

IAEA-TECDOC-413

**COMPETENT AUTHORITY REGULATORY CONTROL
OF THE
TRANSPORT OF RADIOACTIVE MATERIAL**



**A TECHNICAL DOCUMENT ISSUED BY THE
INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1987**

COMPETENT AUTHORITY REGULATORY CONTROL
OF THE TRANSPORT OF RADIOACTIVE MATERIAL
IAEA, VIENNA, 1987
IAEA-TECDOC-413

Printed by the IAEA in Austria
April 1987

**PLEASE BE AWARE THAT
ALL OF THE MISSING PAGES IN THIS DOCUMENT
WERE ORIGINALLY BLANK**

The IAEA does not normally maintain stocks of reports in this series.
However, microfiche copies of these reports can be obtained from

INIS Clearinghouse
International Atomic Energy Agency
Wagramerstrasse 5
P.O. Box 100
A-1400 Vienna, Austria

Orders should be accompanied by prepayment of Austrian Schillings 100,—
in the form of a cheque or in the form of IAEA microfiche service coupons
which may be ordered separately from the INIS Clearinghouse.

FOREWORD

A basic objective when transporting radioactive material must be to ensure safety of people, property and the environment against radiological hazards. Therefore, domestic and international regulations have been developed to facilitate the safe transport of all kinds and quantities of radioactive materials.

In July 1959, the United Nations Economic and Social Council expressed the desire "that the International Atomic Energy Agency (IAEA) be entrusted with the drafting of recommendations on the transport of radioactive substances". Accordingly, the IAEA Regulations for the Safe Transport of Radioactive Materials were first published in 1961.

The IAEA Regulations are prepared by extensive international co-operation. This has led to the worldwide application of the Regulations, which are recommended as a model for Member States and appropriate international organizations. As a "feed back" of experience in application, three comprehensive revisions were published in 1965, 1967 and 1973. Following minor amendments, the 1973 Regulations were again published in 1979 as "1973 Revised Edition as Amended". In 1985 the fourth complete revision was published (Regulations for the Safe Transport of Radioactive Material, 1985 Edition, Safety Series No. 6).

Besides the IAEA Regulations there are many other regulations and recommendations as well as agreements and conventions which have to be taken into account by Member States when regulating the transport of radioactive materials. Specifically concerning transport, regulations from modal international organizations are of high value.

Although the primary responsibility for safety lies with consignors and carriers the competent authorities are responsible for assuring compliance with all relevant safety requirements. They are also responsible for ensuring that these requirements provide for an adequate level of safety. The purpose of this guide is to assist competent authorities in regulating the transport of radioactive materials and to assist users of transport regulations in their interactions with competent authorities. The guide should assist specifically those countries which are establishing their regulatory framework and further assist countries with established procedures to harmonize their application and implementation of the IAEA Regulations.

This guide specifically covers various aspects of the competent authority implementation of the IAEA Regulations for the Safe Transport of Radioactive

Material. In addition, physical protection and safeguards control of the transport of nuclear materials as well as third party liability aspects are briefly discussed. This is because they have to be taken into account in overall transport regulatory activities, especially when establishing the regulatory framework. It should also be noted that the Convention on the Physical Protection of Nuclear Materials (IAEA INFCIRC 274, rev. 1, 1980) came into force at the beginning of 1987, and its uniform implementation is necessary.

In order to provide further explanations and advice on the Regulations, three other guides have been prepared: Safety Series No. 7 "Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition)", Second Edition, published in 1987; Safety Series No. 37 "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive material (1985 Edition)", Third Edition, published in 1987; and Safety Series No. 80, "Schedules of Requirements for the Transport of Specified Types of Radioactive Material Consignments", published in 1986. In addition, the Agency has published some other documents giving supporting information on the safe transport of radioactive material. Besides these guides, many of the provisions of Safety Series No. 50-C-G "Governmental Organization for the Regulation of Nuclear Power Plants", a Code of Practice, IAEA, Vienna 1978, are applicable to the transport of radioactive materials.

Member States and international organizations are invited to take note of this guide and to bring it to the attention of persons and organizations who make use of, or are subject to, the transport Regulations. Readers are encouraged and invited to send through their COMPETENT AUTHORITIES any comments they may wish to make on this guide, including proposals for modifications, additions and deletions, to the Director, Division of Nuclear Safety, International Atomic Energy Agency, Wagramerstrasse 5, P.O. Box 100, A-1400, Vienna, Austria.

EDITORIAL NOTE

In preparing this material for the press, staff of the International Atomic Energy Agency have mounted and paginated the original manuscripts and given some attention to presentation.

The views expressed do not necessarily reflect those of the governments of the Member States or organizations under whose auspices the manuscripts were produced.

The use in this book of particular designations of countries or territories does not imply any judgement by the publisher, the IAEA, as to the legal status of such countries or territories, of their authorities and institutions or of the delimitation of their boundaries.

The mention of specific companies or of their products or brand names does not imply any endorsement or recommendation on the part of the IAEA.

CONTENTS

SECTION I. INTRODUCTION	7
Purpose and scope (101-108).....	7
Definitions (109-120).....	9
SECTION II. COMPETENT AUTHORITY.....	11
Responsibilities and functions (201-206).....	11
Organization of the Competent Authority (207-213).....	12
SECTION III. REGULATIONS AND GUIDES.....	15
General (301).....	15
National regulations and guides (302-306).....	15
International regulations and recommendations (307-313).....	16
SECTION IV. COMPLIANCE ASSURANCE.....	19
General (401-408).....	19
Special form radioactive material (409-412).....	20
Packages requiring Competent Authority approval certificates (413-429).....	21
Packages not requiring Competent Authority approval certificates (430-432).....	25
Transport (433-444).....	25
Radiation protection (445-448).....	27
Materials having other hazards (449-450).....	28
Implementation of quality assurance (451-455).....	29
Provisions for accidents (456-463).....	30
SECTION V. APPROVAL CERTIFICATES.....	33
Types of approval certificates (501-506).....	33
Country of origin (507-509).....	34
Multilateral approvals (510-515).....	34
Co-operation between Competent Authorities (516).....	35
APPENDIX I: INFORMATION TO BE INCLUDED IN APPLICATIONS FOR APPROVALS.....	37
APPENDIX II: EXAMPLES OF CERTIFICATES.....	41
APPENDIX III: PHYSICAL PROTECTION AND SAFEGUARDS CONTROL OF NUCLEAR MATERIALS.....	53
APPENDIX IV: COMPETENT AUTHORITY AUDITS AND INSPECTIONS.....	55
REFERENCES.....	57
LIST OF CONTRIBUTORS.....	59

SECTION I INTRODUCTION

PURPOSE AND SCOPE

101. When transporting radioactive materials there is a potential radiological hazard. To ensure safety of people, property and the environment, appropriate regulations, both domestic and international, are necessary. The governmental authorities regulate the transport of radioactive materials through national regulations. In national regulations, relevant international regulations and recommendations are usually taken into account.

102. The primary responsibility for ensuring safety lies with the consignors and carriers. In the planning and carrying out of transport all the relevant safety regulations need to be taken into account.

103. The safety of transport is based primarily on the limitation of contents and the integrity of packages used to contain and transport radioactive materials. Basic aims of the IAEA Regulations for the Safe Transport of Radioactive Material [1] (later on the Regulations) are the following:

- effective containment of the radioactive material;
- effective control of radiation emitted from the package;
- maintaining a sub-critical condition for any fissile material; and
- adequate dissipation of any heat generated within the package.

104. To ensure that the requirements are met and to provide for a high level of assurance concerning all safety related activities, para. 209 of the Regulations imposes a general provision for quality assurance and para. 210 a general provision for compliance assurance. It is suggested that the responsible organizations adopt effective quality assurance and compliance assurance programmes to implement the provisions of the Regulations. Advisory and explanatory material on these items is provided in Safety Series No. 37 [2] and in Safety Series No. 7 [3].

105. The purpose of this guide is to assist COMPETENT AUTHORITIES in regulating the transport of radioactive material and to assist applicants, licensees and other organizations in their interactions with COMPETENT AUTHORITIES. The guidance presented here is inherently advisory and not binding. However, in order to increase co operation between COMPETENT AUTHORITIES and promote uniform application of international regulations and recommendations it is desirable that a common approach to regulating activities be adopted. This guide serves as a model to assist in accomplishing a uniform application.

