



Provision for the Application of the IAEA Safety Standards

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



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

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OF THE TRANSPORT
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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 Standards 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 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.

In a letter dated 11 September 2002 from the Governor from France at the IAEA, P. Thiébaud, the IAEA received a request from France for a TranSAS appraisal. In preparation for the appraisal, a preparatory mission was

undertaken from 12 to 16 May 2003 at the offices of the General Directorate for Nuclear Safety and Radiation Protection (DGSNR) in Fontenay-aux-Roses, France. At that time a preliminary agreement was developed that addressed the scope of the appraisal as well as the tasks and activities to be undertaken prior to and during the appraisal.

The TransSAS appraisal for France involved a team of nine independent regulatory experts of nine Member States of the IAEA, one maritime expert, one legal expert, and two experts and a technical writer from the IAEA. The experts were from Canada, Germany, Egypt, Ireland, Japan, New Zealand, Panama, the United Kingdom and the United States of America. The TransSAS appraisal for France was conducted between 27 March and 8 April 2004. 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. On 11 September 2002 the IAEA received through the Permanent Mission of France a request from P. Thiébaud, Governor from France at the IAEA, for a TranSAS appraisal. To lay the groundwork for the appraisal, a preparatory mission was undertaken from 12 to 16 May 2003. 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.

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 France, the team reviewed in more detail the maritime and air modes. The appraisal considered in detail all relevant aspects of the regulation of the transport of radioactive material in France on the basis of 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 key areas:

- (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;
- (i) Maritime operations.

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.

S06. France provided the IAEA with a completed questionnaire on 29 December 2003 and related supporting documents on 22 January 2004, in due time prior to the appraisal.

Appraisal team

S07. The team for the appraisal in France was composed of nine independent experts with experience in regulating the transport of radioactive material, one maritime expert, one legal expert, and two transport safety experts and a technical writer from the IAEA. The team, led by one of the IAEA transport safety experts, included representatives from regulatory authorities responsible for the transport of radioactive material in nine IAEA Member States, (i.e. Canada, Germany, Egypt, Ireland, Japan, New Zealand, Panama, the United Kingdom and the United States of America). The expertise of the appraisal team was broad and covered all aspects of the implementation of regulations for the safe transport of radioactive material. The experts were provided with guidelines for the appraisal and copies of the completed TranSAS questionnaire submitted by France. Specific experience of the experts was taken into

account for the assignment of lead responsibilities for appraising the key areas addressed in the TranSAS questionnaire.

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 of the French Government, the General Directorate for Nuclear Safety and Radiation Protection (DGSNR), the Institute for Radiological Protection and Nuclear Safety (IRSN), the General Directorate for Civil Aviation (DGAC), the Directorate for Maritime Affairs and Seafarers (DAMGM), the Directorate for Inland Transport (DTT), CIS bio international, a company involved in the production and international transport of radioactive material, and COGEMA Logistics, on their responsibilities for the safe transport of radioactive material.
- (c) Discussions to obtain clarification and additional or more detailed information.
- (d) Preparation of the draft findings.
- (e) Ongoing feedback on updates to the draft findings.
- (f) Visits to the offices of the relevant regulatory bodies in Paris (the DGSNR, IRSN, DAMGM and DGAC), the COGEMA facility at La Hague, the COGEMA Logistics road and rail trans-shipment terminal at Valognes, the COGEMA Logistics sea and rail trans-shipment terminal at the port of Cherbourg, the radiopharmaceutical production centre of CIS bio international in Saclay and the Air France freight shipment facilities at the Charles de Gaulle airport at Roissy, outside Paris.
- (g) 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 FRANCE

S10. The 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 16 suggestions for areas in which the implementation of the Transport Regulations can be streamlined or improved. The appraisal also identified 12 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 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. Good practice: Memoranda of understanding formally setting out the responsibilities between the ministries and governmental agencies in the application of regulations are considered good practice.

S16. Suggestion: It is suggested that memoranda of understanding be updated and reissued, when appropriate, to record the current names and responsibilities of ministers and agencies.

Authority, responsibilities, functions and organization

S17. Suggestion: It is suggested that a review of the totality of the compliance assurance programme by the DGSNR, as the competent authority, may be beneficial, so as to confirm that all necessary aspects of the compliance assurance programme are in place and are fully effective (e.g. refresher training for both industry and inspectors, distribution of information to industry and more complete interdepartmental liaison).

S18. Suggestion: It is suggested that a suitable protocol be developed and implemented to recognize the respective responsibilities and the range of separate and joint activities of the DTT and DGSNR relative to the safe transport of dangerous goods, including Class 7, radioactive material.

S19. Suggestion: It is suggested that suitable legal training for appropriate competent authority personnel be provided, in order to significantly contribute to the success of future legal actions pursued by the competent authority.

S20. Suggestion: It is suggested that the DGSNR review and improve, if necessary, its arrangements for confirming the adequacy and completeness of the quality assurance programmes in use for all phases of the transport of radioactive material.

S21. Recommendation: It is recommended that the DGSNR's convention with the IRSN for nuclear safety, transport and radiation protection should be reviewed, and an additional specification should be developed; this specification should clarify and record the current understanding of the completeness and recording of transport related assessment work carried out on the DGSNR's behalf.

S22. Recommendation: It is recommended that the DGSNR should consider what an appropriate review programme for non-competent authority approved package design, manufacture and use would consist of, and how such a programme could be incorporated within its compliance programme.

Authorization process

S23. Suggestion: It is suggested to continue with the efforts to minimize the application of special arrangement approvals, as indicated by the statistical data for 2003, and to take appropriate actions in order that fully approved or validated package designs are used.

S24. Good practice: The DGSNR–IRSN register of serial numbers of approved package designs provides a comprehensive and annually updated database for all users and owners of approved package designs in France. It goes beyond the requirements of para. 819 of the 1996 edition of the Transport Regulations by providing more information, and is very useful for the preparation of inspections. In this regard the development of a database on package designs not requiring competent authority approval is also considered to be good practice.

S25. Good practice: The addition of a revision sheet to the certificates of approval provides useful information and clarification about the current revision status of the certificate and its development since the original issuance.

Review and assessment process

S26. Recommendation: It is recommended that the DGSNR, supported by the IRSN, modify the review and assessment procedures in such a way that demonstration of compliance with each applicable requirement of the 1996 edition of the Transport Regulations is documented explicitly for design approvals, shipment approvals and special arrangements.

S27. Suggestion: It is suggested to develop and publish an application guide for design approvals, shipment approvals and special arrangements, in addition to the experience feedback document, to describe a complete and consistent format to reflect all applicable requirements of the 1996 edition of the Transport Regulations for such applications for approvals and to provide guidance on the contents of the corresponding safety analysis reports.

S28. Suggestion: It is suggested that the IRSN review the capability and the application of the available computer codes, and staff training on these codes, for different areas of package design assessment, to ensure a comparable standard and quality level of safety demonstration in all areas, when needed.

S29. Suggestion: It is suggested to review the current assessment practice of looking at quality assurance requirements in a general way during the approval procedure of the package design, in relation to looking at them in detail through later inspection procedures.

S30. Suggestion: It is suggested to review the practice of handling design changes and modifications in such a way that, independent of the decision taken by the certificate holder on classifying the change being safety or non-safety related and independent of inspection activities, a complete and actual status of each packaging as used is maintained by the certificate holder and is available to the competent authority upon request.

Inspection and enforcement

S31. Good practice: France has consolidated competent authority responsibilities for radioactive material transport into a single entity, the DGSNR, and has put into place interagency agreements, where necessary, to jointly define

the roles and responsibilities for inspection. This exceeds IAEA transport guidance and results in increased effectiveness and efficiency of the French inspection programme and facilitates the allocation of resources around safety issues.

S32. Suggestion: It is suggested that the enforcement powers of local DNSR inspectors be reviewed, to consider legislation enabling them to directly serve a legal notice that would immediately prevent a non-compliant or unsafe process from continuing.

Development of regulations and guides

S33. Suggestion: It is suggested that the DGSNR post on its web site the available guidance material on radiation protection programmes produced by the National Radiological Protection Board (NRPB), Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) and IRSN, in order to assist users in complying with the requirements.

Emergency preparedness for transport

S34. Good practice: France has a well established framework for emergency preparedness and response, covering all modes of transport. In particular, the preparation of a guidance circular to assist the prefects in drafting and implementing the PSS-TMR (specialized emergency plan for the transport of radioactive material) facilitates effective response to land based incidents throughout the country. In addition, the Plan NUCMAR Manche/Mer du Nord 2003 is a good example of effective response arrangements and provision of public information in the event of marine incidents in territorial waters.

S35. Good practice: The COGEMA Logistics emergency and intervention plan for the transport of radioactive material (PUI-T-GEN), Revision 6, September 2003, is a good example of an emergency plan covering the transport operations of a major transport company.

Maritime operations

S36. Good practice: Early implementation at the national level of new international mandatory requirements under the International Maritime Dangerous Goods Code (IMDG Code) is considered to be good practice.

S37. Good practice: Implementation at the national level on a mandatory basis of international recommended requirements on training of personnel under the IMDG Code is considered to be good practice.

S38. Good practice: Implementation at the national level on a mandatory basis of the carriage of the most recent editions of the International Maritime Organization's (IMO) Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) and the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS) is considered to be good practice.

S39. Good practice: Early implementation at the national level of recommended international requirements under the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code), well before they were made mandatory, is considered to be good practice.

S40. Good practice: Extension of the requirements of the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) at the national level to additional types of ship is considered to be good practice.

S41. Good practice: The capability of operating, if necessary, the North Sea-English Channel and Atlantic NUCMAR plans together with the established general international emergency response agreements with the United Kingdom and Spain is considered to be good practice.

S42. Suggestion: It is suggested that the establishment of general international response agreements for the Mediterranean area be explored, so that the Mediterranean NUCMAR plan could be operated, if necessary, in a wider context.

S43. Suggestion: It is suggested that the possibility be explored that the DAMGM collect the information on the transport of radioactive material that is available from the ports.

Air transport

S44. Suggestion: It is suggested that the DGAC undertake a review of resources available to conduct compliance monitoring and inspections, in particular in the Paris region.

S45. Suggestion: It is suggested that consideration be given to the compilation of an audit form or check sheet for Class 7 inspections undertaken by DGAC inspectors.

GENERAL CONCLUSIONS

S46. The TranSAS appraisal team completed a thorough appraisal of the implementation of the Transport Regulations in France. The cooperation of the authorities in France, and of all those who participated in the discussions, was excellent and contributed to the success of the appraisal.

S47. The comprehensive legal framework, with responsibilities identified in considerable detail and with memoranda of understanding in areas of overlapping responsibilities, provides a good basis for the implementation of the Transport Regulations.

S48. Generally, the implementation of the Transport Regulations is performed in accordance with IAEA requirements. Some areas for possible improvements have been identified. In general, these relate to keeping guides and procedures up to date and being able to demonstrate that all the requirements of the regulations have been met.

S49. The findings include a considerable number of good practices, in particular in the area of maritime transport.

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 implemented 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’s 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 appraisal was undertaken and completed at the request of Slovenia in 1999. France was the sixth State to request a TranSAS appraisal.

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 the 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 FRANCE

1.7. On 11 September 2002 the IAEA received, through the Permanent Mission of France, a request from P. Thiébaud, Governor from France at the IAEA, for a TranSAS appraisal. The basic objectives for the appraisal were discussed initially with J. Gauvain, of the International Relations Department of the General Directorate for Nuclear Safety and Radiation Protection (DGSNR). J. Aguilar, of the Subdirectorate for Fuel Cycle and Radioactive Material Transport of the DGSNR, provided the initial review of the technical matters. The points of contact in France and the IAEA exchanged initial information and arranged a preparatory mission that was conducted in France from 12 to 16 May 2003. During the preparatory mission a preliminary agreement was developed that 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 French 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 FRANCE

1.9. The general scope of any TranSAS appraisal includes 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.

1.10. The more specific scope for France, pursuant to the request of this State and to additional considerations that arose during the preparatory mission in May 2003, included further attention to the evaluation of the maritime transport and air transport of radioactive material.

ACTIVITIES COMPLETED PRIOR TO THE APPRAISAL

1.11. Preparations completed by France included the following:

- (a) The completion and transmittal to the IAEA of the detailed TranSAS questionnaire and related supporting material;
- (b) Ensuring the availability of key personnel from the authorities during the appraisal;
- (c) The arrangement of the logistics for the appraisal, including accommodation and local transport for the team members, and some translation services 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 relevant documentation and the TranSAS guidelines;
- (c) Arranging for the travel of the team members to and from France.

