The general principles of inspection shall be implemented in conformity with the provisions of the related Articles of the Decree, and in addition shall cover the following issues...”* The inspection report requirements are then detailed in Article 68 of the radiation safety regulation, as is the procedure for dealing with unsatisfactory findings. The requirements for the responsible party to control the adequacy of the services and procedures supplied to it are detailed in Article 71 of this regulation, and the regulatory body checks compliance accordingly. In the event of an abnormal occurrence, experts or a group of experts, depending on the occurrence, are assigned to investigate and report on the incident.

Overview of enforcement

4.79. The enforcement procedures are covered in Article 68 of the radiation safety regulation, which provides that *“The inspection report prepared by the radiation safety experts of the Authority as a result of the investigations shall be evaluated by the Radiation, Health and Safety Department. Following the evaluation of the report, if it is determined that the provisions regarding radiation safety and the licensing terms are violated, a period of maximum 3 (three) months shall be given to eliminate the deficiencies and violations, and a written notification shall be made to the licensee to this effect. If the deficiencies are not eliminated, the licensee and the relevant bodies shall be notified on the decision of temporary termination of the licence by the Presidency of the Authority. If the specified deficiencies and violations are eliminated after the due time, the decision on the temporary termination of the licence shall be lifted. The facility cannot carry out any activity within this period. The licence shall be revoked if deficiencies and violations are not eliminated.”* In the event of a non-compliance, regardless of its severity, the regulatory body can proceed to investigate the occurrence, and the resulting actions will be as specified in Article 75. This article provides that *“If it is determined that the activity is carried out without a licence or if the conditions of the licence are violated and the other provisions laid down in the Regulations are not complied with, the Authority shall apply to authorized bodies to start legal proceedings within the frame of the general principles of law.”* The regulatory body does not have the legal power to immediately order the non-compliant organization to cease operations, but it can suspend or withdraw the licence of the organization, as stated above in Article 68.

4.80. Concerning reporting requirements, the radiation safety regulation covers the following requirements:

- (a) The basic arrangements and requirements for the responsible party for incident reporting (Articles 42, 43, 46 and 47);
- (b) The reports that the responsible party must submit to the regulatory body (Articles 54, 55, 56, 57 and 60);
- (c) The kind of records that the responsible party must retain, and the time frame for record keeping (Article 69);
- (d) The notification of import shipment requirements (Article 62);
- (e) The notification of export shipment requirements (Article 66).

4.81. The causes and consequences of accidents and incidents are analysed to draw lessons from these events ('lessons learned'), and reports of accidents are published on the web site of the TAEK with the particulars of the events, including what actions were taken in response, in Turkish and English. The requirements for keeping records on accidents are detailed in Article 69(d) of the radiation safety regulation.

Findings

4.82. Basis: The overall control of the movement of radioactive sources in Turkey is good and is covered either by a documentation check or a documentation check complemented by site visits. However, Turkey does not have a planned and systematic programme for inspection and audit of packages, as required in paras 310 and 311 of the 1996 edition of the Transport Regulations [1].

Recommendation: A planned and systematic programme should be implemented for quality assurance and compliance assurance concerning the inspection and audit of packages, as required in paras 310 and 311 of the 1996 edition of the Transport Regulations.

4.83. Basis: It was noted during the visits that many forms were completed in non-SI units. Moreover, many measuring instruments in use also gave readings in non-SI units. This is acceptable for compliance with the 1985 edition of the Transport Regulations [6], as the 1985 edition uses data in both SI and non-SI units and the Turkish regulations currently in force still reflect the provisions of that edition. However, the new Turkish regulation, which has not been promulgated but is now being observed, reflects the provisions of the 1996 edition [1], which expresses units in the SI system exclusively.

Suggestion: It is suggested that paperwork be completed in SI units and that measuring instruments also display SI units. This will avoid confusion and misinterpretation and will ensure consistency.

4.84. Basis: Approval of the various activities involved in the transport of radioactive material can be undertaken by different authorities (for further details see paras 4.1–4.47 of this report). The TAEK is consulted on this matter, owing to its acknowledged expertise in the field of the use and transport of radioactive material. This situation could lead, however, to an overlap of responsibilities in the inspection and enforcement areas. It is important, therefore, that the responsibilities of the various authorities be defined and clarified by memoranda of understanding.

Suggestion: It is suggested that memoranda of understanding be produced to determine the responsibilities and interfaces between the various authorities involved in the inspection and enforcement activities carried out in support of authorizations for the transport of radioactive material.