106. This guide specifically concerns the nuclear and radiation safety aspects of transport, i.e., the subjects which are covered by the Regulations [1]. However, radioactive materials could have other dangerous effects as well (such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness), which should be taken into account in the regulatory control of the package design and transport (e.g., see paras 105, 208 and 407 of the Regulations).

107. This guide sets down most of the actions that a COMPETENT AUTHORITY needs to provide for in a programme to assure regulatory compliance. However for countries where the radioactive material transport industry is not yet established, or in its infancy it may be advisable and possible for the COMPETENT AUTHORITY to develop its own compliance assurance programme in stages. For example, initially the COMPETENT AUTHORITY may only need to concern itself with movement of packages which may have been assessed and approved originally by other Member States. Later on that COMPETENT AUTHORITY may progress to the approval of packages designed and built by its own industry and its compliance assurance programme can develop accordingly.

108. Physical protection and safeguards control of nuclear materials as well as third party liability aspects are also discussed briefly in this guide (paras 310, 311, 313, 439, 443 and Appendix III). These subjects are not within the scope of the Regulations [1], but they are included in this guide because they have to be taken into account in the overall transport regulatory control, especially when establishing the regulatory framework.

DEFINITIONS

109. Applicant: Applicant shall mean any person or organization who applies to a COMPETENT AUTHORITY for the issue of an approval in accordance with the Regulations.

110. Approval Certificate: Approval certificate shall mean a certificate signifying compliance with the necessary regulatory requirements, resulting from the independent assessment carried out by a COMPETENT AUTHORITY or other authorized body, of material submitted by an applicant.

111. Carrier: Carrier shall mean any individual, organization or government undertaking the carriage of RADIOACTIVE MATERIAL by any means of transport. The term includes both carriers for hire or reward (known as common or contract carriers in some countries) and carriers on own account (known as private carriers in some countries).

112. Competent Authority: COMPETENT AUTHORITY shall mean any national or international authority designated or otherwise recognized as such for any purpose in connection with the Regulations.

113. Compliance Assurance: Compliance assurance shall mean a systematic programme of measures applied by a COMPETENT AUTHORITY which is aimed at ensuring that the provisions of the Regulations are met in practice.

114. Consignor: Consignor shall mean any individual, organization or government which presents a consignment for transport, and is named as consignor in the transport documents.

115. Licensee: Licensee shall mean the holder of a licence and/or an approval certificate in respect of transport of radioactive material.

116. Manufacturer: Manufacturer shall mean the person or organization who controls, partially or wholly, the fabrication, assembly or similar activity associated with the construction of a package to be used for the transport of radioactive material.

117. Nuclear material: Nuclear material shall mean

plutonium except that with isotopic concentration exceeding 80% in plutonium 238;

- uranium 233;

uranium enriched in the isotope 235 or 233;

uranium containing the mixture of isotopes as occurring in nature other than in the form of ore or ore residue; and

any material containing one or more of the foregoing (Reference [4]); also other definitions of nuclear material exist, e.g.

Reference [5].

118. Quality Assurance: Quality assurance shall mean a systematic programme of controls and inspections applied by any organization or body involved in the transport of radioactive material which is aimed at providing adequate confidence that the standard of safety prescribed in the Regulations is achieved in practice.

119 User: User shall mean a person or organization who uses a package in connection with the transport of radioactive material.

120. Validation: Validation shall mean the process of endorsement (separate or otherwise) of the original approval certificate issued by another COMPETENT AUTHORITY.

SECTION II

COMPETENT AUTHORITY

RESPONSIBILITIES AND FUNCTIONS

201. According to the definition, COMPETENT AUTHORITY means any national or international authority designated or otherwise recognized as such for any purpose in connection with the Regulations. It should be noted that no international COMPETENT AUTHORITY currently exists. The remainder of this guide is concerned with national COMPETENT AUTHORITIES. The primary role of the COMPETENT AUTHORITY is to ensure safety of people and the environment against possible hazards involved in the transport of radioactive materials.

202. The responsibilities and duties of COMPETENT AUTHORITIES are defined within the legal framework of a country. The following should be included:

- Legislative activities to implement the Regulations for the safe transport of radioactive material; and
- Regulatory activities for the safe transport of radioactive materials including
 - . guidance to applicants,
 - . safety review and assessment,
 - . issuance of approvals,
 - . inspection and enforcement,
 - . reporting of accidents and incidents,
 - . emergency response, and
 - . coordination of research.

203. According to the national approach, one or more agencies may be responsible for the regulatory control of transport. This may also depend on the transport mode and on the radioactive material (e.g. fissile or non-fissile material, package type). Usually both radiation regulatory bodies and governmental transport organizations are involved. When there are several responsible authorities, close cooperation is needed. In every case, each COMPETENT AUTHORITY should establish and maintain liaisons with other governmental and non-governmental organizations with related responsibilities or whose cooperation and support would be helpful to the COMPETENT AUTHORITY

in question. The COMPETENT AUTHORITY may also be responsible for physical protection and safeguards controls of nuclear materials. However, according to the legal framework of a country these functions may be carried out by other authorities.

204. The COMPETENT AUTHORITY should provide information and guidance on the safe transport of radioactive materials. In particular specific guidance on the presentation of applications for approval may be necessary. Facilities should also be provided for consultation in relation to the interpretation of regulatory provisions in general and especially in connection with the package design and test requirements. The COMPETENT AUTHORITY may in addition need to ensure that adequate training facilities exist nationally to enable users' staff to acquire appropriate levels of knowledge of the regulatory requirements. The COMPETENT AUTHORITY may also sponsor seminars and conferences for the parties involved in the transport of radioactive materials. Specifically the COMPETENT AUTHORITY should provide the general public with adequate information on its safety and regulatory philosophy, organization, procedures and decisions.

205. The COMPETENT AUTHORITY may identify a need for information to resolve regulatory issues or to assess the effectiveness of its compliance assurance programme. Prior to initiating any significant safety research or risk assessment activity for this purpose, it is useful to the COMPETENT AUTHORITY to determine by contact with other COMPETENT AUTHORITIES and IAEA whether a similar activity has been conducted. The COMPETENT AUTHORITY is encouraged to provide information to the IAEA on its current research activities.

206. Detailed guidance on the duties and activities of the COMPETENT AUTHORITY is given in the succeeding sections of this guide.

ORGANIZATION OF THE COMPETENT AUTHORITY

207. It is recognized that there is no ideal organization model for the COMPETENT AUTHORITY. The organization mainly depends on the area of responsibility in question and on the general organizational approach in the country. However, to avoid conflicts of interest, it is extremely important that the COMPETENT AUTHORITY is not responsible for carrying out the transport, design, manufacturing, use or maintenance of the packages or for promoting such activities.

208. The COMPETENT AUTHORITY should be provided with adequate resources for carrying out its functions as outlined in para. 202. In this work the COMPETENT AUTHORITY needs expertise in many different fields. The size of the staff depends on the extent of transport of radioactive materials. Depending on what kind of packages and transport exist or are expected to develop within a country, expertise should specifically include:

- criticality safety,
- radiation safety,
- thermal analysis,
- structural analysis,
- materials and mechanical engineering,
- quality assurance and quality control,
- emergency preparedness,
- transport operations, and
- inspection and enforcement.

209. The COMPETENT AUTHORITY should establish and maintain a programme for training its employees. The training should be sufficient to achieve consistency in the application of the regulations. Especially at the beginning of the development of nuclear industry or other activities involving significant amounts of radioactive material, training abroad is of great value, specifically in countries which have already developed such industries. International seminars and conferences are also important for education and training purposes.

210. The COMPETENT AUTHORITY shall be able to independently assess and verify the technical and test data submitted by an applicant. These assessments may include criticality, heat transfer, radiation protection and structural analyses as well as risk studies.

211. The COMPETENT AUTHORITY may not be entirely self-sufficient in all technical areas. The COMPETENT AUTHORITY may delegate some of its specific activities to organizations having the necessary technical competence. The COMPETENT AUTHORITY may also engage consultants as necessary. These organizations and consultants shall be independent from the organizations whose work they are evaluating. However, the responsibility for these activities remains with the COMPETENT AUTHORITY and as such the COMPETENT AUTHORITY must evaluate the results of delegated work. Suitable objects for

consultancy and delegation are, for example, inspections and material tests and verification analyses of safety reports.