APPRAISAL TEAM

1.13. The team for the appraisal in France was composed of 13 independent experts and a technical writer. Nine of the experts were from regulatory authorities responsible for the transport of radioactive material in Canada, Germany, Egypt, Ireland, Japan, New Zealand, Panama, the United Kingdom and the United States of America. In addition, there were a maritime expert and a legal expert with experience in the transport of radioactive material and two transport safety experts from the IAEA. The team was led by one of the transport safety experts from the IAEA. Further biographical details on the members of the appraisal team are provided in Appendix II of this report.

1.14. 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 lead responsibilities for appraising the topical areas addressed in the TranSAS questionnaire.

APPRAISAL PROCESS

1.15. The appraisal process included the following:

- (a) A preparatory session for the appraisal team.
- (b) An entrance meeting involving presentations by key representatives of the French Government, the General Directorate for Nuclear Safety and Radiation Protection (DGSNR), the Institute for Radiological Protection and Nuclear Safety (IRSN), the General Directorate for Civil Aviation (DGAC), the Directorate for Maritime Affairs and Seafarers (DAMGM), the Directorate for Inland Transport (DTT), CIS bio international, a company involved in the production and international transport of radioactive material, and COGEMA Logistics, on their responsibilities for the safe transport of radioactive material.
- (c) Discussions to obtain clarification and additional or more detailed information.
- (d) Preparation of the draft findings.
- (e) Ongoing feedback on updates to the draft findings.
- (f) Visits to the offices of the relevant regulatory bodies in Paris (the DGSNR, IRSN, DAMGM and DGAC), the COGEMA facility at La Hague, the COGEMA Logistics road and rail trans-shipment terminal at Valognes, the COGEMA Logistics sea and rail trans-shipment terminal at the port of Cherbourg, the radiopharmaceutical production centre of CIS bio international in Saclay and the Air France freight shipment facilities at the Charles de Gaulle airport at Roissy, outside Paris.
- (g) 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

1.16. This report documents the results of the TranSAS appraisal conducted in France from 27 March to 8 April 2004. 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 domestic 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 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 national and international 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 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 IAEA 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 standard 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. The 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 IMO member States on 1 January 2004.

2.11. The United Nations Economic Commission for Europe’s (UNECE) Inland Transport Committee publishes dangerous goods regulations (including requirements derived from the Transport Regulations [1]) for transport by road (the ADR requirements) [17]. Similarly, the Intergovernmental Organisation for International Carriage by Rail (OTIF) publishes the dangerous goods regulations for transport by rail (the RID requirements) [18]. These road and rail regulations apply to international transport between Contracting Parties (States) of the European agreements concerning the international carriage of dangerous goods by road and by rail. The ADR and RID requirements are mandatory, both for domestic and international transport, for those Contracting Parties (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.

3. APPRAISAL PROCESS IN FRANCE

OVERVIEW OF THE APPRAISAL PROCESS

3.1. The appraisal process in France included the following:

- (a) A preparatory session for the appraisal team.
- (b) An entrance meeting involving presentations by key representatives of the French Government, the General Directorate for Nuclear Safety and Radiation Protection (DGSNR), the Institute for Radiological Protection and Nuclear Safety (IRSN), the General Directorate for Civil Aviation (DGAC), the Directorate for Maritime Affairs and Seafarers (DAMGM), the Directorate for Inland Transport (DTT), CIS bio international, a company involved in the production and international transport of radioactive material, and COGEMA Logistics, on their responsibilities for the safe transport of radioactive material.
- (c) Discussions to obtain clarification and additional or more detailed information.
- (d) Preparation of the draft findings.
- (e) Ongoing feedback on updates to the draft findings.
- (f) Visits to the offices of the relevant regulatory bodies in Paris (the DGSNR, IRSN, DAMGM and DGAC), the COGEMA facility at La Hague, the COGEMA Logistics road and rail trans-shipment terminal at Valognes, the COGEMA Logistics sea and rail trans-shipment terminal at the port of Cherbourg, the radiopharmaceutical production centre of CIS bio international in Saclay and the Air France freight shipment facilities at the Charles de Gaulle airport at Roissy, outside Paris.
- (g) 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

France 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. Specific experience of the team members was taken into account for the assignment of lead responsibilities for appraising the topical areas addressed in the TranSAS questionnaire.

TASKS CONDUCTED AND SCHEDULE OF THE TRANSAS APPRAISAL

3.4. Meetings, interviews and appraisal activities.

Monday, 29 March 2004, entrance meeting, inauguration and overview presentations. Venue: Headquarters of the DGSNR, 6 Place du Colonel Bourgoïn, Paris.

- 0900: Welcome address, J.-L. Lachaume, Deputy General Director, DGSNR.
- 0915: Opening address, G.J. Dicke, IAEA.
- 0930: Presentation, transport safety regulations, J. Aguilar, DGSNR.
- 1000: Presentation, maritime transport, O.P. Lefèvre, DAMGM.
- 1030: Presentation, air transport, J. Le Tonqueze, DGAC.
- 1100: Presentation, land transport, R. Cailleton, DTT.
- 1130: Presentation, Technical Support Organization of the DGSNR, G. Sert, Directorate for the Safety of Factories, Laboratories, Transport and Waste (DSU).
- 1200: Presentation, nuclear fuel and high level waste transport, B. Desnoyers, COGEMA Logistics.
- 1230: Presentation, radioisotope producer, F. Dufour, CIS bio international.
- 1400: Questions (TranSAS team) and answers (by the representatives).
- 1600: Visit to the emergency centre of the DGSNR on the premises.

Tuesday, 30 March 2004, visits and interview, offices of the IRSN in Fontenay-aux-Roses.

- 0900: M.-T. Lizot, Head, Transport Safety Appraisal Section, DSU; R. Bon Nguyen, Deputy Head, Transport Safety Appraisal Section, DSU; S. Le Mao, Engineer, Transport Safety Appraisal Section, DSU.
- 1600: Travel to Cherbourg.

Wednesday, 31 March 2004, visits to installations and interviews.

- 0800: Visit to the loading pier at the port of Cherbourg, which features COGEMA's high capacity crane designed for the loading and unloading of flasks from ships at berth.
- 0930: Visit to the COGEMA fuel reprocessing installation at La Hague. Welcome by M. Gac, Director of Quality, Safety, Security and Environment; J. Vansteelant, Public Relations. Interviews: D. Dupuis, COGEMA La Hague, Manager of the Industrial Directorate/Reception and Storage (DI/RE) facility, unloading and maintenance; M. Gourlay, COGEMA La Hague, safety and environment; M. Hartenstein, COGEMA Logistics, Deputy Director of Transport Division, external affairs; L. Besq, COGEMA Logistics, Transport Department, North West Division; F. Darras, COGEMA Logistics, Transport Department, North West Division; A. Salaün, COGEMA Logistics, Head, Forwarding and Transport Department, North West Division; P. Zunino, COGEMA Logistics, Maintenance Manager, Transport Department, North West Division.
- 1200: Visit to the COGEMA fuel reprocessing installation, in particular the chambers for dry and wet loading and unloading of flasks, interim storage pools for spent fuel and flask maintenance halls, P. Riou, COGEMA La Hague, DI/RE facility.
- 1530: Visit to the La Hague site emergency centre, J.M. Cremont, Officer in Charge.
- 1600: Visit to the road to rail, rail to road flask trans-shipment centre at Valognes, F. Harari, Director, COGEMA Logistics, Head of Cherbourg Establishment, North West Division.

Thursday, 1 April 2004, report writing, DGSNR, Fontenay-aux-Roses.

Friday, 2 April 2004, interviews and report writing.

- 1000–1300: Offices of the DGAC, M. Coffin, Head, Aircraft Operations Division of the DGAC; J. Le Tonqueze, Head, Dangerous Goods Department, Aircraft Operations Division of the DGAC.
- 0930–1200: Offices of the DAMGM, F. Escaffre, C. Clinkemaille and C. Massa, vessel monitoring and response to maritime accidents; J.-L. Le Liboux and O. Pestel Lefèvre, implementation of international maritime regulations and guidance.
- 1400–1800: Offices of the DGSNR, report writing.

Monday, 5 April 2004, visits to installations and interviews.

0900–0930: Visit to CIS bio international, Saclay, a manufacturer of radiopharmaceuticals.

0930–1230: Interviews, G. Turquet de Beauregard, General Director; F. Dufour, transport safety; E. Hello, in charge of sales logistics; P. Cozic, in charge of shipping; J. Malardé, in charge of quality assurance.

1230–1300: Visit to the conveyor belt area for packaging of radiopharmaceuticals and to the conveyor belt for dispatch of ^{99m}Tc generators.

1430–1600: Visit to the Air France freight offices, Charles de Gaulle airport. Interviews with I. Vougaz, Air France, Quality Deputy; W. Baquiast, Air France, Head, Dangerous Goods Department; B. Alexandre, Air France, Director, Freight Operations, Engineering; P. Masson, Air France, Dangerous Goods Coordinator; J.-L. Boutillier, Air France, Ground Operations Safety Manager; B. Petitguyot, Air France, Ground Operations Safety.

1600–1700: Visit to the Air France cargo hall at Charles de Gaulle airport at Roissy: receiving offices and areas reserved for the analysis, handling and overnight storage of radioactive material.

Tuesday, 6 April 2004, report writing, review of feedback, follow-up interviews, offices of the DGSNR.

Wednesday, 7 April 2004, report writing, review of feedback, preparation of exit meeting report, offices of the DGSNR.

Thursday, 8 April 2004, exit meeting.

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

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, functions and organization of the regulatory bodies;
- (c) The authorization process;
- (d) The review and assessment process;
- (e) Inspection and enforcement;
- (f) The development of regulations and guides;
- (g) Emergency preparedness for transport;
- (h) Maritime operations.

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 an underpinning (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 legislative framework and governmental responsibilities of the authorities in France are described taking into account the legislative hierarchy (Fig. 1). For the purposes of this appraisal, the legal system that regulates the transport of radioactive material — as far as it relates to aspects of the safety of transport — was reviewed against the requirements that are relevant for the transport of radioactive material as specified in paras 2.2 and 2.4 of Ref. [11]. Paragraph 2.2 of Ref. [11] addresses the legislative and governmental mechanisms that are prerequisites for the safe transport of radioactive material. Paragraph 2.4 of Ref. [11] addresses specific legislative requirements concerning transport safety.

4.3. Reference [11] states, inter alia, in para. 1.5, that “*This publication establishes legal and governmental responsibilities which are common to a broad range of facilities and activities...*” These activities include the “*transport of radioactive materials;...*” Reference [11] states, inter alia, in para. 2.2, that there are “*certain prerequisites for the safety of facilities and activities.*” These prerequisites are addressed in certain subparagraphs of para. 2.2.

4.4. Reference [11] states, inter alia, in para. 2.2, that “(1) A legislative and statutory framework shall be established to regulate the safety of facilities and activities.”

Legal framework for the transport of radioactive material in France

4.5. The legal framework for the transport of radioactive material in France is provided by the Constitution, binding international conventions (treaties), national laws and various types of executive regulations. The requirements of the Transport Regulations are implemented in the legal system in France by ministerial orders that make mandatory the following international modal transport regulations: the ADR requirements, RID requirements, Regulations for the Carriage of Dangerous Substances on the Rhine (ADNR requirements) [19], IMDG Code and ICAO Technical Instructions.

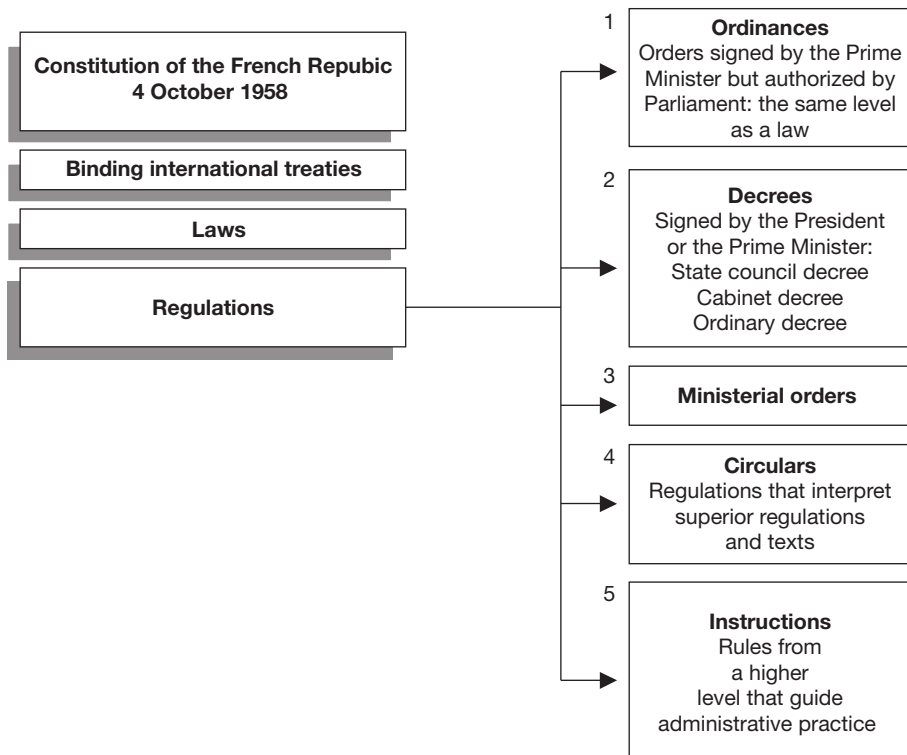


FIG. 1. The legal hierarchy in France. The numbers indicate the hierarchy of legal texts.