DEVELOPMENT OF REGULATIONS AND GUIDES

Overview

4.85. In Turkey the revision of, and development of new, regulations on the transport of radioactive material is the responsibility of the RHSD, with the Standing Commission on Legislation playing a role. Draft proposals for new regulations or the revision of current regulations are to be submitted to the Atomic Energy Commission.

4.86. According to Turkish law, all orders are mandatory. The hierarchy of regulations can be described as follows:

- (a) Acts, which have to be signed by Parliament;
- (b) Decrees, which have to be signed by all ministers of the Government;
- (c) Regulations, which have to be approved and signed by the Prime Minister;
- (d) Instructions (e.g. licence instructions for applicants and/or licensees), which have to be approved by the President of the TAEK and signed by the director of the relevant department.

4.87. The regulations and guides that are now applied to the transport of radioactive material are described in paras 4.1–4.40 of this report. As mentioned, the RHSD is responsible for the development of new orders and guides in the field of the transport of radioactive material. In developing regulations and guides, the regulatory body (the TAEK) takes into account staff experience, enforcement results, the findings of investigations and internationally recognized standards.

4.88. To date in Turkey, pursuant to Article 65 of the radiation safety regulation, only the regulations set forth in Ref. [6] are mandatory. However, the TAEK has prepared a draft Turkish translation of the 1996 edition of the Transport Regulations [1]. This draft has to be reviewed by all relevant authorities (the General Directorate of Civil Aviation, the General Directorate of Road Transport, the Undersecretariat of Maritime Affairs and the Undersecretariat of Customs). It then has to be approved by the Atomic Energy Commission and signed by the President of the TAEK. After clearance by the Prime Minister, the regulation can be published in the Official Gazette. At the time of the appraisal it was expected that the Turkish version of the 1996 edition of the Transport Regulations [1] would come into force around the end of 2003.

4.89. The Ministry of Transport, General Directorate of Civil Aviation, is responsible for the implementation of the ICAO Technical Instructions. For transport by sea and the general implementation of the IMDG Code for Turkey, the Undersecretariat of Maritime Affairs is responsible. For road and rail transport regulations, the Ministry of Transport has the lead responsibility.

Findings

4.90. Basis: As provided in Article 4 of the Turkish Atomic Energy Authority Act, the TAEK, as the competent authority, is responsible for the implementation of the regulation on the safe transport of radioactive material for all modes of transport. Nevertheless, the present regulations of the Ministry of Transport (for air and sea transport) refer to the newest version of the IMDG Code and the ICAO Technical Instructions. At present these are contradictory for radioactive material, as the IMDG Code and ICAO Technical Instructions refer to the 1996 [1] edition of the Transport Regulations, while the Turkish regulation on the safe transport of radioactive material refers to the 1985 [6] edition.

Suggestion: In order to avoid discrepancies between the implementation of the various editions of the Transport Regulations (and potential safety hazards), it is suggested to simultaneously apply in Turkey the same regulations for the national and international transport of radioactive material (i.e. to formally promulgate the Turkish translation of the 1996 edition of the Transport Regulations as soon as possible).

4.91. Basis: According to the radiation safety regulation, Part IV, Chapter II, Article 61, the TAEK has to issue for each single shipment a permit (in addition to the general licence, which each applicant and licensee needs to obtain).

Suggestion: It is suggested to change Article 61 of the radiation safety regulation so that authorizations are issued in a more generic way, for example to issue permits covering the same material in the same package, for a given time frame (e.g. 6 months or 12 months).

4.92. Basis: Concerning the radiation safety decree, the use of non-SI units (Ci) and of SI units (Bq) is allowed for quantifying activity. In addition, non-SI units are applied for the equivalent dose (rem) and the absorbed dose (rad).

Suggestion: It is suggested for the ongoing revision of the radiation safety decree to use only SI units, so as to be in line with the international regulations in the field of radiation protection, especially with the Transport Regulations and the Turkish radiation safety regulation.

4.93. Basis: Both a decree and a regulation deal with radiation safety in Turkey, but the transport of radioactive material is mentioned only in the regulation.

Suggestion: In order to be in line with the other international standards for radiation safety and radiation protection (e.g. the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources), it is suggested that the transport of radioactive material be incorporated into the radiation safety decree.

4.94. Basis: It is a common practice to have a standing commission within the TAEK that includes representatives from different divisions within the RHSD to formally review changes to the regulations.