212. The COMPETENT AUTHORITY should be provided with adequate resources to respond to possible transport accidents. This activity is discussed further in Section IV.

213. National COMPETENT AUTHORITIES for IAEA Member States are listed in the IAEA publication [6]. This report is updated annually.

SECTION III

REGULATIONS AND GUIDES

GENERAL

301. The regulations for ensuring the safety of people, property and the environment are primarily made in a country according to its national legal framework. However, the transport of radioactive materials is often international and of worldwide importance and national regulations are in most cases directly traceable to the IAEA Regulations. The IAEA has examined manners in which Member States regulate the transport of radioactive materials. The results of this examination are published in Reference 7.

NATIONAL REGULATIONS AND GUIDES

302. National documents for regulating the transport of radioactive materials can in principle be placed in three main categories, namely:

- legislation and regulations,
- approval and other mandatory documents, and
- guides, standards and other advisory documents.

303. The authority for promulgating regulations for the transport of radioactive materials and the designation of the COMPETENT AUTHORITY is usually given within the legislation concerning nuclear installations and activities and radiation protection and/or within the legislation for modal transport. All the basic regulations and requirements should be given in the country's legislative/regulatory system and the following areas should be included:

- receipt, possession, use and transfer of radioactive materials,
- transport and packages,
- protection of people, property and the environment,
- the responsibilities of the COMPETENT AUTHORITY,
- inspection and enforcement, and
- third party liability.

304. Regulations are made by the government of a country or by a COMPETENT AUTHORITY on behalf of the government based on the legislative authority. Mandatory requirements that are not in the legislation should be given in regulations. The regulations should define the approval procedures and the essential safety requirements.

305. Guides and standards may be distributed by the COMPETENT AUTHORITY to provide detailed and specific information on acceptable technical and administrative approaches to satisfying the safety requirements. Such guides and standards should be considered as non-mandatory documents.

306. When preparing national regulations, guides and standards for the transport of radioactive material, all relevant international agreements, regulations and recommendations should be taken into account. In paras 307 to 312 most common international documents relating to the transport of radioactive material are discussed.

INTERNATIONAL REGULATIONS AND RECOMMENDATIONS

307. The IAEA Regulations have been for several years the basic international document concerning the safety of the transport of radioactive material. The latest revision of that document was published in 1985. Many supporting documents exist [2,3,8,9 and 10] to the Regulations.

308. International bodies have published many general and modal regulations and recommendations on safe transport of dangerous goods. As far as the transport of radioactive material is concerned, these documents are based on the Regulations. These regulations and recommendations are given e.g. by the UN/ECOSOC Committee of Experts [11], the International Civil Aviation Organization (ICAO) [12], the International Air Transport Association (IATA) [13], the International Maritime Organization (IMO) [14] and the Universal Postal Union [15]. These regulations and recommendations are updated periodically.

309. Regional agreements, conventions and regulations also exist concerning the safe transport of radioactive material as follows:

- European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), Economic Commission of Europe (ECE) [16];

- "Convention relative aux transports internationaux ferroviaires (COTIF)", Central Office for the International Transport by Rail (OCTI) [17];
- the Agreement of International Railroad Freight Traffic (SMGS), Railroad Co operation Organization (OSZhD) [18];
- the Regulations for the Safe Transport of Spent Nuclear Fuel from Nuclear Power Plants of CMEA Member Countries - Transport by Rail, Council of Mutual Economic Assistance (CMEA) [19]; and
- the Regulations for the Transport of Dangerous Goods on the Rhine (ADNR), Central Commission for Navigation on the Rhine (CNR) [20].

These agreements and conventions are also generally consistent with the Regulations.

310. Safeguards control of nuclear materials is needed for assuring the peaceful uses of nuclear energy, which is covered by several types of international agreements. These agreements usually also require IAEA safeguards. An introduction to IAEA safeguards is given in Reference 21. The agreements concerning peaceful uses of nuclear energy usually have no requirements for radiation and nuclear safety, but have a great influence on control of transport.

311. Guidelines for protecting nuclear material transports against sabotage and theft are given in IAEA report INFCIRC 225, rev. 1 [22]. The Convention on the Physical Protection of Nuclear Material [4] has also been negotiated. The Convention specifically concerns the international transport of nuclear material, and is in conformity with the IAEA report mentioned above.

312. International co-operation may be useful and necessary to respond to transport accidents. These accidents are also covered by the following conventions:

- Convention on Early Notification of a Nuclear Accident [23]; and
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency [23].

313. Third party liability coverage is needed to compensate parties from the radiological consequences of possible transport accidents. The following international agreements concern this area:

- Convention on Third Party Liability in the Field of Nuclear Energy, Paris, 29th July 1960 [24];
- Convention of 31st January 1963, Supplementary to the Paris Convention of 29th July 1960 on Third Party Liability in the Field of Nuclear Energy [25]; and
- Vienna Convention on Civil Liability for Nuclear Damage, 21st May 1963, Vienna [26] (not yet in force).

SECTION IV

COMPLIANCE ASSURANCE

GENERAL

401. The COMPETENT AUTHORITY is required to have a compliance assurance programme which will examine and review all aspects of the transport of radioactive materials with regard to safety and the provisions of the regulations. In determining the national programme for compliance assurance, the numbers and types of packages and transport operations should be taken into account. However, compliance assurance should include as a minimum:

- review and assessment activities, including issue of approval certificates;
- inspection and enforcement; and
- emergency response.

402. Within the provisions of the regulations, approval for the transport of radioactive materials should be given directly by the COMPETENT AUTHORITY in the cases referred to in Section V.

403. Upon receipt of an application for approval, the COMPETENT AUTHORITY should evaluate whether all the relevant requirements are fulfilled and whether the applicant and other organizations involved are competent and capable to meet in practice the regulatory requirements. A COMPETENT AUTHORITY may also be interested in the safety of a shipment within or through its country for which its approval is not required according to Reference 1. This being the case all the necessary documents must be available to that COMPETENT AUTHORITY.

404. Through the inspection and enforcement programmes the COMPETENT AUTHORITY ensures that all the activities important to safety (e.g., design, testing, manufacturing and maintenance of packages, preparing and carrying out transport and quality assurance) are carried out in practice according to the regulatory requirements. The inspection frequency should be determined taking

into account the safety concern of the activity in question. The inspection and enforcement programmes should cover all the transport activities related to radiological safety irrespective of whether a COMPETENT AUTHORITY approval certificate is required.

405. Enforcement actions should be applied and correspond to the safety related importance of the violation and upon the prevailing circumstances. Sanctions could include, for example, written notices for the violation, fines, suspension of activity and prosecution. In most cases it is useful to require the violator in question to evaluate the case and to suggest corrective actions to be taken. A reinspection or an increased inspection frequency may also be necessary.

406. In spite of all the measures taken for ensuring safe transport there is still a possibility that an accident may take place. An accident may result in a release of radioactive materials to the environment which could have significant consequences. These consequences can be controlled or mitigated by proper emergency planning and preparedness for responding to this kind of accident.

407. The respective responsibilities and relationship between the COMPETENT AUTHORITY and the applicant/licensee must be clearly understood, i.e. it is the applicant's/licensee's responsibility to demonstrate compliance with the regulations in force and the COMPETENT AUTHORITY to review and judge the case of compliance. This should not discourage nor prohibit the COMPETENT AUTHORITY from giving informal advice, without commitment, as to what is likely to be an acceptable way of demonstrating compliance. However, the independence and objectivity must be maintained by the COMPETENT AUTHORITY.

408. The following guidance will specifically be of assistance to those COMPETENT AUTHORITIES who are still developing their compliance assurance programmes, and may benefit those COMPETENT AUTHORITIES with established programmes. It should also assist in the uniform application and interpretation of the international regulations and recommendations.

SPECIAL FORM RADIOACTIVE MATERIAL

409. The COMPETENT AUTHORITY should declare his requirements in respect of tests of special form radioactive material (SFRM), agreement of test procedures, etc. The COMPETENT AUTHORITY may inspect the testing arrangements

before testing, especially the specimens, the target and the measuring system. The COMPETENT AUTHORITY may also witness the tests, and need to be made aware by the applicant of any deviation from the testing plan, as well as the testing results, e.g. evidence of leakage, distortion or other damage.