Binding international treaties and conventions

4.6. On the basis of the decision by the Conseil d'État (the superior administrative court) in the *Nicolo* case (Conseil d'État du 20.10.1989, *Actualité Juridique–Droit Administratif* 1989, 788), it is a rule that international treaties, when they are ratified and in force, take precedence over national laws. Such treaties have a priority status and may influence national laws when a conflict between an international treaty and a law may arise. National law has to be compatible with the superior international treaties. Different opinions or legal interpretations that may lead to a conflict between national law and international treaties can be resolved through a juridical decision. On the basis of the ruling by the Conseil d'État in the *Gisti* case (Conseil d'État du 29.06.1990, *Actualité Juridique–Droit Administratif* 1990, 630), which breaks with a constitutional tradition of 160 years, it is the Conseil d'État, and not the Minister for Foreign Affairs, that may decide in a situation of conflict of law.

International treaties ratified by France covering the transport of radioactive material

Convention on Third Party Liability in the Field of Nuclear Energy (the Paris Convention)

4.7. Law No. 68-943 of 30 October 1968, concerning civil liability in the field of nuclear energy, modified by Law No. 90-488, of 16 June 1990. The provisions of this law specify the measures that, by virtue of the Convention on Third Party Liability in the Field of Nuclear Energy signed in Paris on 29 July 1960, the supplementary convention signed in Brussels on 31 January 1963 and the additional protocols to these conventions signed in Paris on 28 January 1964 and 16 November 1982, are left to the initiative of each Contracting Party. As regards the transport of nuclear substances on the territory of the French Republic and that of a State in which the Brussels Convention is not in force, the operator of a nuclear installation located on the territory of the French Republic that ships or receives said substances will, in accordance with the provisions of this law, assume liability for nuclear incidents occurring during transport on the territory of the French Republic (Article 9-1). To carry nuclear substances in transit on the territory of the French Republic, the carrier must prove that it has insurance or an equivalent financial security covering the damage that could be caused by a nuclear incident during transport, up to the amount set in Article 9, if the transport is governed by the Paris Convention, and €228 673 525.86 in all other cases (Article 9-2). For an international transport not covered by the Paris Convention, the carrier must prove the

existence of financial security by producing a certificate issued by the insurer or other financial guarantor providing the equivalent financial guarantee and giving the name of the insurer or guarantor, its address, and the amount, type and duration of the guarantee. This certificate must also identify what nuclear substances are being transported and the route to be covered. When the international transport of radioactive material falls within the scope of the Paris Convention, the certificate is produced in accordance with Article 4C of this convention. A joint order from the Minister for Industry and the Minister for Transport defines the certificate models (Article 9-3). The Paris and Brussels Conventions have been revised and the protocols of the revisions were signed by the Contracting Parties on 12 February 2004.

Convention on International Civil Aviation — Annex 18: The Safe Transport of Dangerous Goods by Air, Chicago, 7 December 1945

4.8. Under this convention France has adopted the ICAO Technical Instructions into the law of France by ministerial order. The current ICAO Technical Instructions (2003–2004) have incorporated by ministerial order the requirements of the 1996 edition of the Transport Regulations [1]. The ICAO Technical Instructions apply also to international air transport to and from France. France has applied for variations in the ICAO Technical Instructions.

Revised Convention on the Navigation on the Rhine and four protocols and regulations concerning the Regulations for the Carriage of Dangerous Substances on the Rhine (ADNR requirements), Mannheim, 17 October 1969

4.9. The ADNR requirements were adopted by Resolution 2001-II-27 of 29 November 2001 and Resolution 2002-I-37 of 30 May 2002 of the Central Commission for Navigation on the Rhine, in Strasbourg.

4.10. In the Ministerial Order of 5 December 2002, concerning the carriage of dangerous goods by inland waterways (known as the ADNR order), which came into force on 1 January 2003, it is stated in Article 3 (decisions and opinions of the competent authority) that, when this order or its annex require a decision from the French competent authority, or the issuing of a certificate by this authority, this competent authority is the Minister for Transport, except for the transport of radioactive and fissile material for civilian use, in which case the Minister for Industry and the Minister for the Environment have joint jurisdiction to act as the competent authority. With regard to domestic transport and international transport originating in France, when the annex to this order requires a decision by the competent authority or the issuing of a

certificate by this authority, the Minister for Transport shall have competence, except for the transport of radioactive and fissile material for civilian use, in which case the Minister for Industry and the Minister for the Environment have joint jurisdiction to act as the competent authority.

International Convention for the Safety of Life at Sea (SOLAS Convention), adopted in London on 1 November 1974, first published by Decree No. 80-369 of 14 May 1980

4.11. Numerous amendments have been made to the original SOLAS Convention. For example, the amendment of 17 June 1983 was published by Decree No. 86-801 of 24 June 1986. An important amendment to the SOLAS Convention was promulgated in London on 27 May 1999, to make the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code) mandatory. Decree No. 2001-1199 of 10 December 2001 adopts this amendment, making the INF Code (comprising one annex) mandatory. Another important amendment to the SOLAS Convention was made in 2002 to make the IMDG Code mandatory.

International Convention on Salvage 1989, adopted in London on 28 April 1989

4.12. Decree No. 2002-645 of 23 April 2002 adopts the 1989 International Convention on Salvage.

Convention Concerning International Carriage by Rail (COTIF), Appendix B, Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (CIM), Annex I, Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID), Rome, 9 May 1980

4.13. RID is the abbreviation for the Regulations Concerning the International Carriage of Dangerous Goods by Rail, constituting Annex I to the CIM. These regulations are included in Annex I of the below mentioned Ministerial Order of 5 December 2002 and comprise the amendments coming into force on 1 January 2003. In Article 3 (decisions and opinions of the competent authority) of the Ministerial Order of 5 December 2002 modifying the Ministerial Order of 5 June 2001, amended, concerning the carriage of dangerous goods by rail (known as the RID order), it is stated that when this order or its annexes require a decision from the French competent authority, or the issuing of a certificate by this authority, this competent authority shall be the Minister for

Transport. However, for the transport of radioactive and fissile material for civilian use, this competent authority is jointly the Minister for Industry and the Minister for the Environment. Article 5 states, inter alia, that the DGSNR and the DTT are each, in accordance with their jurisdiction, responsible for the execution of this order, which came into force on 1 January 2003.

Convention on the Physical Protection of Nuclear Material

4.14. Decree No. 92-110 of 3 February 1992 publishes in the Official Journal of the French Republic the Convention on the Physical Protection of Nuclear Material. The Convention on the Physical Protection of Nuclear Material was opened for signature in Vienna and New York on 3 March 1980 (two appendices), and it was approved by Law No. 89-433 of 30 June 1989.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

4.15. Decree No. 92-883 of 27 August 1992 publishes in the Official Journal of the French Republic the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (a total of six annexes), adopted in Basel on 22 March 1989; this convention was authorized by Law No. 90-1078 of 5 December 1990.

Convention on the Liability of Operators of Nuclear Ships, Brussels, 25 May 1962

4.16. This convention was signed in Brussels on 25 May 1962 but has not been ratified by France.

Convention on Civil Liability in the Field of Maritime Transport of Nuclear Material, Brussels, 17 December 1971

4.17. This convention was signed in Brussels on 17 December 1971, ratified by Law No. 72-1164 of 23 December 1972 and published as Decree No. 75-673 of 23 July 1975.

Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, adopted in Vienna on 26 September 1986

4.18. With Decree No. 89-360 of 2 June 1989, the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, adopted in

Vienna on 26 September 1986, was published in the Official Journal of the French Republic. It was approved by Law No. 88-1252 of 3 December 1988.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, 29 September 1997

4.19. Law No. 2000-174 of 2 March 2000 authorizes the approval of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Authorization is given to approve this convention, signed in Vienna on 29 September 1997, the text of which is appended to this law. Decree No. 2001-1053 of 5 November 2001 adopts the convention.

Decree on the import, export, transit and shipment of radioactive waste between member States of the European Union

4.20. Decree No. 94-853 of 22 September 1994 covers the import, export, transit and shipment of radioactive waste between member States of the EU passing through national territory. Compliance with the provisions of this decree in no way obviates the need to comply with other regulations in force, in particular those concerning the protection and control of nuclear material resulting from Law No. 80-572 of 25 July 1980 and the decree of 12 May 1981 implementing it, on the transport of dangerous goods and protection against ionizing radiation. This text has been adopted by member States of the EU to be in conformity with the directives of 92/3/EURATOM of 3 February 1992.

European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) and one protocol, Geneva, 30 September 1995

4.21. ADR is the abbreviation for the European Agreement Concerning the International Carriage of Dangerous Goods by Road, signed in Geneva on 30 September 1957, published by Decree No. 60-794 of 22 June 1960. Annexes A and B to this order are Annexes A and B to this agreement, including the amendments entering into force on 1 January 2003. In the Ministerial Order of 5 December 2002 modifying the order of 1 June 2001 concerning the carriage of dangerous goods by road (known as the ADR order), which came into force on 1 January 2003 (Article 5), it is stated in Article 3 (decisions and opinions of the competent authority) that, when this order or its annexes require a decision from the French competent authority, or the issuing of a certificate by this authority, this competent authority is the Minister for Transport. However, this competent authority is jointly the Minister for Industry and the Minister for the

Environment for the transport of radioactive and fissile material for civilian use. The DTT and the DGSNR are, each within their jurisdiction, responsible for the execution of this order.

French national laws

4.22. Law No. 263 of 5 February 1942, concerning the rail, road or inland waterway carriage of dangerous or infected goods, is the historical basis for the modern legislation in the field of the transport of certain dangerous goods.

4.23. Law No. 96-369 of 3 May 1996, relating to fire and rescue services, establishes a public authority in each French department, to be known as the Departmental Fire and Rescue Service, that consists of a departmental fire brigade organized into fire and rescue units, including emergency medical services. Fire and rescue units include emergency rescue and first response services (Article 1). Fire and rescue services are responsible for fire prevention and safety as well as fire fighting. They work with related agencies and professionals to prevent and combat other accidents and disasters, assess and prevent natural and technological hazards, and provide emergency rescue services. The scope of their responsibility includes the following:

- (a) The prevention and evaluation of threats to civil defence;
- (b) The development of safety measures and the organization of rescue services;
- (c) The protection of citizens, property and the environment;
- (d) Emergency services for victims of accidents, fires and disasters, including the evacuation of victims (Article 2).

4.24. Law No. 87-565 of 22 July 1987, on the organization of civil defence, the protection of forests against fire and the prevention of major risks, states that the purpose of civil defence is to prevent risks of all types and to protect persons, property and the environment against accidents, incidents and disasters. The safeguard measures are prepared and the resources needed to combat major risks and disasters are implemented under the conditions stipulated in this law. They are determined within the framework of the emergency response organization plans, called ORSEC plans, and emergency plans.

4.25. Law No. 75-1335 of 31 December 1975, concerning the detection and repression of private transport offences, modified by Article 12 of Law No. 2002-3 of 3 January 2002, concerning the safety of transport infrastructures and

systems, technical enquiries further to perils of the sea, accidents or incidents during land or air transport and the underground storage of natural gas, hydrocarbons and chemical products, provides that, in addition to criminal investigation department officers, the following persons are authorized to ascertain breaches of the legislative and regulatory provisions: labour inspectors; inspectors of employment law in agriculture; transport inspectors; and civil servants or State officers responsible for monitoring land transport under the authority of the Minister for Transport.

4.26. A fine of €30 000 (Article 4 of Law No. 75-1135, as modified by Article 12 of Law No. 2002-3) and a term of imprisonment of 1 month to 1 year, or one only of these two penalties, shall be incurred by any person who transports dangerous goods or allows them to be transported by rail, road or inland waterway and who commits one of the following offences:

- (a) The transport of dangerous goods whose carriage is prohibited;
- (b) The use of transport means (packages, tanks, vehicles, etc.) that have not passed the relevant technical tests or technical inspections;
- (c) The use of roads or parking lots that are prohibited to transports of dangerous goods;
- (d) Not displaying the required placarding, marking or labelling or not having the necessary documentation regarding dangerous goods;
- (e) Not having a safety adviser in accordance with para. 1.8.3 of the ADR and RID requirements and the ADNR requirements.