Suggestion: It is suggested that expanded responsibilities may justify the creation of a separate division within the RHSD that would be dedicated to the transport of radioactive material.

EMERGENCY PREPAREDNESS FOR TRANSPORT

Overview

4.95. Turkey has a regulation on nuclear and radiological national emergency preparedness, which was issued in the Official Gazette on 15 January 2000. This regulation was prepared taking into consideration related IAEA technical documents [20–22]. Since Turkey does not operate nuclear power plants, this regulation deals mainly with off-site emergencies, and provides for organizational aspects, roles and responsibilities. Roles and responsibilities are clearly identified for each participating organization. According to the relevant national legislation, a national crisis management centre has to be set up immediately for Category I and Category II accidents. All the responsible organizations are represented in this centre. The chairperson of the centre is the Prime Minister.

4.96. For Category III, IV and V accidents, the TAEK organizes, coordinates and handles all aspects of the situation. Category IV includes transport. In the event of an emergency in the transport of radioactive material, the TAEK decides and provides advice on all protective measures. However, implementation of these measures is carried out with other participating organizations (e.g. the Ministry of Health, Ministry of Agriculture, Ministry of Interior (General Directorate of Civil Defence, Police Department), Ministry of Environment and Turkish Red Crescent Society). In the event of an accident, all users involved in the transport of radioactive material can call the TAEK by dialling the toll free number that is displayed on a label that is affixed on all packages used for radioactive material in Turkey.

4.97. The TAEK has a nuclear and radiological emergency implementation plan (emergency plan) aimed at determining the measures to be taken and activities to be performed for the protection of individuals, the public and the environment in the event of an emergency. The emergency plan is to be activated with the first notification of an emergency and deactivated when all governmental agencies have terminated their responses. The TAEK is the lead organization and coordinates all the radiological aspects of the governmental response. In this plan, the emergency organization, pre-emergency prepar-

edness activities and protective measures are outlined. In addition, the plan details items such as the intervention levels, contact points of national and international organizations, notification procedures and inventory of measuring equipment. The plan is updated annually.

4.98. According to the radiation safety regulation issued in the Official Gazette on 24 March 2000, all users, importers and transporters are obligated to prepare an emergency preparedness plan as part of the licensing procedure (Article 39, Article 71(h)). In accordance with Article 41 of the regulation, this plan has to be approved by the TAEK.

4.99. According to Article 40 of this regulation, the plan should include:

- (a) The names, titles, addresses and telephone numbers of the persons assigned for emergency and accident response;
- (b) A description of the communication system, with identification of the responsible persons;
- (c) The radiation measurement programmes to be applied;
- (d) Probable accident scenarios and the precautions to be taken;
- (e) A description of the equipment, tools and devices necessary to respond to an emergency.

4.100. Concerning the requirements for accident reports, Article 43 of the radiation safety regulation further provides that *“Following the termination of the accident or emergency cases, the characteristics of the accident, the doses received by the radiation worker and other individuals, and the ways and reasons for body intake of radioactive substances shall be investigated by the Licensee or an expert assigned by the Licensee, and the Authority shall be notified promptly about the results with a report accompanied by the films, and/or TLD dosimeter and the chromosome aberration test results, if required.”*

4.101. Pursuant to the legislation on the national crisis centre for emergencies and the emergency plan of the TAEK, an emergency response centre (ERC) has been established and is operational; it is managed by the President of the TAEK, with the participation of the representatives of the related departments in the TAEK. The ERC is responsible for emergency preparedness and for the management of emergencies relating to nuclear accidents and radiological emergencies. In the event of an emergency, the ERC coordinates all the radiological aspects of the response. Competent groups in the ERC decide and provide expert advice on all emergency activities. However, the implementation of these activities is carried out in coordination with the related

departments of the TAEK. The ERC is linked with national and international information and data centres on-line (i.e. the Emergency Response Centre of the IAEA, the International Nuclear Event Scale, the Power Reactor Information System, the European Centre for Medium-Range Weather Forecasts, the Early Warning Environmental Radiation System (RESA) of the TAEK (with 66 online RESA stations in operation around the clock) and the national authorities involved in crisis management).

4.102. At the international level, Turkey is a party to the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. Turkey entered into bilateral agreements on early notification of a nuclear accident and exchange of information on nuclear facilities with Bulgaria on 28 July 1997 and Ukraine on 23 November 2000. In the event of an emergency, the ERC of the TAEK is the national contact point for the implementation of these conventions and agreements. Further agreements of this type are under negotiation with the Russian Federation and Romania.