410. The final application for the design for SFRM should be sent to the COMPETENT AUTHORITY for approval. The application should include, among other subjects described in Appendix I, the final test programme and testing results, which need to be evaluated by the applicant. The application should specify the requirements for the individual SFRM and demonstrate that the regulatory requirements for SFRM are met.

411. If the COMPETENT AUTHORITY verifies that the design for SFRM meets all the valid regulations the COMPETENT AUTHORITY should issue an approval certificate. More detailed guidelines on certification are given in Section V and in Appendix II of this guide.

412. During the manufacturing of SFRM, the COMPETENT AUTHORITY may carry out inspections on a random basis to ensure that all the requirements have been correctly implemented.

PACKAGES REQUIRING COMPETENT AUTHORITY APPROVAL CERTIFICATES

Package Design Review

413. The COMPETENT AUTHORITY should be prepared to discuss the development and the proposed tests of a package with the applicant based on preliminary information. The preliminary information should cover, as available, the topics described in Appendix I. Specifically it should discuss the testing plan of the package, stating clearly the model scale, requirements and specifications of the model, the number of tests proposed, drop attitudes, essential measuring and recording equipment to be used and the nature of the target. The information should also cover the quality assurance requirements for design and testing. If there is no need for further testing the final application should be sent to the COMPETENT AUTHORITY for approval (see para. 417).

414. The COMPETENT AUTHORITY should pay attention to the special features of the package design, as well as to the testing plan. If it is proposed to use a scale-model specimen, it should be ensured that all relevant features are

adequately represented, including materials, contents and internal structures. The adequacy of the means proposed to establish compliance with the acceptance limits should be reviewed. Account should be taken of instrumentation for measurement of local accelerations, strains, internal pressure transients, etc.

415. The COMPETENT AUTHORITY should verify that the manufacturing of the models or prototypes is carried out in a controlled manner which is representative of the proposed package design. Special attention should be given to materials, welding, inspections, as well as quality control results. Any deviations from the requirements and specifications should be noted.

416. The COMPETENT AUTHORITY may inspect the testing arrangements before testing, especially the specimen, the target and the measuring system. The COMPETENT AUTHORITY may also witness the tests. The COMPETENT AUTHORITY needs to be made aware by the applicant of all deviations from the testing plan, as well as the testing results, e.g. evidence of leakage, distortion or any other damage.

417. The final application for the package design should be sent to the COMPETENT AUTHORITY for approval. The application should include, among other subjects described in Appendix 1, the final test programme and testing results, which need to be evaluated by the applicant. The application should specify in particular the requirements for the individual packages to be manufactured and their proper maintenance and use. Specifically the applicant should demonstrate that the requirements for the package type in question are met. The following aspects should be required, if appropriate, to be covered by analyses (normal and accident conditions):

- criticality safety,
- heat transfer,
- radiation safety, and
- structural integrity.

The structural analyses should also take into account the brittle fracture of the packaging materials, if appropriate. According to the Regulations compliance with the specific test requirements may also be demonstrated by analyses.

418. The design of the package needs to be evaluated by the COMPETENT AUTHORITY in order to assure that all the relevant regulations are fulfilled. In assessing safety the COMPETENT AUTHORITY should, as appropriate, carry out independent assessments to verify the results presented in the application. In making such assessments, the COMPETENT AUTHORITY needs to ensure that proper codes and models have been used, they have been adequately verified by appropriate experiments and that all input data has been defined conservatively. Depending on the package type, expertise in different areas is needed. The evaluation should also specifically cover the manufacturing and use of the packages.

419. The design of the package type in question should be accepted, or rejected, on the basis of the evaluation results. An approval certificate should be issued by the COMPETENT AUTHORITY. More detailed guidelines on certification are given in Section V and in Appendix II of this guide.

Control of manufacture

420. It is of fundamental importance that packagings are manufactured in a controlled manner and in accordance with the approved design, specifications and quality assurance programme. In order that this can be confirmed the COMPETENT AUTHORITY should, in addition to the quality assurance programme for manufacture, receive sufficient information to carry out such inspections of manufacture as it deems necessary to assure compliance.

421. All manufacturing facilities and subcontractors may be subject to COMPETENT AUTHORITY inspections. The frequency and extent of inspections should take into account the established levels of confidence in manufacture and the safety related importance of the package features concerned.

422. The manufacturing and quality control methods may be audited by the COMPETENT AUTHORITY before the manufacturing of the package in question is started. The purpose of such audits is to ensure that the manufacturer's quality assurance methods are capable of achieving and demonstrating compliance with approved specifications and that qualified methods are to be used. If the package manufacturing takes place continuously, additional audits of the methods may be carried out periodically. However, significant changes in manufacturing and quality control methods should be agreed before those methods are applied.

423. During the manufacturing the COMPETENT AUTHORITY may inspect manufacturing and quality control activities on a random basis. This may include taking samples for independent non-destructive or destructive testing. The purpose of the inspections is to ensure that the packaging is manufactured in accordance with the design approved. The licensee should be required to record all deviations from the specifications in the reports and the reasons for accepting the deviations. If a safety related deviation is planned to be corrected by repair, a plan for repair work should be subject to the approval of the COMPETENT AUTHORITY. The reports of the accepted deviations and repairing must be available to the COMPETENT AUTHORITY for inspection. The COMPETENT AUTHORITY should review all the reports of safety related deviations and shall have the final authority for the acceptance or denial of all deviations from the approved manufacturing specifications.

424. All the results of the inspections carried out by the COMPETENT AUTHORITY should be recorded and be provided to the licensee for information and for possible actions.

425. The COMPETENT AUTHORITY needs to assure that prior to first use of the packaging, the licensee has determined that the requirements of para. 401 of the Regulations have been met. The licensee should also be required to determine, based on the quality control results, deviation reports and other quality assurance measures, that the packaging has been manufactured in accordance with the design approved by the COMPETENT AUTHORITY. The COMPETENT AUTHORITY may confirm the licensee's determinations by direct inspections.

426. Following the determination required in para. 425, the authorized organization should conspicuously and durably mark the packaging in accordance with the requirements of paras 436 to 439 of the Regulations and with any other identifications required by the COMPETENT AUTHORITY. The serial number of each accepted package should be provided to the Competent Authority according to para. 715 of the Regulations.

Control of maintenance

427. The COMPETENT AUTHORITY needs to assure that the licensee/user has determined prior to each use of the packaging that the requirements of para. 402 of the Regulations have been met and that all inspections and maintenance as required by the COMPETENT AUTHORITY has been systematically carried out.

428. The COMPETENT AUTHORITY may witness on a random basis the maintenance inspections carried out by the licensees/users. The licensee/user must maintain, during the life of the packaging to which they pertain, sufficient quality assurance records to demonstrate that the requirements of para. 427 are met. The licensee/user must make such records available to the COMPETENT AUTHORITY and permit the COMPETENT AUTHORITY to inspect the records, packaging and facility.

429. The licensee or other user should be required to record and to inform within a stated time period, e.g. 30 days, the COMPETENT AUTHORITY of all the safety related deviations from the specifications as well as other significant damage noted during the use of the packages. Corrective measures including the plan for repairs should be subject to the approval of the COMPETENT AUTHORITY.

PACKAGES NOT REQUIRING COMPETENT AUTHORITY APPROVAL CERTIFICATES

430. The compliance assurance programme should also cover the design, manufacture and maintenance of packagings which do not require COMPETENT AUTHORITY approval certificates.

431. Recognizing the reduced involvement of the COMPETENT AUTHORITY in respect of packages not requiring their certification the following subjects should nevertheless be considered in a compliance assurance programme:

- quality assurance programme
- design and approval process
- manufacturing control
- maintenance programme (in case of re-usable packagings).

432. The preceding paras 401 to 429 will provide basic guidance which can be applied when considered necessary by the COMPETENT AUTHORITY.

TRANSPORT

Transport operation

433. Consistent with the requirements of para. 209 of the Regulations quality assurance programmes are necessary for transport and in-transit operations.

The COMPETENT AUTHORITY should verify that such programmes provide for compliance with the Regulations and are consistent with the number, complexity and radiological significance of actual transport movements.

434. As described in Section V, certain shipments and items are subject to the approval of a COMPETENT AUTHORITY or COMPETENT AUTHORITIES.