4.27. Notwithstanding Law No. 75-1335 and Law No. 2002-3, according to Decree No. 77-1331 of 30 November 1977, concerning certain breaches of dangerous goods transport regulations, a fine of €1500 shall be incurred by any person who transports dangerous goods or allows them to be transported by rail, road or inland waterway without meeting the relevant specifications of the regulations laid down for transport of these materials, in particular as to:

- (a) Package labelling;
- (b) Prohibitions on mixed packaging or loading;
- (c) The nature of the packaging;
- (d) Weight limits;
- (e) Safety equipment, marking, signalling, parking or surveillance of the vehicles or transport equipment;
- (f) On-board documents;

- (g) All other safety rules laid down for the transport of dangerous material and not covered by the scope of Article 4 of Law No. 75-1335 of 31 December 1975.

4.28. Law No. 83-581 of 5 July 1983, on the safety of life at sea, shipboard living conditions and the prevention of pollution, modified by Law No. 96-151 of 27 February 1996, provides for several penalties; for example, a fine of €15 000 will apply to the master of any French ship carrying packaged cargo all or part of which constitutes dangerous goods within the meaning of the SOLAS Convention and who, having experienced an event at sea leading to or liable to lead to the loss overboard of such goods, shall have omitted, immediately upon becoming aware of the situation, to send as detailed a report as possible on the circumstances of this event to the competent authority of the nearest coastal State. For foreign ships sailing in territorial waters, an identical penalty shall be imposed on the master who omits to fulfil the obligation if the loss or risk of loss of dangerous goods can constitute a danger to the safety of navigation and the control of maritime traffic, to the protection of navigation aid equipment and systems and other equipment and installations, to the protection of cables and pipelines, to the conservation of marine biological resources, to fishing, to the preservation of the environment, to the prevention, reduction and control of pollution or to marine scientific research and hydrographical surveys, or can lead to a breach of French laws or regulations covering the customs, fiscal and health areas.

4.29. Law No. 89-434 of 30 June 1989, which supplements Law No. 80-572 of 25 July 1980, on the protection and control of nuclear material and the penal procedure code.

4.30. Further to the directives of the EU in the field of energy and with the view to optimizing the transparency of the legislation covering nuclear matters in France, a new law on energy is currently being drafted that will, inter alia, deal with transparency and security in nuclear matters.

Ordinances

4.31. Ordinance No. 2001-270 of 28 March 2001, concerning transposition of EU directives in the field of protection against ionizing radiation, has resulted in the implementation of new provisions in the public health code concerning the protection of workers and the general public.

Decrees

Legal basis for the regulatory body: The organization of the authorities

- (1) Delegation from the Prime Minister to the responsible ministers in the field of the transport of radioactive material

4.32. The power to regulate, inter alia, various aspects of the safe transport of radioactive material in France is delegated to several ministries on the basis of a decree of the Prime Minister and in reliance upon the constitutional legal system (Decree of 17 June 2002 and Decree of 7 May).

4.33. The transport of radioactive material for civilian use, inter alia, falls under the scope of:

- (a) The Minister for Industry: Decree No. 2002-893 of 15 May 2002, pursuant to Decree No. 2002-966 of 9 July 2002, states that the DGSNR is placed under the joint authority of the Minister for Health, the Minister for Industry and the Minister for the Environment.
- (b) The Minister for the Environment (Decree No. 2002-895 of 15 February 2002), jointly with the Minister for Industry.
- (c) The Minister for Health (Decree No. 2002-986 of 12 July 2002, Decree No. 2002-896 of 15 May 2002), who, jointly with the Minister for the Environment and the Minister for Industry, has authority over the DGSNR.

- (2) The regulatory body, the DGSNR (previously the Directorate for the Safety of Nuclear Installations (DSIN))

4.34. The DGSNR was established by Decree No. 2002-225 of 22 February 2002, which modified Decree No. 93-1272 of 1 December 1993. The DGSNR is responsible, inter alia, for (Article 2 III, No. 2):

- (a) Preparing and implementing all steps concerning the safe transport of radioactive and fissile material for civilian use and, in particular, together with the services of the Minister for Transport, for drafting the corresponding technical regulations and monitoring their application.
- (b) Organizing safety inspections for basic nuclear installations (BNIs) and, together with the competent services of the Minister for Transport, for the transport of radioactive and fissile material for civilian use.

- (c) Without prejudice to the inspections provided in the labour code and the environment code, organizing the radiation protection inspections provided for in the public health code and in Law No. 61-842 of 2 August 1961 and its implementing texts, and for overseeing all inspections for the monitoring of radiation protection in the industrial, medical and research fields, including by supervising sources of ionizing radiation used in these fields (Article 2 III, Nos 4 and 5).

References to the ‘Central Service for the Safety of Nuclear Installations’ and the ‘DSIN’ are replaced by references to the ‘DGSNR’ in all regulatory provisions in which they appear (Article 4).

4.35. Together with the competent administrations, the DGSNR, within its scope of competence, steers, organizes and controls the devolved local (regional) departments concerned. It oversees and coordinates their actions and calculates the resources that they will need. The functions that, under application of Article 21 of the Decree of 19 July 1994, were assigned to the agents of the Office of Protection Against Ionizing Radiation, which was merged with the Institute for Nuclear Safety and Protection (IPSN) to form the IRSN, for the application of laws and regulations in radiation protection and the policing of breaches and violations are carried out equally by the agents of the DGSNR and by the State’s devolved services intervening in their areas of competence (Article 3).

Power of signature given to the Director General and the Deputy Directors General of the DGSNR

4.36. The responsibility and the capability for the DGSNR to carry out the aforementioned obligations are fixed in several ministerial orders and decrees that delegate permanently the necessary administrative instruments and the power of signature of the responsible minister to the Director General of the DGSNR (currently A.-C. Lacoste) or, in the Director General’s absence, to the Deputy Directors General, all of whom are designated by name. With these administrative instruments, which, due to the constitutional system of France, constitute a direct juridical link to the Prime Minister of France, the DGSNR is the competent authority, and is capable to react to, decide upon and regulate any matter concerning the safe transport of radioactive material for civilian use in France.

4.37. The legal bases for the DGSNR to develop every administrative regulation without resorting to decrees in the field of the transport of radioactive material for civilian use in France are as follows:

- (a) The Ministerial Order of 22 May 2000 of the Minister for Health, in which the power of signature is given to the Director General, A.-C. Lacoste;
- (b) The Ministerial Order of 23 May 2000 of the Minister for the Environment, in which the power of signature is given to the Director General, A.-C. Lacoste;
- (c) The Ministerial Order of 24 May 2000 of the Minister for Industry, in which the power of signature is given to the Director General, A.-C. Lacoste;
- (d) The Decree of 2 February 2004, which provides that the full power of signature for the Minister for Health will devolve to the Deputy Directors General, J.-L. Lachaume, A. Schmitt and M. Bourguignon, in the absence of the Director General, A.-C. Lacoste;
- (e) The Decree of 11 February 2004, which provides that the full power of signature for the Minister for Health will devolve to the Deputy Directors General, J.-L. Lachaume, A. Schmitt and M. Bourguignon, in the absence of the Director General, A.-C. Lacoste;
- (f) The Decree of 17 February 2004, which provides that the full power of signature for the Minister for Industry will devolve to the Deputy Directors General, J.-L. Lachaume, A. Schmitt and M. Bourguignon, in the absence of the Director General, A.-C. Lacoste.

Interministerial Commission for the Transport of Dangerous Goods

4.38. Executive Decree No. 95-1029 of 13 September 1995, concerning the Interministerial Commission for the Transport of Dangerous Goods, modified by Decree No. 97-1169 of 16 December 1997, and by Decree No. 2002-850 of 3 May 2002, modifying the composition of the commission, established the Interministerial Commission for the Transport of Dangerous Goods (CITMD) to assist the Minister for Transport. The commission is required to give its opinion in all cases required by law or the regulations and to study plans to amend the regulations for the carriage of dangerous goods and all other issues concerning this transport that the Minister for Transport may deem necessary to submit to it.

IRSN and Transport Advisory Committee

4.39. The IRSN, established by Decree No. 2002-254 of 22 February 2002, is a public State institution of an industrial and commercial nature that performs functions of expertise and research in the areas of, inter alia, (a) the safe transport of radioactive and fissile material and (b) protection against malicious acts against nuclear installations and the transport of radioactive and fissile material. The IRSN is placed under the joint authority of the Minister for Defence, the Minister for the Environment, the Minister for Industry, the Minister for Research and the Minister for Health.

4.40. On the basis of the Decision of 1 December 1998 of the Minister for Industry and the Minister for the Environment, the Decision of 27 March 1973, concerning the advisory committees responsible for examining the technical aspects of safety in nuclear installations, in particular as modified by the Decision of 27 April 1995, is amended. Article 1a is added to the Decision of 27 March 1993, which states that “*An advisory committee reporting to the DGSNR is set up with the responsibility of examining the technical problems raised by the safe transport of radioactive and fissile materials for civilian purposes.*” The opinion of the advisory committee may be accompanied by proposals or recommendations.

Competent authority for the transport of fissile or radioactive material intended for military use

4.41. Decree No. 2001-592 of 5 July 2001, concerning the safety and radiation protection of defence related nuclear installations and activities, states that the Minister for Defence and the Minister for Industry define the nuclear safety policy applicable to, inter alia, the transport of fissile and radioactive material intended for military use. With regard to the transport of defence related fissile and radioactive material performed under the responsibility of the Minister for Defence or the Minister for Industry, the delegate performs the duties stipulated in Article 2 of this decree. In this respect this person is the competent authority as defined by the regulations for the transport of dangerous goods.

Decree No. 84-810 of 30 August 1984, concerning the safety of life at sea, shipboard living conditions and the prevention of pollution

4.42. Decree No. 84-810 is important for radioactive material. This is a link between Law No. 83-581 and the Ministerial Order of 23 November 1987, as amended. As mentioned in Article 54 of this decree, the provisions applicable to ships and their cargoes are established in ministerial orders by the

appropriate ministers. Article 54 also refers to dangerous goods, including Class 7 goods. This decree also establishes the Commission for the Transport of Dangerous Goods by Sea (CMD) (Article 19-1), which may be consulted by the Minister for Transport on matters relating to the transport of dangerous goods by sea.

4.43. Decree No. 2002-460 of 4 April 2002, on the general protection of persons against the dangers arising from ionizing radiation, implements new chapters in the public health code, inter alia general measures for protecting the general public against ionizing radiation.

4.44. Decree No. 2003-296 of 31 March 2003, on the protection of workers against the dangers of ionizing radiation, created a new chapter for the labour code on prevention against the risk of exposure to ionizing radiation. This code is applicable for workers in facilities and nuclear installations.

4.45. Decree No. 88-622 of 6 May 1988, on emergency plans, which implements Law No. 87-565 of 22 July 1987, concerning the organization of civil defence, the protection of forests against fire and the prevention of major risks, as amended by Decree No. 2002-367 of 13 March 2002, states that emergency plans are prepared by the prefect of the department together with the authorities, services and organizations that are competent to take safeguard measures or whose resources are liable to be deployed to deal with particular risks. Off-site emergency plans are drawn up to deal with the particular risks linked to the existence or operation of facilities or installations with a fixed perimeter. The following facilities require an off-site emergency plan:

“1 Sites comprising at least one basic nuclear installation, whether secret or not, of the following type:

- (a) a nuclear reactor with a thermal power of more than ten megawatts;*
- (b) a spent nuclear fuel reprocessing plant;*
- (c) a nuclear fuel isotope separation plant;*
- (d) a nuclear fuel chemical conversion plant;*
- (e) a nuclear fuels fabrication plant;*
- (f) a unit producing radioactive materials for military uses;*
- (g) a unit for the fabrication, assembly or utilization of elements containing radioactive materials for military uses (Article 6).*

The off-site emergency plan for a facility mentioned in 2 or 3 of Article 6 shall be re-evaluated at least every three years and updated if necessary.

Implementation exercises shall be carried out with the same frequency (Article 10,1)."

4.46. In Decree No. 2000-571 of 26 June 2000, which amends Decree No. 88-622 of 6 May 1988, on emergency plans, secret BNIs are taken into account and also require emergency plans.

4.47. Decree No. 2001-470 of 28 May 2001, on information for the public, which amends Decree No. 88-622 of 6 May 1988, on emergency plans, states that a booklet should inform the public of the existence and nature of the risk, its foreseeable consequences for humans, property and the environment, the planned procedures to alert the public, and protection and assistance measures. Posters or advertisements specify the safety instructions to be followed in the event of an emergency. The booklet is regularly updated, and in any case whenever changes are made to the facilities involved, or to how they are operated, that are liable to lead to a significant change in the risks, and whenever the off-site emergency plan is revised. The booklets are distributed at each update and in any case at least every five years (Article 9).