4.103. For emergency arrangements according to the emergency plan and the radiation safety regulation, emergency exercises are proposed to be held at least once a year. The TAEK, with the cooperation of related organizations, is responsible for training the related personnel. The exercise scenarios are prepared at the local level by licensees of the facilities according to their emergency plans and by the TAEK at the national level with the collaboration of related organizations such as governors' offices and related ministries. The scenarios take into account all probable radiological accidents, which may include car accidents, theft of material and sabotage. The exercises are performed annually, and all participating organizations have their own budget for these purposes.

4.104. For nuclear and radiological emergencies, the TAEK is responsible for public information, with the cooperation of the Ministry of Interior, the Ministry of Education, the Ministry of Health, the Ministry of Environment and the Ministry of Agriculture (in accordance with Article 10 of the nuclear and radiological national emergency preparedness regulation).

4.105. In general, the following information can be released to any member of the public:

- (a) The location of the accident;
- (b) The nature of the hazard and risks;
- (c) Warnings to keep at a safe distance from the location of the accident;

- (d) The protective measures to be taken;
- (e) The final results of emergency response actions;
- (f) The recommended follow-up.

Finding

4.106. Basis: Emergency preparedness regulations and capabilities are well developed in Turkey. These address all aspects of the transport of radioactive material as a part of the use of radioactive material.

Good practice: The emergency capabilities for the transport of radioactive material have been incorporated into the overall emergency preparedness structure across the country. The regulations of Turkey in the area of the transport of radioactive material, and the nuclear and radiological emergency plan, which is updated by the TAEK every year, are a good basis for emergency response, which also extends to the transport area.

5. GENERAL CONCLUSIONS

5.1. The appraisal team completed a thorough appraisal of the implementation of the transport regulations in Turkey. The cooperation of the Turkish authorities, and of all those who participated in the discussions, was excellent and contributed much to the value of the appraisal.

5.2. The transport of the relatively small number of packages of radioactive material in Turkey is well controlled. Customs regulations specify permission of the TAEK for the import of radioactive material. Only companies licensed by the TAEK can import, export, transit and transport radioactive material. Each shipment of radioactive material is subject to a permit from the TAEK. A comprehensive database with information on the use, storage and movement of radioactive material is updated on a continuous basis. This high level of control and monitoring enhances the safety of the transport of radioactive material in Turkey.

5.3. A draft revision of the national transport regulations based on the 1996 edition of the Transport Regulations [1] has been used in Turkey since the requirements of these Transport Regulations became effective for international transport in 2001. It is recommended that these draft regulations be approved formally as soon as possible.

Appendix I

ABBREVIATIONS

The abbreviations below are for the purposes of this report only.

ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ÇNAEM	Çekmece Nuclear Research and Training Centre
COLREG	Convention on the International Regulation for Prevention of Collision at Sea
ERC	emergency response centre
EU	European Union
IATA	International Air Transport Association
ICAO	International Civil Air Organization
IMDG Code	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
RESA	Early Warning Environmental Radiation System
RHSD	Radiation Health and Safety Department
RID	Regulations Concerning the International Carriage of Dangerous Goods by Rail
SOLAS Convention	International Convention for the Safety of Life at Sea
TAEK	Turkish Atomic Energy Authority
TESST	Tibbi Endüstriyel Sistemler Sanayi ve Ticaret Ltd ti (Medical Industrial Systems Limited)
TSS	traffic separation scheme
UMA	Undersecretariat for Maritime Affairs
UNECE	United Nations Economic Commission for Europe

Appendix II

THE TURKEY TRANSPORT SAFETY APPRAISAL SERVICE TEAM

L. BAEKELANDT – Team member

L. Baekelandt is a physicist and at present Head of the Regulatory and Licensing Department of the Federal Agency for Nuclear Control, Belgium. He started his professional career as an assistant at the Institute for Theoretical Physics at the Catholic University of Leuven. From 1973 to 1988 he worked for the competent authority for radiation protection and nuclear safety at the Belgian Ministry of Public Health and the Environment. In 1988 he moved to the Belgian Agency for the Management of Radioactive Waste and Enriched Fissile Materials, where he served as an adviser to the general management in charge of radiological protection, environmental protection and safety issues. In May 1999 he was appointed Head of the Regulatory and Licensing department of the newly established Federal Agency for Nuclear Control, the regulatory authority for radiation protection and nuclear safety, which is also competent in the area of the transport of radioactive material. In this capacity he is involved in the implementation of the Belgian and international regulations dealing with the transport of radioactive material.