435. A special case requiring COMPETENT AUTHORITY approval is shipment under special arrangement. The applicant is required to demonstrate that the overall level of safety provided in the package design and the operational controls during transport is at least equivalent to that which would be achieved if all applicable regulatory requirements were met. Possible additional operational controls which may be used are discussed e.g. in Reference 2 (para. A-721). The concept of special arrangement is mainly intended to be used to allow the development of new safety measures.

436. The COMPETENT AUTHORITY should verify that emergency planning provisions for accidents are adequately addressed by consignors and carriers.

437. The approval of a shipment should be considered on the basis of the review results of the application sent to the COMPETENT AUTHORITY. The application should be required to include the items which are described in Appendix I.

438. The COMPETENT AUTHORITY should evaluate the application for compliance with the regulatory requirements. Based on the results of the evaluation, the shipment or shipments should be accepted or rejected. An approval certificate should be given by the COMPETENT AUTHORITY according to Section V and Appendix II.

439. For carrying out the transport of certain nuclear materials the licensees and other users should be required to prepare a security plan. According to national practices security plans may be subject to the approval of the appropriate authority. In planning and carrying out the transport of nuclear materials the licensees and other users should also be required to take into account the safeguards requirements of the State's System of Accounting for and Control of Nuclear Materials [27]. Although security measures and safeguards control are not part of the Regulations they are discussed generally in Appendix III.

440. The COMPETENT AUTHORITY should develop a system to provide for the timely reporting by users of significant incidents and accidents. Users should additionally be required to evaluate such incidents and notify the COMPETENT AUTHORITY of their findings in due course. The informal notification of untoward events not serious enough to warrant mandatory reporting should also be encouraged.

Inspection of shipments

441. Through a compliance assurance programme, the COMPETENT AUTHORITY should ensure that shipments take place according to the regulations and the accepted plans. In considering the extent and frequency of the inspections, types of packages, their radioactive contents, the number of transports and experiences should be taken into account.

442. The COMPETENT AUTHORITY should also within its compliance assurance programme and associated inspections of transport operations recognize the occasionally different requirements which apply to freight containers and tanks. Other international conventions and standards concerning these types of packages should also be taken into account, e.g. References 11 and 28. The guidance given in this document is equally applicable to transport operations involving such freight containers and tanks.

443. Inspections may be carried out before shipment and during transport. Areas which may be subject to inspections are generally listed in Appendix IV. Measures taken for emergency preparedness as well as - outside the scope of the Regulations - for physical protection and safeguards control of nuclear materials are also subject to inspections. These inspections should be coordinated.

444. The COMPETENT AUTHORITY may require a notification before a package is shipped and after it has been received. In considering the need for notifications, package types as well as the number of shipments should be taken into account. The Regulations prescribe the specific provisions for notifications in paras 455 to 458.

RADIATION PROTECTION

445. Paras 201 to 205 of the Regulations prescribe the general principles for radiation protection of transport of radioactive material. Through a

compliance assurance programme the COMPETENT AUTHORITY should ensure that the provisions are met in transport.

446. Radiation monitoring equipment employed by consignors and carriers should be of suitable design and properly calibrated and maintained, and the staff using it should be adequately trained and qualified. Where necessary, information on radiation protection programmes should be required to be included in the applications for approval (see e.g. para. 204 of the Regulations and Section V). Further, radioactive materials are required to be segregated sufficiently from transport workers and from members of the public (see para. 205 of the Regulations). The COMPETENT AUTHORITY should ensure that parameters are properly determined for calculating segregation distances. Through inspections the COMPETENT AUTHORITY should ensure that the requirements for all modes of transport are met in transport operations.

447. The radiation protection principles of the Regulations require that radiation exposures from the handling, storage and transport of radioactive material shall be kept as low as reasonably achievable, economic and social factors being taken into account (optimization of radiation protection). The COMPETENT AUTHORITY should ensure through a compliance assurance programme that this provision is met. More guidance on optimization of radiation protection of transport is given in Reference 9.

448. The COMPETENT AUTHORITY is required to arrange periodic assessments to evaluate the radiation doses to workers and to members of the public due to the transport of radioactive material (para. 203 of the Regulations). As a part of these assessments the COMPETENT AUTHORITY could use the data from those consignors and carriers who need to assess doses due to their transport. The COMPETENT AUTHORITY should independently verify the data received from the consignors and carriers. Combinations of questionnaires, analyses, site visits and measurements may be used to assess doses.

MATERIALS HAVING OTHER HAZARDS

449. Radioactive materials may have in addition to radiological hazards other hazards, e.g. chemical and corrosive hazards. These other hazards are known as "subsidiary hazards" in international regulations and recommendations for the transport of dangerous goods [11-20 and 29].

450. The Regulations provide provisions against radiological and criticality hazards of radioactive materials; in addition they require that national regulations and international requirements for the transport of dangerous goods also apply for radioactive materials having other dangerous properties. The COMPETENT AUTHORITY should ensure that adequate national regulations exist for dangerous goods, and that they are also followed in practice during the transport of radioactive materials having subsidiary hazards.

IMPLEMENTATION OF QUALITY ASSURANCE

451. The COMPETENT AUTHORITY should have an auditing programme for providing assurance that the quality assurance programmes are implemented and followed correctly. The quality assurance programmes operated by designers, manufacturers and users of Type B packages and of packages containing fissile materials will be of particular interest to the COMPETENT AUTHORITY. However, the COMPETENT AUTHORITY should also assure by periodic audits that suitable quality assurance programmes have been implemented in transport associated with other types of packages.

452. The audit programme should cover all aspects identified in Reference 2, Appendix IV. Special attention should be paid to the objects listed in Appendix IV of this guide.

453. In determining the audit programme the continuity of the activity in question should be taken into account, e.g. the programme may be different for the case concerning a single package or some packages compared to the case of continuous manufacture of different packages. The COMPETENT AUTHORITY should place special emphasis on quality assurance activities before manufacture of a package begins.

454. In particular, the COMPETENT AUTHORITY should verify through audits that, consistent with the recommendations of Reference 2, Appendix IV and V, the designer, manufacturer and applicant has as a part of his quality assurance programme:

- 1) an organizational structure and competent personnel for administering and conducting quality assurance activities;

- 2) the capability to develop as needed all procedures and instructions to guide, control and verify the conduct and evolution of its quality assurance activities; and
- 3) the means to develop, maintain and make accessible to the COMPETENT AUTHORITY all necessary quality assurance records and documents.

455. When applicable, audits may be combined with other inspections referred to earlier in this section.

PROVISIONS FOR ACCIDENTS

456. The COMPETENT AUTHORITY should assess the transport of radioactive materials in his country considering the consequences and risks of accidents. Emergency planning by public health and safety organizations should be based on these and other relevant assessments.

457. The COMPETENT AUTHORITY should require consignors and carriers to prepare their emergency plans in cases where radioactive materials to be transported have a considerable potential hazard. These plans should include, where applicable, bases for planning, organizational responsibilities (including emergency teams), training, communication systems and procedures for response activities, as well as emergency equipment to be used readily available. If a plan covers several shipments for a long period it should be required to be updated systematically. The COMPETENT AUTHORITY should review these plans and it should also verify that the required preparedness is maintained.

458. The public health and safety organizations have the overall responsibility for responding to accidents. For this purpose a national emergency plan should exist. The plan should cover the following aspects:

- bases for planning;
- responsibilities and duties of the organizations involved;
- alerting and notifying key organizations and personnel; methods and procedures for warning and advising the public;
- intervention levels for exposure and contamination, and protective measures;
- procedures for response actions;
- resources (equipment, emergency teams, etc.) and medical and public health services;

- procedures for training, exercises and updating of plans; and
- public information.

459. The COMPETENT AUTHORITY should prepare its emergency response activities within the framework of the national plan. The COMPETENT AUTHORITY should also maintain its preparedness to respond to accidents whenever needed.

460. Local authorities should develop their own emergency plans, where needed, based on the national plan. These plans should cover the response actions and the resources of their organizations. Coordination in the development of these plans is necessary among local and national levels.

461. The IAEA has published a TECDOC on Emergency Response Planning for Transport Accidents involving Radioactive Materials [10]. The guide contains more detailed guidance on emergency planning and preparedness philosophy. The guide is being revised and is planned to be published as a Safety Series document in 1987.

462. This kind of emergency planning and preparedness is to some extent similar to that required for responding to accidents involving non-radioactive dangerous materials. Therefore it is useful if the public emergency response organizations are prepared to respond to all types of hazardous material accidents. In fact, in some cases of shipments of radioactive material, e.g. shipments of uranium hexafluoride, other non-radioactive consequences from accidents could be dominant.