4.48. Decree No. 2002-367 of 13 March 2002, which amends Decree No. 88-622 of 6 May 1988, on emergency plans, modifies and augments Decree No. 88-622 of 6 May 1988, on emergency plans.

Ministerial orders

4.49. The Ministerial Order of 23 November 1987 and appended regulations concerning the safety of ships: these regulations comprise seven volumes divided into divisions. Division 221, as complemented by Division 411, implements the SOLAS Convention, including the INF Code and the IMDG Code.

4.50. The Ministerial Order of 6 January 2003, which modifies the regulation appended to the Ministerial Order of 23 November 1987, as amended, concerning the safety of ships, states that the specifications of Division 411 of the regulations appended to the Ministerial Order of 23 November 1987, as amended, concerning the carriage by sea of dangerous goods, are replaced by those of the same division (2003 edition), the text of which is appended to this order of 6 January 2003.

4.51. Division 411, 2003 edition:

“Article 411-1.01

General

The purpose of this division is to define the rules applicable to carriage by sea of dangerous goods in packages.

“Article 411-1.05

Applicable provisions

Subject to the provisions of this division, the applicable rules for the carriage by sea of dangerous goods are those contained in the International Maritime Dangerous Goods Code (IMDG Code) and its amendments in force on 1 January 2003¹, adopted by the Maritime Safety Committee of the International Maritime Organization (IMO) during its 75th session (resolution MSC.122(75)). According to the jurisdiction specified in paragraph 1, the competent minister may approve one or more organizations to issue the certificates or decisions mentioned in paragraph 1 of this article in the conditions mentioned in this division. Refer to chapters 411-2 to 411-6 as applicable.

“Article 411-1.12

For implementation of sub-section 5.1.5.2.4 of the IMDG Code, jurisdiction as competent authority for receipt of certificates applying to the package model prior to first shipment and requiring approval lies jointly with the Minister for Industry and the Minister for the Environment. Furthermore, the consignor shall send notification for the cases specified in sub-section 3.5.2 of the IMDG code prior to any shipment:

- to the Ministry for Industry and the Minister for the Environment²;*
- to the Minister for Transport³;*
- to the head of the safety centre concerned.”*

¹ Amendment 31.02 (see para. 2 of Article 411-1.05 to obtain or consult it).

² Notification is sent to the DGSNR.

³ Notification is sent to the DAMGM.

Chapter 411-4

4.52. The purpose of this chapter is to define the provisions satisfying the Minister for Transport or the Minister for Industry and the Minister for the Environment jointly when approval or consent from the competent French authority is required under application of Chapters 4.1 and 6.1–6.6 of the IMDG Code.

“Article 411-4.04

Package approval for Class 7 and applicable tests

The package models and the Class 7 materials shall be qualified in accordance with the provisions of Chapter 6.4 of the IMDG Code. Approval is issued jointly by the Minister for Industry and the Minister for the Environment in the following cases provided for in sub-section 5.1.5.3.1 and paragraphs 7.1.14.10 and 2.7.7.2.2 of the IMDG Code:

- 1. models used for radioactive materials in a special form;*
- 2. models used for low-dispersible radioactive materials;*
- 3. models used for packages containing 0.1 kg or more of uranium hexafluoride*
- 4. models used for all packages containing fissile materials, subject to the exceptions of 6.4.11.2 of the IMDG code;*
- 5. models used for type B(U) packages and type B(M) packages;*
- 6. models used for type C packages;*
- 7. special arrangements;*
- 8. shipments of:*
 - 1. type B(M) packages not conforming to the provisions of 6.4.7.5 of the IMDG Code or specially designed to allow the specified intermittent ventilation;*
 - 2. type B(M) packages containing radioactive materials having an activity level of more than 3000 A1 or 3000 A2, as applicable, or 1000 TBq, whichever is the lower;*
 - 3. packages of fissile materials, if the sum of the criticality-safety indices exceeds 50;*
- 9. the radiological protection programme and the stowage conditions for shipments by special use ship, in accordance with 7.1.14.9 of the IMDG Code;*
- 10. calculation of the A1 and A2 values which do not appear in the list in the table in sub-section 2.7.7.2.1 of the IMDG code.”*

4.53. The IRSN assists the DGSNR with this activity as well as those mentioned in para. 1 of Article 411-1.09 and in Article 411-7.05 of this division.

Article 411-2.04

4.54. The certificates, approvals or qualifications of containers (packagings, intermediate bulk containers, large packagings, tanks) may be revoked or suspended by the services or organizations that issued them or, after consulting with them, either by the Minister for Transport or the Minister for Industry and the Minister for the Environment, in accordance with the jurisdiction specified in para. 1 of Article 411-1.09, when it appears that said containers constitute a serious safety threat. The purpose of this chapter is to define the provisions satisfying the Minister for Transport or the Minister for Industry and the Minister for the Environment jointly, when approval or consent from the competent French authority is required under application of Chapters 4.1 and 6.1–6.6 of the IMDG Code.

ICAO Technical Instructions

4.55. The current ICAO Technical Instructions have incorporated the requirements of the 1996 edition of the Transport Regulations [1]. The ICAO Technical Instructions apply also to international air transport to and from France.

Sending radioactive material by post

4.56. The purpose of the Ministerial Order of 22 March 2001, concerning the sending of radioactive material by post, which carries out, inter alia, the postal convention signed in Beijing on 15 September 1999 and the Ministerial Order of 18 August 1972, as amended, concerning the sending by post of radioactive material that is not covered by special transport requirements, is to define the rules specific to the transport of radioactive material in France by post (Article 1.1). This order only concerns domestic transports. The international transport of radioactive material by post is prohibited (Article 1.2).

4.57. Radioactive material can be accepted for transport by post subject to the provisions of the above mentioned ministerial order, and the ADR and RID requirements and JAR-OPS 1 [20], which do not run contrary to this order, with the exception of the provisions relative to transport documents. A consignment that complies with the requirements and checks for the transport of excepted packages, as defined by the regulations for the mode of transport

considered, and whose radioactive content is in conformity with the provisions of Appendix I to this order, may be accepted for transport by post, subject to the following provisions and any additional provisions as may be set by the universal postal service provider:

- (a) It may only be given to the postal services by a consignor approved by the competent authority, in a branch of the post office specifically designated in the approval.
- (b) It must be visibly and indelibly marked on the outside with the words “Radioactive materials, quantity acceptable for transport by post”; these words must be marked on a white label to be affixed by the consignor; the words should be crossed out if the empty packaging is returned by post.
- (c) The name and address of the consignor should be marked on the outside, along with text requesting return of the consignment if not delivered.
- (d) The name and address of the consignor and the contents of the consignment must be marked on the interior packaging (Article 4).

4.58. The consignors must first apply for approval. The approval is valid for a period of three years. It can be suspended without compensation, by decision of the competent authority. The DGSNR and the General Directorate for Industry, Information Technologies and the Postal Service (DIGITIP) are, each in its domain, responsible for execution of this order, which will be published in the Official Journal of the French Republic (Article 8).

Ministerial Order of 6 January 2003 modifying the regulation appended to the Ministerial Order of 23 November 1987, as amended, concerning the safety of ships

4.59. Ministerial Order of 6 January 2003:

“Article 1: The specifications of division 411 of the regulations appended to the order of 23 November 1987 amended concerning sea transport of dangerous goods are replaced by those of the same division (2003 edition), the text of which is appended to this order (1).

“Article 2: However, the specifications of division 411 (2001 edition) may be applied in place of the new specifications until 31 December 2003.”

Ministerial Order of 16 July 2002 amending the regulations appended to the Ministerial Order of 18 July 2000 concerning the transport and handling of dangerous goods in seaports

4.60. Ministerial Order of 16 July 2002:

“III. The text relative to Article 711-2 is replaced by the following provisions:

711-2. Provisions relative to protection of workers against the hazards of ionizing radiation:

- Decree No. 86-1103 of 2 Oct. 1986 concerning radiation protection of workers against the hazards of ionizing radiation;*
- Ordinance No. 2001-270 of 28 March 2001 concerning the transposition of community directives in the field of protection against ionizing radiation;*
- Decree No. 2002-460 of 4 Apr. 2002 concerning the general protection of persons against the hazards of ionizing radiation.”*

“IV. The text relative to Article 712 “On-shore warehouses” is replaced by the following provisions:

712. ON-SHORE WAREHOUSES

Class 7 radioactive materials must stay in the port for as short a time as possible. They should preferably be loaded on or unloaded from ships without transiting through on-shore warehouses.

If an on-shore warehouse is used, account must be taken of Paragraphs 1 and 2 below.

Exceptional cases are subject to the authorization of the port authority and, if dealing with nuclear materials, jointly with and only with the Institute for Radiation Protection and Nuclear Safety (IRSN) and its body with competence for transport: the “Operational Transport Unit” (EOT).”

“712-1. Separation from other goods and premises for human occupation

Packages, overpacks, containers and tanks containing radioactive materials must be separated:

- from other dangerous goods, whatever the nature of the hazard, by a minimum distance of 6 metres;
- from undeveloped photographic films — packages marked: “FOTO”;
- and mail bags, with the minimum distances to be observed being given in the following table:

MINIMUM DISTANCES BETWEEN PACKAGES OF CATEGORIES II-YELLOW OR III-YELLOW AND PACKAGES MARKED “FOTO” OR MAIL BAGS.”

Ministerial Order of 18 July 2000 Regulating the Transport and Handling of Dangerous Material in Seaports

4.61. Ministerial Order of 18 July 2000:

“Article 1. The transport and handling of dangerous goods in seaports is subject to the regulation appended to this Ministerial Order (1) and its two annexes (2).”

Ministerial Order of 12 May 1997, concerning the technical conditions for the operation of aircraft by a commercial air transport operator (JAR-OPS 1)

4.62. This order specifies the technical conditions applicable to companies subject to Titles III and IV of Book III of the civil aviation code, hereinafter referred to as operators, within the territorial limits of the French Republic as defined in Article 2 of the Convention on International Civil Aviation and in any other place where it is compatible with the specific rules of the State flown over, whenever they operate an aircraft for commercial air transport operations.

Circulars

Memorandum of understanding concerning overlapping responsibilities for maritime transport

4.63. Note No. 01/98 of 11 May 1998 (the DSIN/DAMGM protocol) provides interim clarification for the drafting, application and monitoring of rules covering the maritime transport of radioactive material. This memorandum was necessary to clarify responsibility for the transport of radioactive material in accordance with Article 411-1.09 of Division 411. When Division 411 or the IMDG Code requires a decision from the French competent authority, or the issuing of a certificate by this authority, the competent authority shall be the

Minister for Transport. However, this authority shall be jointly the Minister for Industry and the Minister for the Environment when dealing with transports of radioactive and fissile material for civilian use. If there is a doubt concerning the applicable authority or if there is a conflict of jurisdiction, the competent authority shall be the Minister for Transport.

4.64. A gradual change in the organization of public authorities is required, as the activity of drafting, applying and monitoring the rules covering the maritime transport of radioactive material was previously entrusted to the Minister for Transport. With regard to maritime transport, this role was attributed to the Directorate for Maritime Affairs and Seafarers (DAMGM), while under the authority of the Minister for Industry and the Minister for the Environment the DSIN (now the DGSNR) was given responsibility for the transport of radioactive material. As part of its new duties, the DGSNR relies on the technical expertise of the IRSN (formerly the IPSN).

4.65. Within this context, the purpose of the protocol is to provide interim clarification through a detailed list of the responsibilities of each of the directorates mentioned for the maritime transport of radioactive material. Thus for each field of action, Tables 1–7, taken from the DSIN/DAMGM protocol, specify who is in charge (the directorate known as the ‘pilot’) and whether other directorates and/or organizations are to be consulted (in the column with the ‘associate’ heading). During inspections or visits on board vessels transporting radioactive material organized by the Centre of Safety of Ships (CSN), the Nuclear Safety Authority’s (ASN) inspectors may:

- (a) If dealing with foreign ships, and under the terms of the Paris Memorandum of Understanding on Port State Control (Paris Memorandum) in the company of ship and maritime works safety inspectors, take part in visits to these ships with the aim of checking the packages and, if necessary, the radiation protection measures.
- (b) If dealing with French ships:
 - (i) Be appointed by the head of the CSN as members of commissioning inspection commissions and periodic inspection commissions. They will first have been designated by the regional director for maritime affairs.
 - (ii) Take part, with ship and maritime works safety inspectors, in checking packages and, if necessary, checking radiation protection measures during visits arising from complaints by the crew. They will first have been designated by the head of the CSN.