He has been involved in several revisions of the Transport Regulations and in developing the supporting explanatory and advisory material. He has lectured at several IAEA transport training courses and IAEA workshops.

L. Baekelandt is also Chairman of the IAEA Waste Safety Standards Committee (WASSC). He participated in the TransSAS appraisal of Brazil.

G.J. DICKE – Team leader

G.J. Dicke is a Transport Safety Specialist in the IAEA Transport Safety Unit of the Division of Radiation, Transport and Waste Safety, Vienna, Austria. He is the Scientific Secretary for the annual IAEA meetings on the review and revision of the Transport Regulations. He represents the IAEA at meetings of the United Nations Committee of Experts on the Transport of Dangerous Goods and the Dangerous Goods Panel meetings of the ICAO for the incorporation of the Transport Regulations into the United Nations model regulations and the ICAO Technical Instructions. He chairs the annual interagency meeting with the ICAO, United Nations and IMO in support of the

harmonized and integrated implementation of the Transport Regulations into the United Nations model regulations and the international modal transport regulations. G.J. Dicke had the lead role in the development of the working procedures and the questionnaire for the IAEA TranSAS service and has served as Team Leader or co-Team Leader for all TranSAS appraisals to date.

Prior to joining the IAEA in May 1997, G.J. Dicke worked for 26 years for the Nuclear Operations Division of Ontario Hydro in Canada. For close to 20 years he was responsible, initially as Unit Head and later as Section Head, for the operational and regulatory aspects of Ontario Hydro's transport of radioactive material. He completed his doctoral examinations in chemical engineering at Delft University in the Netherlands. He is a Professional Engineer in Ontario, a Member of the Chemical Institute of Canada and a Member of the Editorial Board of the International Journal of Transport of Radioactive Material.

C. FASTEN – Team member

C. Fasten is a physicist and a Scientific Co-worker at the Bundesamt für Strahlenschutz in Germany. She has been working in the radiation protection field since 1974 and has held responsibilities in the field of the safe transport of radioactive material since 1983.

At the Bundesamt für Strahlenschutz (the competent authority for the safe transport of radioactive material in Germany) she has been involved in the implementation by Germany of the 1985 edition as well as the 1996 edition of the Transport Regulations in Germany and the incorporation of these requirements into international agreements for road and rail transport. She has worked as the international chairperson of the United Nations Joint Meeting on the RID Safety Committee and the Working Party on the Transport of Dangerous Goods. This joint meeting prepared the revisions to the RID/ADR regulations for the rail and road mode in Europe. These revisions have included the incorporation of all the requirements of the Transport Regulations into the RID/ADR regulations.

C. Fasten's work with the IAEA has included participation in meetings on the review and revision of the Transport Regulations and related Consultant Services Meetings since 1984. At these meetings she has often been a Group Leader or Secretary. She has also coordinated the IAEA Transport Safety course in Germany and has lectured in IAEA training courses.

A.R. WEBSTER – Team member

A.R. Webster is an Assessment Engineer in the Mechanical Assessment Branch of Radioactive Materials with the Transport Division of the Department for Transport, which acts as the competent authority in the UK. He has worked for the UK civil service for over 39 years, starting his career in the Ministry of Defence and then transferring to his current post in 1985, thereby having over 17 years' experience in the field of radioactive material transport and the mechanical assessment of radioactive material transport packages for all categories of packaging of the Transport Regulations.

He has previously served as a member at several IAEA Consultants Services Meetings and Technical Services Meetings to develop UF₆ transport regulations and the brittle fracture guidelines, Appendix VI of the IAEA Advisory Material for the Regulations for the Safe Transport of Radioactive Material, Ref. [2] in this report. He has also chaired an IAEA Technical Committee Meeting convened to evaluate methods of communicating information on the level of safety provided during the modal transport of radioactive material. In addition, he has contributed to the Regulatory Review Process by acting as both Working Group Secretary and Chairman at two past review sessions.

A.R. Webster is also a member of two ISO working groups reviewing and developing International Standards for UF₆ Packaging (ISO 7195) and Leakage Testing on Packages for the Safe Transport of Radioactive Materials (ISO 12807). He also served on an international working group that provided the Class 7 input to the restructured version of RID/ADR.

A.R. Webster is an Incorporated Engineer and a member of the UK Institution of Incorporated Engineers.

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