463. International co-operation may be needed in cases of transport accidents, as discussed in para. 312. More guidance in this area is provided in the IAEA documents INFCIRC 310 [30] and INFCIRC 321 [31].

SECTION V

APPROVAL CERTIFICATES

TYPES OF APPROVAL CERTIFICATES

501. One of the responsibilities of the COMPETENT AUTHORITY is to issue approvals. The decision to approve is based upon the COMPETENT AUTHORITY's evaluation of the applicant's demonstration that the package design or transport operation is in accordance with the relevant regulations. The COMPETENT AUTHORITY should record these safety evaluations which provide the basis for the issue of the approvals.

502. In general, COMPETENT AUTHORITY approval is required in accordance with para. 701 of the Regulations for the following:

- special form radioactive material,
- all packages containing fissile material,
- Type B packages - Type B(U) and Type B(M),
- special arrangements,
- certain shipments,
- radiation protection programme for special use vessels, and
- calculation of unlisted A_1 and A_2 values.

503. Unilateral COMPETENT AUTHORITY approvals are specifically required according to paras 702 and 704 of the Regulations for:

- the design of special form radioactive material, and
- Type B(U) package design, except a package design for fissile material.

504. Multilateral COMPETENT AUTHORITY approvals are specifically required according to paras 704, 707, 710, 713, 714, 716 and 720 of the Regulations for:

- the package design for fissile material,
- Type B(M) package design,
- the packagings manufactured to a design approved by the COMPETENT AUTHORITY under the provisions of the 1967 Edition of the Regulations,

- the packagings manufactured to a design approval by the COMPETENT AUTHORITY under the provisions of the 1973 Edition and the 1973 Edition (As Amended) of the Regulations (after 31 December 1990),
 - the shipment of Type B(M) packages designed to allow controlled intermittent venting, or containing radioactive material with an activity greater than $3 \times 10^3 A_1$ or $3 \times 10^3 A_2$ (as appropriate) or 1000 TBq, whichever is the lower,
 - the shipment of packages containing fissile materials, if the sum of the transport indexes of the individual packages exceeds 50,
 - radiation protection programmes for shipments by special use vessels, and
- the consignment shipped under special arrangement.

505. To the extent possible, standard formats should be utilized for each type of certificate. In Appendix II models for certificates are given.

506. Certificates for international carriage of certain packages which are provided by national COMPETENT AUTHORITIES to the IAEA are listed in the IAEA publication [32]. This report is updated bi-annually.

COUNTRY OF ORIGIN

507. Under the Regulations, an approval is given in respect of a package design in the country of origin. If both the design of a package and the shipment originate in the same country as is normally the case, the country of origin is also the country of shipment.

508. If a package, which has received an initial approval, is later amended by other than the country of origin, then the country which authorizes the amendment becomes the country of origin.

509. The initial shipment approval must be by the COMPETENT AUTHORITY of the country of origin of shipment.

MULTILATERAL APPROVALS

510. Under the Regulations, multilateral approval of a design or shipment may be effected either:

- by independent certification as a part of a multilateral chain; or
- by validation of the original certificate issued by the COMPETENT AUTHORITY of the country of origin.

511. The essential difference between independent certification and validation is that the latter should not specify the design or shipment since these are already contained in the original certificate. Instead it should direct the applicant to refer to the original certificate for this information. Equally a validating certificate should not assign an independent identification mark but utilize that of the country of origin.

512. An assessment should always be made in the course of multilateral approval. If it is necessary in the course of assessment for multilateral approval to require modification of any of the essential detailed provisions of the certificate from the country of origin, independent certification should be carried out.

513. Validation eliminates the possibility of confusion arising between certificates issued by different COMPETENT AUTHORITIES to cover the same case. Validation may apply to the original certificate in its entirety, or to the appropriate part(s) if there are other parts which constitute a unilateral approval or are otherwise inappropriate to multilateral approval.

514. Where a ship is used for transport the COMPETENT AUTHORITY of the flagstate of the vessel is required to form part of any multilateral chain of COMPETENT AUTHORITIES, where relevant, even though the shipment is not destined to enter any port on that COMPETENT AUTHORITY's territory.

515. Where a COMPETENT AUTHORITY is required to approve as a part of a multilateral chain, the certification or validation should not be carried out before a copy of the certificate produced by the COMPETENT AUTHORITY of the country of origin has been received.

CO-OPERATION BETWEEN COMPETENT AUTHORITIES

516. The co-operation of COMPETENT AUTHORITIES is needed specifically in the international transport of radioactive materials. This co-operation should cover various aspects of compliance assurance. It is also encouraged that the

bases for approvals are discussed between COMPETENT AUTHORITIES. As regards shipments, matters related purely to transport operations should be addressed to the COMPETENT AUTHORITY where the shipment originates. Co-operation is also needed in cases where the country of origin may not be clear, e.g., in the case when the packaging is not manufactured in the country where the radioactive contents originate.

Appendix I
INFORMATION TO BE INCLUDED IN APPLICATIONS
FOR APPROVALS

It is useful if the COMPETENT AUTHORITY provides a guide to assist applicants in submitting the necessary information for approvals in a convenient form. The guide may be divided into parts in such a way that each part refers to a particular aspect or type of approval. Convenient divisions could be, for example:

- PART I - GENERAL INFORMATION
- II - ADMINISTRATIVE INFORMATION
- III - SPECIFICATION OF RADIOACTIVE CONTENTS
- IV - SPECIFICATION OF PACKAGING
- V - PACKAGE ANALYSES AND TESTS
- VI - SHIPMENT
- VII - SPECIAL ARRANGEMENT TRANSPORT OPERATION
- VIII - SPECIAL FORM RADIOACTIVE MATERIAL
- IX - QUALITY ASSURANCE

Suggested items on which information should be required, as appropriate, are:

Part I - General information.

Instructions on the provision of approval information

Reference to related publications (Safety Series No. 6, Safety Series No. 37, National Standards, etc.)

List of transport regulations

Designs not requiring competent authority approval (excepted, industrial or Type A packages), and procedures to be followed for these designs

Information on the compliance assurance programme

Part II - Administrative information.

Name, address, telephone number of applicant

Name, address, telephone number of designer

Name, address, telephone number of manufacturer

Type of approval required (e.g., Type B(U), Type B(M), packages containing fissile material)
Modes of transport
Competent authority identification mark, if previously allocated
Package title and general arrangement drawing number
Date of application
Date by which approval is required

Part III - Specification of radioactive contents

General nature
Radionuclide
Physical state
Chemical state
Quantity in mass units and enrichment, where applicable (i.e., for packages containing fissile material)
Total activity/specific activity
Calculation of A_1/A_2 values, if not listed in Safety Series No. 6
Nature of emitted radiation
Information on irradiated fuel, e.g. rating, irradiation, initial enrichment and cooling time
Heat output
Hazards other than radioactivity

Part IV - Specification of packaging

Drawings (arrangement, assemblies, sub-assemblies and details)
Material specifications
Types of closures (e.g. welding)
Overall dimensions and mass
Handling facilities
Tie-down system
Radiation shielding
Neutron absorbers
Containment system
Quality control programme for manufacturing
Maintenance provisions
Actions before shipment
Actions during shipment
Restrictions (including modal restrictions)
Instructions for handling and stowage
Emergency instructions

Part V Package analyses and tests

Radioactive material behaviour
Effects of radiolyses
Structural evaluation
Containment evaluation
Radiation shielding evaluation
Thermal evaluation, including surface heat flux
Criticality evaluation
Model tests
Prototype tests
Tests with real specimen

Part VI - Shipment

Mode of transport
Consignor
Carrier
Consignee
Consignment details
Exclusive use provisions
Operational controls
Storage in transit
Stowing, handling and lifting
Radiation protection programme
Transport instructions
Emergency instructions

Part VII - Special arrangement transport operation

Mode of transport
Consignor
Consignee
Consignment details
Reason for special arrangement
Proposed compensatory measures

Part VIII Special form radioactive material

Drawings
Specifications of materials and closures
Overall dimensions and mass
Radionuclide

Physical and chemical state

Nature of emitted radiation

Heat output

Water concentration of contents

Demonstration of compliance with tests

Leakage tests and other quality control measures

Part IX. Quality assurance

Description of the organizations involved

Duties and responsibilities of different organizations

Quality assurance programmes

More information on the application of this kind of guide can be found in Reference 2.