TABLE 1. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR THE COMMITTEES OF THE IMO, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

Committee	Texts to be drafted or amended	Pilot	Associate
CSM ^a	SOLAS Convention INF Code IMDG Code	DAMGM	DGSNR IPSN
CPMM ^b , with the OPRC ^c working group	INF Code Expansion of the OPRC Convention on Radioactive Materials	DAMGM SGM ^d	DGSNR IPSN

^a Maritime Safety Committee.

^b Committee for the Protection of the Marine Environment.

^c International Convention on Oil Pollution, Preparedness, Response and Cooperation.

^d General Secretariat for the Sea.

TABLE 2. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR THE SUBCOMMITTEES OF THE IMO, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

Subcommittee	Texts to be drafted or amended	Pilot	Associate
DSC ^a	SOLAS Convention INF Code IMDG Code	DAMGM	DGSNR IPSN
NAV ^b	SOLAS Convention INF Code	DAMGM	DGSNR IPSN
DE ^c and SLF ^d	SOLAS Convention INF Code	DAMGM	DGSNR IPSN
FP ^e	SOLAS Convention INF Code	DAMGM	DGSNR IPSN

^a Subcommittee for Dangerous Goods, Solid Cargo and Containers.

^b Subcommittee for Navigation Safety.

^c Subcommittee for Ship Design and Outfitting.

^d Subcommittee for Stability and Load Lines on Fishing Vessels.

^e Subcommittee for fire protection.

TABLE 3. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR IAEA COMMITTEES, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

Committee	Texts to be drafted or amended	Pilot	Associate
Working Group DG VII	Directive 93/75/CE, as modified	DAMGM	DTMPL ^a DGSNR IPSN

^a Directorate for Maritime Transport, Ports and Coastlines.

TABLE 4. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR IAEA COMMITTEES, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

Committee	Texts to be drafted or amended	Pilot	Associate
TRANSAC (now TRANSSC ^a)	Transport Regulations	DGSNR	DAMGM IPSN

^a Transport Safety Standards Committee.

Letter by the DAMGM of 27 February 2003

4.66. In accordance with resolution MSC.122(75), adopted by the IMO on 24 May 2002, the DAMGM officially announced that as of 1 January 2003, Amendment 31.02 of the IMDG Code would be applied by France, which is party to the SOLAS Convention. For its part, Division 411, 2003 edition, defines the conditions for implementation of this amendment in France.

Memorandum of understanding concerning overlapping responsibilities for air transport

4.67. Note No. 01/99 of 4 June 1999, the DGAC/DSIN protocol, and Decree No. 97-710 of 11 June 1997 and Decree No. 97-715 of 11 June 1997 (published in the Official Journal of 12 June 1997), assign the task of drafting and implementing safety policy concerning the transport of radioactive and fissile material for civilian use jointly to the Minister for Industry and the Minister for the Environment. Under the authority of these two ministers, the DSIN (now the DGSNR) is responsible for this matter.

TABLE 5. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR IMDG CODE MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

IMDG Code matter	Pilot	Associate
Waivers concerning separation from persons and from photographic film	DGSNR	IPSN
Waivers concerning separation with regard to other dangerous goods	DAMGM	
Non-deliverable shipments	DGSNR	
Notification of package model (first shipment)	DGSNR	
Notification of shipment	DAMGM	
Interpretation and daily application of the IMDG Code	DGSNR (for the package, tanker transport, radiation protection, labelling, marking, contamination, and separation from persons and photographic film) DAMGM (for the declaration, stowage and separation from other dangerous goods)	DAMGM (for tanker transport) IPSN

4.68. Furthermore, the DGAC monitors the operation of aircraft in France under application of the ministerial orders that cover the technical conditions for the operation of aircraft by an air carrier (Ministerial Order of 5 November 1987, as amended, and Ministerial Order JAR-OPS 1 of 12 May 1997) and the technical conditions for operation of helicopters by an air carrier (Ministerial Order of 25 February 1985, as amended, and Ministerial Order JAR-OPS 3, yet to be published). In this context, the purpose of this protocol is to clarify the responsibilities of each of the mentioned directorates in the field of the air

TABLE 6. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR INF CODE MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

INF Code matter	Pilot	Associate
Incorporation of the INF Code into French regulations	DAMGM	
Examination of ship conformity with the INF Code and issuing a certificate in accordance with the Flag State	DAMGM	DGSNR IPSN

TABLE 7. FRENCH MARITIME TRANSPORT AUTHORITIES RESPONSIBLE FOR CHECKS ON BOARD SHIPS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL)

Pilot	Member able to assist the CSN during a visit
DAMGM CSN	DGSNR and/or DRIRE ^a (for package appearance and radiation protection)

^a Regional Directorate for Industry, Research and the Environment.

transport of radioactive material. It is intended that the measures contained in this protocol will be officially finalized in due course.

4.69. Tables 8–14, taken from the DGAC/DSIN protocol, show which directorate has responsibility for each air transport area (again, this directorate is known as the ‘pilot’). The column headed ‘associate’ specifies whether other directorates and/or organizations are to be consulted. These tables concern international actions, domestic actions, the organization of inspections and the handling of incidents or accidents.

4.70. With regard to packages, the areas of competence of the DGSNR are radiation protection, labelling, marking, contamination, interim storage and separation from persons and from photographic film.

4.71. For the purpose of carrying out its new duties, the DGSNR may call on the technical expertise of the IPSN.

TABLE 8. FRENCH AUTHORITIES RESPONSIBLE FOR AIR TRANSPORT IN ACCORDANCE WITH THE ICAO TECHNICAL INSTRUCTIONS, AS STATED IN NOTE No. 01/99 OF 4 JUNE 1999, THE DGAC/DSIN PROTOCOL

Advisory committee	Texts to be drafted or amended	Pilot	Associate
Dangerous Goods Panel	ICAO Technical Instructions	DGAC	DGSRN IPSN

TABLE 9. FRENCH AUTHORITIES RESPONSIBLE FOR AIR TRANSPORT IN ACCORDANCE WITH THE IAEA REGULATIONS, AS STATED IN NOTE No. 01/99 OF 4 JUNE 1999, THE DGAC/DSIN PROTOCOL

Committee	Texts to be drafted or amended	Pilot	Associate
TRANSSAC (now TRANSSC)	Transport Regulations	DGSRN	DGAC IPSN

TABLE 10. FRENCH AUTHORITIES RESPONSIBLE FOR AIR TRANSPORT IN ACCORDANCE WITH THE EU REQUIREMENTS, AS STATED IN NOTE No. 01/99 OF 4 JUNE 1999, THE DGAC/DSIN PROTOCOL

Committee	Texts to be drafted or amended	Pilot	Associate
European Dangerous Goods Liaison Group	European Recommendations for Application of JAR-OPS 1 [20] and JAR-OPS 3 [21]	DGAC	DGSRN IPSN

TABLE 11. FRENCH AUTHORITIES RESPONSIBLE FOR CLASS 7 MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL): ICAO TECHNICAL INSTRUCTIONS

	Pilot	Associate
Incorporation of the ICAO Technical instructions (Class 7) into French regulations (JAR-OPS 1 and JAR-OPS 3) for application on board aircraft	DGAC	DGSNR IPSN
Certificates issued by the competent authority — model approval	DGSNR	IPSN
Radioactive material in special form		
Packages loaded with fissile material		
Type B(U) and B(M) packages		
And as of 1 January 2001:		
Low dispersability material		
Type C packages		
Packages loaded with uranium hexafluoride		
Shipment approval:	DGSNR	IPSN
Type B(M) packages		
Heat flux > 15 W/m ²		
Packages loaded with fissile material on board aircraft with total transport index > 50		
Special arrangement approval	DGSNR	IPSN
Quality assurance (depending on the areas of competence)	DGSNR DGAC	IPSN
Conformity assurance (depending on the areas of competence)	DGSNR DGAC	IPSN
Waiver concerning separation from persons and from photographic film	DGSNR	IPSN DGAC (informed)
Waiver concerning separation from other dangerous goods	DGAC	
Non-deliverable shipments	DGSNR	

TABLE 11. FRENCH AUTHORITIES RESPONSIBLE FOR CLASS 7 MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL): ICAO TECHNICAL INSTRUCTIONS (cont.)

	Pilot	Associate
Notification of package model by consignor (first shipment)	DGSNR	IPSN
Notification of shipment by consignor	DGSNR	IPSN
Notification by the owner and registration of packaging serial numbers	DGAC DGSNR	IPSN
Interpretation and daily application of the ICAO Technical Instructions (depending on the areas of competence)	DGAC DGSNR	IPSN
Shipment authorization for departure, arrival, transit and overflight for high activity special form material (ICAO Technical Instructions, State variation FR4)	DGSNR	IPSN DGAC
Notification of shipment by consignor	DGAC	DGSNR
For overflight of high activity radioactive material (ICAO Technical Instructions, State variation FR4)	DDSC ^a	IPSN
Authorization to transport radioactive material, barring excepted packages	DGAC	DGSNR IPSN
Approval for reuse of contaminated aircraft (ICAO Technical Instructions, FR5 divergence)	DGSNR	DGAC

^a Directorate for Civil Defence and Security.

TABLE 12. FRENCH AUTHORITIES RESPONSIBLE FOR CLASS 7 MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL): AIR MODE CHECKS

	Pilot	Associate during an inspection
Checks (in the storage areas (controlled areas), transport on the ground within airports and on board aircraft (on the ground))	DGAC	DGSNR DRIRE

TABLE 13. FRENCH AUTHORITIES RESPONSIBLE FOR CLASS 7 MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL): HANDLING OF INCIDENTS OR ACCIDENTS

	Pilot	Associate
The information is given simultaneously by all parties in the transport chain who are cognizant of an incident or accident	DGAC, DGSNR, IPSN — the three entities are alerted	
A concise declaration of the incident or accident must be forwarded by the consignor as rapidly as possible	DGAC, DGSNR — the declaration is transmitted to the two entities	IPSN
Handling (Class 7): information concerning the results of the dose rate or contamination measurements taken by the operator, the fire brigade or any other qualified organization	DGAC, DGSNR — the measurement results are sent to the two entities	IPSN
Protective measures: markings are put in place to prevent access to the damaged package; the damaged packages are repackaged in a safe package to be taken away for expert appraisal	DGSNR, DGAC — the two entities are informed of the steps taken	IPSN
An information sheet and a detailed incident–accident report, including feedback, are sent by the consignor within a maximum of 30 days	DGAC, DGSNR — the information sheet and incident–accident report are sent to both entities	IPSN
In the event of a serious incident or accident, notification is sent to the competent prefect’s office: press releases are drafted	DGAC, which consults the DGSNR, or DGSNR, which informs the DGAC	IPSN

4.72. The areas of competence of the DGAC concern the air carrier, transport authorizations, handling, storage at the airport, flight conditions, separation of radioactive material from other dangerous goods and stowage on board the aircraft.

4.73. Inspectors from the DGSNR and DRIRE may take part in technical operational inspections, both scheduled and unannounced, for the transport by air of radioactive material, under the authority of the central or decentralized services of the DGAC.

TABLE 14. FRENCH AUTHORITIES RESPONSIBLE FOR CLASS 7 MATTERS, AS STATED IN NOTE No. 01/98 OF 11 MAY 1998 (THE DSIN/DAMGM PROTOCOL): INSPECTIONS

	Pilot	Associate
The inspections may be unannounced, in response to an incident or accident, or scheduled	DGAC	DGSNR IPSN
A preparatory meeting is organized before the inspection in order to establish the planned programme for the visit	DGSNR DRIRE	DGAC IPSN
For reactive or scheduled inspections, a letter of notification may be sent to the operators concerned	DGAC	DGSNR IPSN
Depending on the entity concerned, the inspection leads to:		
A findings sheet	DGSNR	IPSN
A follow-up letter (per entity in principle ^a)	DGAC, DGSNR	IPSN
A concise inspection sheet	DGSNR	IPSN
An internal report per entity	DGAC, DGSNR	IPSN
General action following surveillance visits	DGAC, DGSNR	IPSN

^a The draft follow-up letters are subject to consultation by the entities before transmittal to the operator.

TABLE 15. FRENCH AUTHORITIES RESPONSIBLE FOR THE DRAFTING OF REGULATIONS FOR RADIATION PROTECTION IN THE TRANSPORT OF RADIOACTIVE MATERIAL (CLASS 7)

Committee	Texts to be drafted or amended	Pilot	Associate
TRANSSC	Transport Regulations	DGSNR	IGTMOT IPSN

Note: Other texts are incorporated into the protocols with the DAMGM and DGAC.

Memorandum of understanding concerning overlapping responsibilities for labour affairs

4.74. Decree No. 97-710 of 11 June 1997 and Decree No. 97-715 of 11 June 1997 (published in the Official Journal of 12 June 1997) assign the task of

TABLE 16. SPECIAL COMPETENCE FOR THE MONITORING OF RADIATION PROTECTION REQUIREMENTS FOR THE TRANSPORT OF RADIOACTIVE MATERIAL

	Pilot	Associate
Relations with the operators of BNIs	DGSNR	IPSN
Application of the provisions of Decree No. 75-306, as amended (on radiation protection in BNIs)	DGSNR	IPSN
Application of the provisions of the RID and ADR requirements, the ADNR requirements and the ICAO Technical Instructions, including the radiation protection programme, as of 2001	DGSNR IGTMOT	IPSN
Relations with operators of non-BNI installations and the transporters	IGTMOT	DGSNR IPSN
Application of the provisions of Decree No. 86-1103, as amended (on radiation protection in non-BNI installations)	IGTMOT	DGSNR IPSN
Application of the provisions of texts that penalize offences in the area of the transport of radioactive material (Law No. 75-1335 of 31 December 1975, Decree No. 77-1331 of 30 November 1977, civil aviation code)	IGTMOT	DGSNR IPSN
The worker protection decree, abrogating the provisions of Decree No. 75-306 and Decree No. 86-1103, as amended	To be defined according to the decree	IPSN

drafting and implementing safety policy concerning the transport of radioactive and fissile material for civilian use jointly to the Minister for Industry and the Minister for the Environment. Under the authority of these two ministers, the DGSNR has responsibility for this new competence. For the performance of its duties and for monitoring compliance with the regulations it issues, the ASN calls on the services of the DRIRE and on the technical expertise of the IPSN.

4.75. Regarding those responsibilities in overlapping areas, Note No. 01/2001 of 12 June 2001 (the IGTMOT/DSIN protocol) states that the General Inspectorate for Labour and Workers in Transport (IGTMOT) is competent under the terms of Article L 611-4 of the labour code for monitoring the application of labour regulations in the field of transport. The Ministerial Order of 21 February 1984, as amended, organizes the IGTMOT. The purpose of this protocol is to clarify the respective duties of each of the above mentioned entities in the field of radiation protection as applied to the transport of

radioactive and fissile material for civilian use (Article 1). An appended table, modifiable by addendum to keep pace with changing regulations, specifies the competences of each entity and those of the directorates or services that could be associated with each. In addition to the duties for which it is responsible, each entity strives to promote concerted and/or joint actions. They will thus organize scheduled or unannounced checks on the application of the rules of radiation protection in the transport of radioactive material. As applicable, these actions may be decided on either at the central or decentralized level, provided that higher levels are informed (Article 2). The entities confirm the need for training, primarily with regard to the IGT MOT (for transport) (Article 4).

4.76. Note No. 01/98 of 11 May 1998 (the DSIN/DAMGM protocol) serves as the basis for the development of an excellent working relationship between the competent authority for package approval (the DGSNR) and the other authorities involved, the DAMGM, DTMPL and IRSN, to ensure compliance with the applicable regulations, both international and national, during vessel inspections and other activities to promote the safe maritime transport of radioactive material. However, it is noted that some names and responsibilities have changed since the note was issued.

4.77. Similarly, other notes, such as Note No. 1/99 of 4 June 1999, the DGAC/DSIN protocol, and Note No. 01/2001 of 12 June 2001, the IGT MOT/DSIN protocol, serve as the basis for ensuring compliance with the other authorities involved.

4.78. Basis: Ref. [11] states, inter alia, in para. 2.6, that “*The regulatory body shall have the authority:... (13) to liaise and co-ordinate with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security, and transport of dangerous goods;...*”

Good practice: Memoranda of understanding formally setting out the responsibilities between the ministries and governmental agencies in the application of regulations are considered good practice.

Suggestion: It is suggested that memoranda of understanding be updated and reissued, when appropriate, to record the current names and responsibilities of ministers and agencies.

Other prerequisites for the safe transport of radioactive material

4.79. Reference [11] states, inter alia, in para. 2.2, that “(2) *A regulatory body shall be established and maintained which shall be effectively independent of organizations or bodies charged with the promotion of nuclear technologies or responsible for... activities. This is so that regulatory judgements can be made, and enforcement actions taken, without pressure from interests that may conflict with safety.*”

4.80. French legislation establishes the DGSNR, which is responsible for “*preparing and implementing all steps concerning the safe transport of radioactive and fissile materials.*” The DGSNR is independent of organizations or bodies charged with the promotion of nuclear technologies. In overlapping areas (air, sea and labour affairs), ministerial notes between the involved departments lead to clarification between related organizations.

4.81. Reference [11] states, inter alia, in para. 2.2, that “(3) *Responsibility shall be assigned to the regulatory body for authorization, regulatory review and assessment, inspection and enforcement, and for establishing safety principles, criteria, regulations and guides.*” These responsibilities are given to the DGSNR by several decrees.

4.82. Reference [11] states, inter alia, in para. 2.2, that “(5) *No other responsibility shall be assigned to the regulatory body which may jeopardize, or conflict with, its responsibility for regulating safety.*” The DGSNR does not have responsibilities that jeopardize or conflict with its assigned regulatory responsibilities for transport safety.

4.83. Reference [11] states, inter alia, in para. 2.2, that “(7) *Adequate infra-structural arrangements shall be made for the safe transport of radioactive material.*” Several notes between the involved authorities facilitate the optimization of limited resources for the transport of radioactive material.

4.84. Reference [11] states, inter alia, in para. 2.2, that “(8) *An effective system of governmental emergency response and intervention capabilities shall be established and emergency preparedness shall be ensured.*” This topic is addressed in detail in the section of this report on emergency preparedness for transport.

Specific legislative requirements concerning transport safety

4.85. Reference [11] states, inter alia, in para. 2.4, that “*Legislation shall be promulgated to provide for the effective control of nuclear, radiation, radioactive waste and transport safety.*”

4.86. As described, the basis for the regulations covering the safe transport of radioactive material for the French Republic is the Transport Regulations. The new provisions of the Transport Regulations are promulgated in several ministerial orders, as has been described (see Figs 2 and 3). On 1 January 2002, the new provisions arising from the 1996 edition of the Transport Regulations [1] came into full force in the French regulations. They superseded the 1985 edition [6], which had hitherto been applicable.

4.87. Reference [11] states, inter alia, in para. 2.4, that “*This legislation: (1) shall set out objectives for protecting individuals, society and the environment from radiation hazards, both for the present and in the future;...*” With Decree No. 2003-296 of 31 March 2003, on the protection of workers against the dangers of ionizing radiation, and with the implementation of the Transport Regulations for all modes of transport, these objectives are fulfilled in France.

4.88. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (2) shall specify... activities and materials that are included in the scope of the legislation and what is excluded from the requirements of any particular part of*

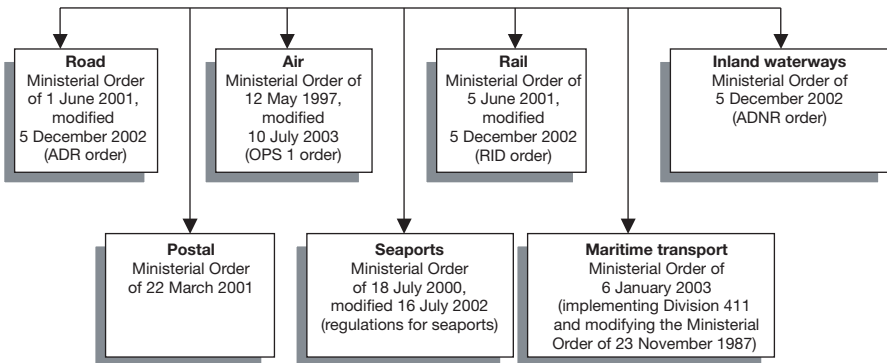


FIG. 2. The statutory authority in France that underlies the implementation of the requirements of the Transport Regulations.

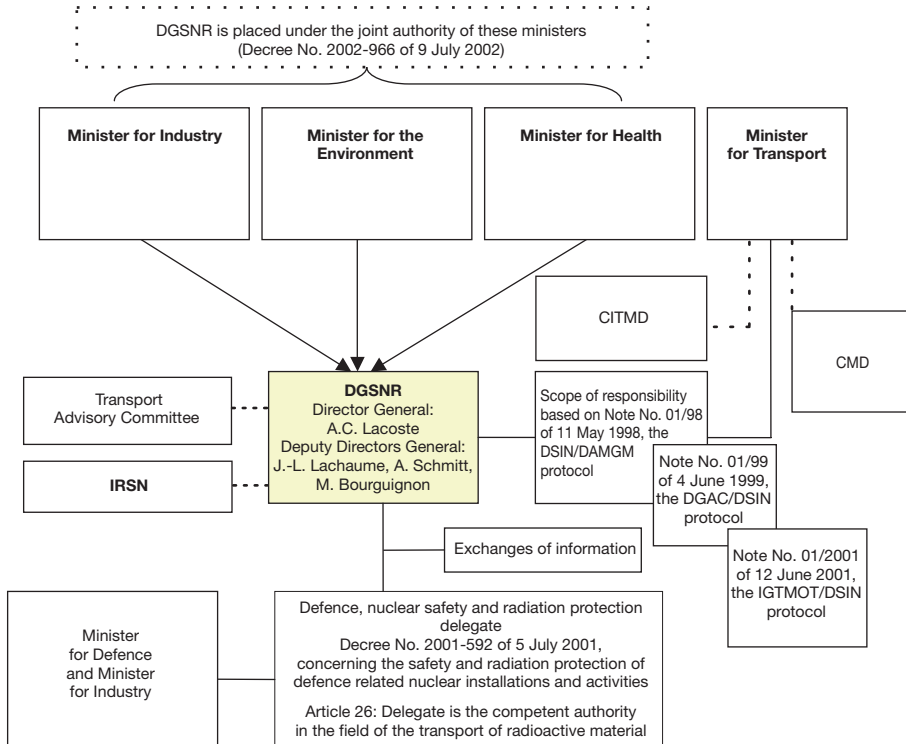


FIG. 3. The authorities and legal undertakings in France for the transport of radioactive material.

the legislation;...” Owing to the implementation of the Transport Regulations, both the activities and the material are specified in several legislative acts.

4.89. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (3) shall establish authorization and other processes (such as notification and exemption), with account taken of the potential magnitude and nature of the hazard associated with the facility or activity, and shall specify the steps of the processes;...*” Decree No. 2002-255 of 22 February 2002, which modifies Decree No. 93-1272 of 1 December 1993 and created the DGSNR, states in Article 2 III, inter alia, that the DGSNR is, within its scope of competence, responsible for:

- (a) Preparing and implementing all steps concerning the safety of BNIs, in particular by drafting the corresponding technical regulations and monitoring application thereof.

- (b) Preparing and implementing all steps concerning the safe transport of radioactive and fissile material for civilian use, in particular and jointly with the services of the Minister for Transport, by drafting the corresponding technical regulations and monitoring application thereof.
- (c) Preparing and implementing, jointly with the other competent administrations, all steps to prevent or minimize the health risks involved in exposure to ionizing radiation, in particular by drafting the technical regulations concerning radiation protection, except for those concerning the protection of workers against ionizing radiation, and by monitoring application thereof.
- (d) Organizing safety inspections of BNIs and, together with the competent services of the Minister for Transport, of the transport of radioactive and fissile material for civilian use.
- (e) Without prejudice to the inspections stipulated in the labour code and the environment code, organizing the radiation protection inspections stipulated in the public health code and in Law No. 61-842 of 2 August 1961 and its implementing texts, and for overseeing all inspections aimed at monitoring radiation protection in the industrial, medical and research fields, including by supervising the sources of ionizing radiation used in these fields. The authorization process follows the system described in the Transport Regulations, which is implemented for all modes of transport in the legal system in France. A new energy law is being planned, in which the scope of inspections will be more precisely set out.

4.90. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (7) shall establish a procedure for review of, and appeal against, regulatory decisions (without compromising safety);...*” France has probably the oldest systems of administrative legal procedure of review and appeal against regulatory decisions in Europe. The *Recours pour excès de pouvoir*, which was fixed in a law of 7 and 14 October 1790, gives to the administrative court full control over an administrative decision by the regulatory authority.

4.91. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (9) shall allow for the creation of independent advisory bodies to provide expert opinion to, and for consultation by, the government and regulatory body;...*” With the creation of several independent advisory bodies, for example the CITMD and IRSN, which have, inter alia, the task to provide expert opinion to the Government and the DGSNR, it is obvious that this prerequisite is fulfilled.