Appendix II

EXAMPLES OF CERTIFICATES

Attached are examples of standard formats for approval certificates for

- design of special form radioactive material,
- package design,
- shipment, and
- special arrangement.

It is suggested that they will be adopted by the COMPETENT AUTHORITIES, because uniform certification is of worldwide importance. All the certificates should list the appropriate regulations, e.g. as described in the model certificate for special form radioactive material. More advice on the contents of the certificates can be found in the Regulations, paras 723-729.

CERTIFICATE OF APPROVAL
OF DESIGN FOR
SPECIAL FORM RADIOACTIVE MATERIAL

1. Certificate Issue Date

2. Competent Authority
Identification Mark

Expiry Date

3. This certificate is issued on the basis of the application by

[Name and address of the
applicant]

[Title and identification of the
application]

4. Radioactive Material
[Radionuclide, chemical and
physical form]

5. Maximum Activity

6. Specification and Drawing References

7. This is to certify that the design of the radioactive material identified in items 4, 5 and 6 above meets the requirements set for the Special Form Radioactive Material in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1985 Edition and in the regulations [references] listed overleaf.

Date

[Signature(s) of authorized official(s)]

Competent Authority

Cont.

The address and telephone and telex numbers of the Competent Authority

Regulations concerning the Transport of Radioactive Material

ROAD: _____

RAIL: _____

SEA: _____

AIR: _____

INTERNATIONAL: _____

OTHERS: _____

CERTIFICATE OF APPROVAL
OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

1. Certificate Issue Date	2. Competent Authority Identification Mark
Expiry Date	Package Identification Number

3. This certificate is issued on the basis of the application by

[Name and address of the applicant]	[Title and identification of the application]
----------------------------------------	--------------------------------------------------

4. This is to certify that the design of the package described below meets the applicable requirements set for [the Type B() packages] [the Type ... packages containing fissile material] in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1985 Edition and in the regulations [references] listed overleaf, and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

Date [Signature(s) of authorized official(s)]

Competent Authority

Cont.

The address and telephone and telex numbers of the Competent Authority

CERTIFICATE OF APPROVAL
OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

5. Package Identification

(a) Packaging

- (i) Model No.
- (ii) Descriptions
[Use, dimensions, materials, closures, penetrations, gross mass, etc.]

- (iii) Reference to Drawings and Specifications

(b) Radioactive Contents (non-fissile)

- (i) Type and Form
[including special form radioactive material, if applicable]

- (ii) Maximum Activity per Package
[including activities of the various isotopes]

(c) Packages for Fissile Material

- (i) Type and Form of Fissile Material
- (ii) Maximum Activity and Quantity per Package
- (iii) Transport Index for Nuclear Criticality Control
- (iv) Special Features
[On the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment]
- (v) Irradiated Fissile Material
[Any determination on which decreased neutron multiplication is assumed in the criticality assessment as a result of actual irradiation experience]

Cont.

CERTIFICATE OF APPROVAL
OF PACKAGE DESIGN FOR
RADIOACTIVE MATERIAL

6. References to Certificates for Alternative Radioactive Contents, other Competent Authority Validation, or Additional Technical Data or Information

7. Restrictions on the Modes of Transport

8. Shipment Approval Required

9. Shipment Authorization

10. Specification of Quality Assurance Programme

11. Operational Controls
[Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as use of the packaging and specific actions prior to shipment]

XX. [Ambient conditions if not in accordance with paragraphs 545, 546 and 556, as applicable, of Safety Series No. 6]

YY. [For Type B(M) packages, the prescriptions of paragraphs 550-556 with which the package design does not conform with amplifying information]

ZZ. [Other endorsements

(a) Emergency arrangements

(b) Others]

SHIPMENT APPROVAL
CERTIFICATE

1. Certificate Issue Date

2. Competent Authority
Identification Mark

Expiry Date

3. This Certificate is issued on the basis of the application submitted by

{Name and address of the
applicant}

{Title and Identification of the
application}

4. This is to certify that the shipment of the radioactive material described below is designed to meet the requirements set for the shipment of the radioactive material in question in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1985 Edition and in the regulations [references] listed overleaf and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

Date

{Signature(s) of authorized official(s)}

Competent Authority

Cont.

The address and telephone and telex numbers of the Competent Authority

SHIPMENT APPROVAL
CERTIFICATE

5. Identification of the Package Design Approval Certificate

6. Identification of Radioactive Material

(i) Type and Form
[including fissile material and special form radioactive material]

(ii) Maximum Activity per Package
[including activities of the various isotopes]

(iii) Maximum Quantity of Fissile Material per Package

7. Restrictions on the Modes of Transport, Type of Conveyance and/or Freight Container, and Routing Instructions

8. Operational Controls
[Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as specific actions prior to shipment]

XX. [Other endorsements

(a) Emergency arrangements

(b) Others]

SPECIAL ARRANGEMENT
APPROVAL CERTIFICATE

1. Certificate Issue Date

2. Competent Authority
Identification Mark

Expiry Date

3. This Certificate is issued on the basis of the application submitted by

[Name and address of the
applicant]

[Title and Identification of the
application]

[In addition, name and address of
the carrier]

4. This is to certify that the shipment of the radioactive material described below is designed to meet the requirements set for the shipment of the radioactive material in question, under special arrangement, in the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1985 Edition and in the regulations [references] listed overleaf and is conditional upon fulfilling the requirements specified in succeeding pages of this certificate.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

Date

[Signature(s) of authorized official(s)]

Competent Authority

Cont.

The address and telephone and telex numbers of the Competent Authority

SPECIAL ARRANGEMENT
APPROVAL CERTIFICATE

5. Package identification

(a) Packaging

(i) Model No.

(ii) Descriptions

[Use, dimensions, materials, closures, penetrations, gross mass, etc.]

(iii) Reference to Drawings and Specifications

(b) Radioactive Contents (non-fissile)

(i) Type and Form

[including special form radioactive material, if applicable]

(ii) Maximum Activity per Package

[including activities of the various isotopes]

(c) Packages for Fissile Material

(i) Type and Form of Fissile Material

(ii) Maximum Activity and Quantity per Package

(iii) Transport Index for Nuclear Criticality Control

(iv) Special Features

[On the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment]

(v) Irradiated Fissile Material

[Any determination on which decreased neutron multiplication is assumed in the criticality assessment as a result of actual irradiation experience]

Cont.

SPECIAL ARRANGEMENT
APPROVAL CERTIFICATE

6. References to Certificates for Alternative Radioactive Contents, other Competent Authority Validation, or Additional Technical Data or Information

7. Mode(s) of Transport

8. Restrictions on the Modes of Transport, Type of Conveyance and/or Freight Container, and Routing Instructions

9. Operational Controls

[Conditions for operational controls for preparation, loading, transport, stowage, unloading and handling of the consignment and stowage provisions for dissipation of heat as well as use of the packaging and specific actions prior to shipment]

10. Reasons for Special Arrangement

11. Compensatory Measures as a Result of the Shipment under Special Arrangement

XX. [Ambient conditions if not in accordance with paragraphs 545, 546 and 556, as applicable, of Safety Series No. 6]

YY. [Other endorsements

(a) Emergency arrangements

(b) Others]

Appendix III

PHYSICAL PROTECTION AND SAFEGUARDS CONTROL OF NUCLEAR MATERIALS

Physical Protection

Security measures may need to be developed for the protection of transport of nuclear materials against sabotage and theft.

The primary responsibility for protecting the transport usually lies on the consignor and the carrier. It is essential to define the place where the responsibilities for physical protection are transferred to the consignee. The public security authorities have the overall responsibility for protecting people against criminal activities. For international transport the relevant authorities of the countries involved should also define the places for transfer of responsibilities.

The responsible organization transporting nuclear materials should be required to prepare a security plan for protecting the materials. The plan should cover the following:

- security organization; responsibilities and duties,
- communication systems, alerting and notifications,
- protective measures,
- responses,
- training, and
- updating the security plan.

The security plan should take into account the categories of nuclear materials to be transported. Security measures should be planned according to the categories of the nuclear material in question. The extent of the plan depends on the category of the nuclear materials. One plan may cover many shipments of certain types of transport.

The public authorities should also plan their activities against sabotage and theft. In determining what measures are needed, all transport of nuclear materials in their country should be considered. In addition to security measures, the plans should also cover responsibilities and duties for each

organization, communication and alerting systems, as well as requirements for training and updating the plans.

All security plans should be confidential and they should be given only to the persons who need them for their work.

More detailed guidance on physical protection of transport of nuclear materials are given in References 4 and 22.

Safeguards control of nuclear materials

A State's System of Accounting for and Control of Nuclear Material [27] may have, for example, the following objectives:

- a national objective, to account for and control nuclear material and to contribute to the detection of possible losses, or unauthorized use or removal of nuclear materials, and
- an international objective, to provide the essential basis for the application of TAEA safeguards pursuant to the provision of relevant agreements.

In a State's System all the relevant international agreements are taken into account.

The regulatory measures for transport of nuclear material may involve, for example,

- licensing of transport of nuclear materials,
- verification of material received or to be transported,
- inspection of transport documents,
- complementary measures, such as sealing of transport packages, and
- inspection during transport, e.g. in places where safeguards responsibilities are transferred.

General

The inspections for the purpose of safeguards, safety and physical protection should be carefully coordinated. The safeguards information system may also serve the needs of relevant authorities when controlling the fulfillment of appropriate licence conditions.

Appendix IV

COMPETENT AUTHORITY AUDITS AND INSPECTIONS

The following is a listing of general items to which the COMPETENT AUTHORITY should direct its specific attention during audits/inspections (inspections may also include measurements carried out by the COMPETENT AUTHORITY):

- The management of the organization in question has provided the necessary personnel and resources to carry out an effective programme for compliance with the transport regulations. This programme should clearly identify those persons who have the capability and who are responsible for the various specific requirements. Clear delegations of authority by management to those responsible persons are of extreme importance.
- The management has provided the proper training of those persons who are responsible for carrying out the programme for compliance with the transport regulations. Documentation of the training which has been provided should be submitted to the COMPETENT AUTHORITY upon request.
- Established procedures for the design and fabrication or for the selection and procurement of packagings are followed.
- The consignor is using the proper packaging for the specific contents. Direct examination of packages being prepared for shipment should be made by the COMPETENT AUTHORITY, when practicable.
- The organization in question has in his possession all of the required documentation, including the relevant COMPETENT AUTHORITY certificates and any associated instructions for handling, loading, stowage, use and maintenance of the packaging. This is most often in the form of an instruction manual for the packaging.
- Established procedures for the preparation and use of the package are followed in accordance with the approval certificate, instruction manual and related documents.

- Established procedures are followed to properly mark and label packages in accordance with the Regulations. This includes the proper determination and application of the correct Transport Index (TI). When practicable, the COMPETENT AUTHORITY should directly observe these actions.

- Established procedures are followed, and appropriate and properly calibrated instruments are provided, to monitor packages for both radiation and contamination.

- Established procedures are followed for preparing and controlling all relevant shipping documents correctly, for providing correct placarding of the carrier's vehicles, for providing all the required documentation to carriers and for providing any required notification to COMPETENT AUTHORITIES of each country into which or through which the consignment is transported.

- During transport, carriers are maintaining any required actions relating to placarding, stowage and segregation of packages, etc., particularly any administrative controls relating to exclusive use shipments or supplementary operational controls specified in the COMPETENT AUTHORITY certificate.

REFERENCES

1. IAEA, Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, Vienna (1985 Edition), and Supplement 1986.
2. IAEA, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition), Safety Series No. 37, Vienna, 1987.
3. IAEA, Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition), Safety Series No. 7, Vienna, 1987.
4. IAEA, The Convention on the Physical Protection of Nuclear Material, INFCIRC/274, rev. 1, May 1980.
5. IAEA Safeguards, Glossary, IAEA/SG/INF/3, Vienna, 1980.
6. IAEA, List of National Competent Authorities for Transport, published annually.
7. IAEA, Assessment of the Application of the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA TECDOC-399, Vienna, 1986.
8. IAEA, Schedules of Requirements for the Transport of Specified Types of Radioactive Material Consignments, Safety Series No. 80, Vienna, 1986.
9. IAEA, Discussion of and Guidance on the Optimization of Radiation Protection in Transport of Radioactive Material, IAEA-TECDOC-374, Vienna, 1986.
10. IAEA, Emergency Response Planning for Transport Accidents involving Radioactive Materials, TECDOC 262, Vienna, 1982 (to be developed as a Safety Series document).
11. United Nations, Transport of Dangerous Goods, Recommendations of the Committee of Experts on the Transport of Dangerous Goods, Geneva, 1983.
12. International Civil Aviation Organization (ICAO), Technical Instructions for the Safe Transport of Dangerous Goods by Air (TI), Montreal.
13. International Air Transport Association (IATA), Dangerous Goods Regulations, Montreal.
14. International Maritime Organization (IMO), International Maritime Dangerous Goods (IMDG) Code, London.
15. Universal Postal Union (UPU), Universal Postal Convention of Rio de Janeiro 1979, Berne, 1979.
16. Economic Commission of Europe (ECE), European Agreement Concerning the International Carriage of Dangerous Goods by Road and Protocol of Signature, Geneva 1957.

17. Central Office for the International Transport by Rail (OCTI), Convention Relative aux Transports Internationaux ferroviaires (COTIF), Berne, 1980.
18. Railroad Co-operation Organization (OSZhD), Regulations for the Safe Transport of Radioactive Substances, Annex 4 to the Agreement of International Railroad Freight Traffic (SMGS), Hoza Street 63/67, Warsaw, Poland.
19. Council for Mutual Economic Assistance (CMEA), Regulations for the Safe Transport of Spent Nuclear Fuel from Nuclear Power Plants of CMEA Member Countries Transport by Rail.
20. Central Commission for Navigation on the Rhine (CNR), The Regulations for the Transport of Dangerous Goods on the Rhine (ADNR).
21. IAEA Safeguards, An Introduction, IAEA/SG/INF/3, Vienna, 1981.
22. IAEA, The Physical Protection of Nuclear Material, INF/CIRC/225, rev. 1, June 1977.
23. IAEA, Final Document Resolutions and Conventions, GC (SPL.1)/Resolutions (1986), General Conference, 24-26 September 1986.
24. Organization for Economic Co-operation and Development (OECD), Convention on Third Party Liability in the Field of Nuclear Energy, Paris 29th July 1960.
25. OECD, Convention of 31st January 1963, Supplementary to the Paris Convention of 29th July 1960 on Third Party Liability in the Field of Nuclear Energy, Paris 18th March 1963.
26. IAEA Vienna Convention on Civil Liability for Nuclear Damage, 21st May 1963, Vienna, 21 May 1963.
27. IAEA Safeguards, Guidelines for States' Systems of Accounting for and Control of Nuclear Materials, IAEA/SG/INF/2, Vienna, 1980.
28. International Organization for Standardization, Series 1, Freight Containers - Specifications and Testing Part 1: General Cargo Containers, ISO-1496/1-1984.
29. IAEA, Recommendations for Providing Protection during the Transport of Uranium Hexafluoride, to be published as an IAEA TECDOC document.
30. IAEA, Guidelines for Mutual Emergency Assistance Arrangements in Connection with a Nuclear Accident or Radiological Emergency, INF/CIRC/310, Vienna, 1984.
31. IAEA, Guidelines on Reportable Events, Integrated Planning and Information Exchange in a Transboundary Release of Radioactive Materials, INF/CIRC/321, Vienna, 1985.
32. IAEA, Directory of Competent Authorities Approval Certificates for: Packages, Shipments, Special Arrangements and Special Form Material, published bi annually.

LIST OF CONTRIBUTORS

FIRST DRAFT, December 1984

Young, Clive, UK

SECOND DRAFT, February 1986

Koponen, Hannu, International Atomic Energy Agency (IAEA)

CONSULTANTS MEETING, 17-21 March 1986

MacDonald, Charles, USA

Pecover, Christopher, UK

Young, Clive, UK

Koponen, Hannu, IAEA, Scientific Secretary

COMMENTS ON THE DRAFT, April 1986

Australia J.M. Rolland

Canada J.J. McLellan

Finland S. Vilkamo

United Kingdom R. O'Sullivan

United States
of America M.E. Wangler

FINAL DRAFT, December 1986

O'Sullivan, Raymund, IAEA

Koponen, Hannu, IAEA, Scientific Secretary