4.92. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (11) shall define liabilities in respect of nuclear damage; (12) shall set out the arrangements for provision of financial security in respect of any liabilities;...*” France has signed and ratified the Paris Convention on Third Party Liability. In this convention, and in related laws and decrees, the liability of an operator of a nuclear facility is defined and financial arrangements are set. For an international transport that is not covered by the Paris Convention, the carrier must prove the existence of financial security by producing a certificate issued by the insurer or other financial guarantor providing the equivalent financial guarantee, stating the name of the insurer or guarantor, its address, and the amount, type and duration of the security. This certificate must also indicate the nuclear substances and route covered by the security. For a national transport that is not covered by the term ‘radioactive material’ or by the Paris Convention, a financial security is not a prerequisite. Such transports will be in the scope of the national civil law.

4.93. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (14) shall define what is an offence and the corresponding penalties;...*” Offences and corresponding penalties were defined in Law No. 2002-3 of 3 January 2002, concerning the safety of transport infrastructures and systems, technical enquiries further to perils of the sea, accidents or incidents during land or air transport and the underground storage of natural gas, hydrocarbons and chemical products. Further special offences and their corresponding penalties are fixed in the civil aviation code.

4.94. Reference [11] states, inter alia, in para. 2.4, that “*This legislation... (15) shall implement any obligations under international treaties, conventions or agreements;...*” As described in the section on international treaties, there is no doubt that all the obligations stemming from international treaties concerning the transport of radioactive material are implemented in the legal system of France.

AUTHORITY, RESPONSIBILITIES, FUNCTIONS AND ORGANIZATION

Overview

4.95. Nuclear safety and radiation protection in France is the responsibility of the ASN. The ASN is answerable to three ministers, namely the Minister for Industry, the Minister for the Environment and the Minister for Health (Fig. 4).

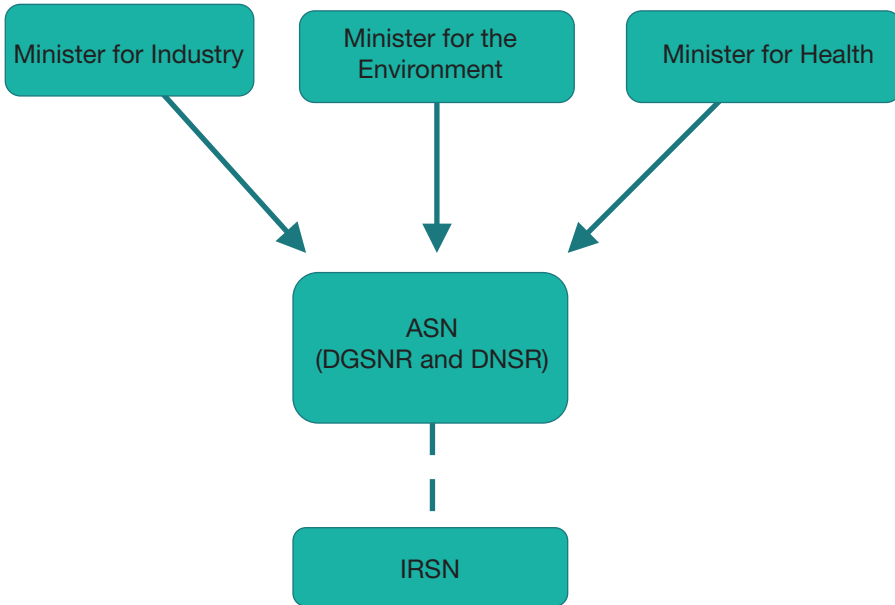


FIG. 4. Organization of nuclear safety and radiation protection in France.

The ASN comprises two official bodies: (1) the DGSNR; and (2) the Division for Nuclear Safety and Radiation Protection (DNSR) within the DRIRE. The declared main missions of the ASN are:

- (a) The development of regulations and the control of their application;
- (b) The management of the authorization process;
- (c) The organization and management of inspections;
- (d) Participation in emergency preparedness;
- (e) The provision of information to the public.

4.96. Through the legal instruments described in the legislative and governmental responsibilities section of this report, it has been confirmed that, when considering radiation protection, the ASN reports to the Ministry of Health. For nuclear safety and for the regulation and supervision of the safe transport of radioactive material in France, the ASN responds to the Ministry of Industry and the Ministry of Environment.

4.97. The principal official body in France that serves as the competent authority for the safe transport of radioactive material is the DGSNR, and its authority is established in Decree No. 2002-255 of 22 February 2002. The

DGSNR is supported by the DSNR within the DRIRE for the regular inspection and compliance related work carried out at licensed sites and certain other places involved with the transport of radioactive material. The DGSNR comprises nine divisions, as shown in Fig. 5, with the SD1 division taking the lead in the transport of radioactive material and acting as the competent authority on behalf of the Director General. This division has a total of seven people, including its head, working on transport. The SD1 division can call on the support of other divisions as necessary, in particularly SD4, which leads for nuclear installation inspection and on matters relating to emergency planning and control, SD5, which has responsibility for fabrication and manufacturing inspections, SD8, which has regulatory responsibility for radioactive sources in industry, and SD9, which leads on activities associated with the medical uses of radioactive material. The DSNR is regionally organized, with 11 regional divisions covering the entire country.

4.98. The overall compliance assurance arrangements seem to be well organized, with the competent authority having a clear understanding of the range and amount of radioactive material transport activities being carried out in France. The DGSNR has well established working arrangements with most of the interfacing government bodies and organizations that have responsibilities in the transport of radioactive material.

4.99. The DGSNR requests and receives technical advice from the IRSN (Fig. 6). The IRSN was established by Decree No. 2002-254 of 22 February 2002 as an independent public State institution with one of its functions declared to be providing technical support for the DGSNR. There is no legal or formal memorandum of understanding or protocol between the DGSNR and IRSN. However, there is a convention with the IRSN for nuclear safety, transport and radiation protection that sets out what will be provided upon demand to the DGSNR by the IRSN in respect of technical assessment and support. This convention is reviewed and amended annually as necessary.

4.100. Within the Plants, Laboratories, Transports and Waste Division of the IRSN sits the Transports and Fuel Cycle Facilities Safety Department; within this department is the Transport Safety Assessment Section. This section, which comprises 15 people, is the main supplier of technical advice to the DGSNR concerning radioactive material transport matters.

4.101. The DGSNR also receives advice from the Standing Group of Experts for Transport, which was established in 1998. This standing group is made up of

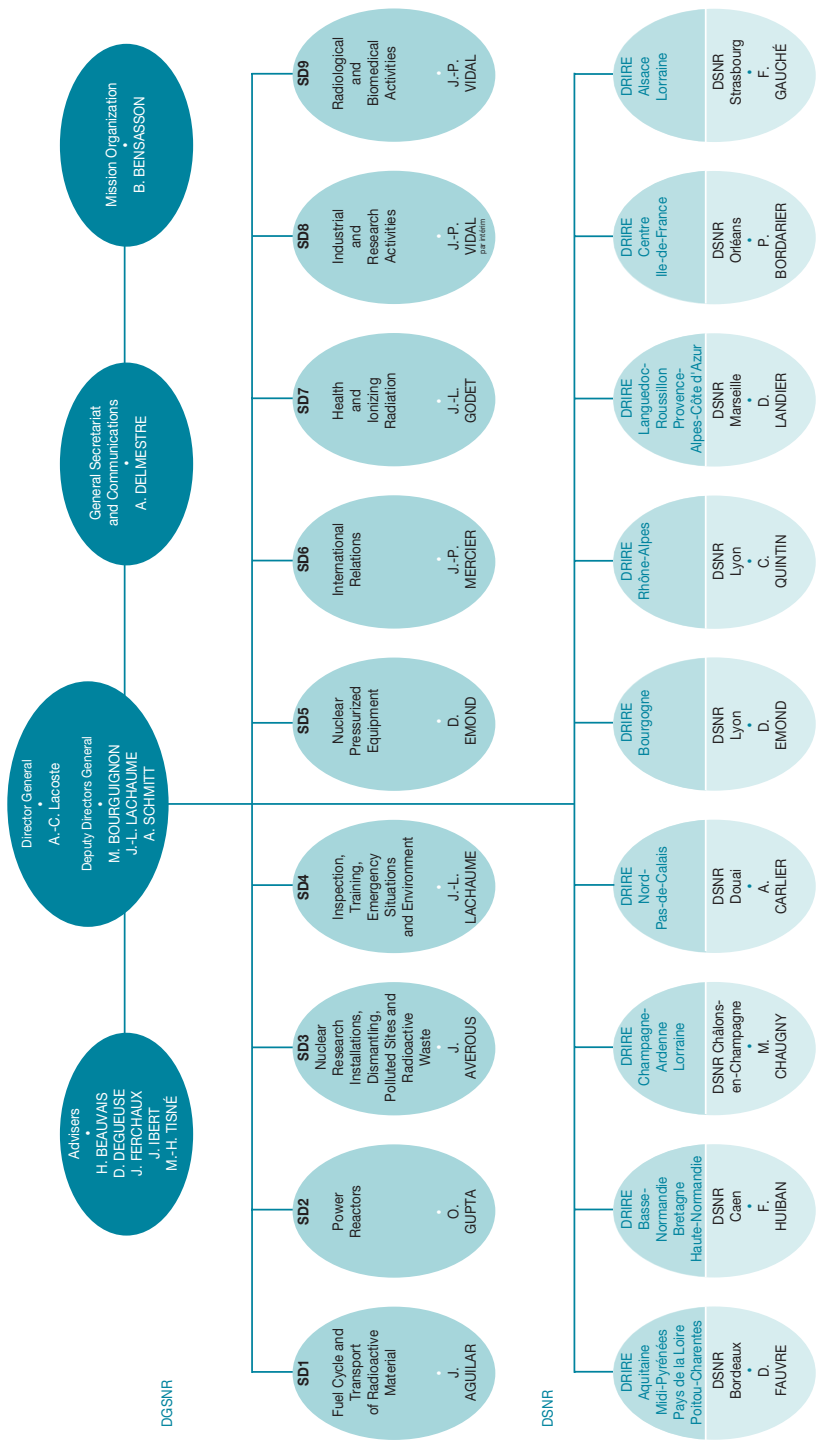


FIG. 5. Organization chart of the supervision of nuclear safety and radiation protection.

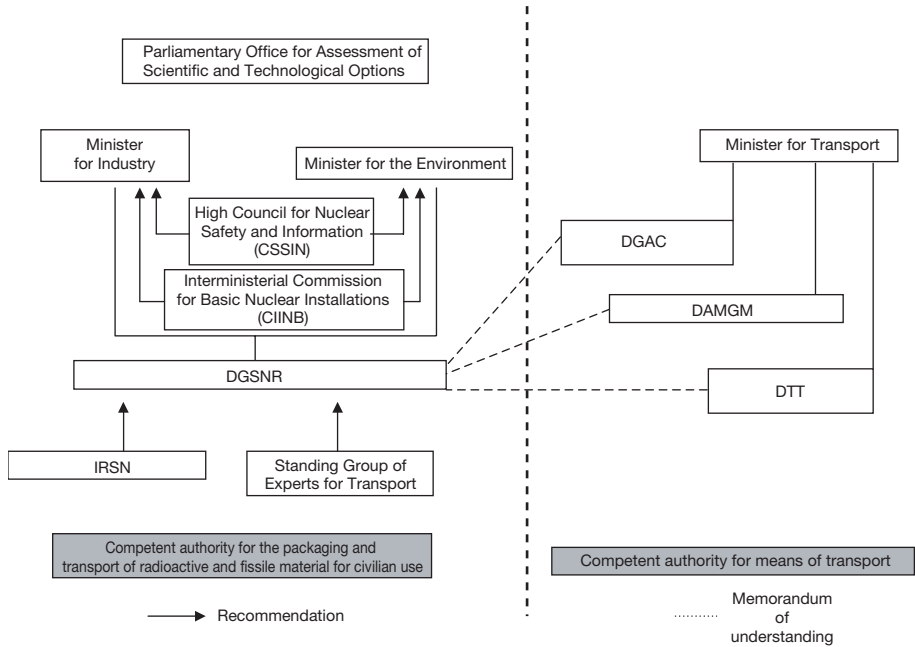


FIG. 6. Nuclear safety and the regulation and supervision of the safe transport of radioactive material in France.

experts from other government departments, industry, academia and some foreign radioactive material transport experts. As with the advice provided by the IRSN, the DGSNR can take note of the advice provided or balance the advice in a discretionary way with its other priorities.

4.102. The DGAC, DAMGM and DTT report to the Minister for Transport for their respective areas of responsibility.

4.103. The DGAC has overall responsibility for implementing and enforcing the relevant legislation. This responsibility is delegated to the Dangerous Goods Department within the Operations Division of the Service for Aviation Training and Technical Information (SFACT). Within the DGAC are a total of 26 inspectors to address all aspects of dangerous goods, including radioactive material, transport by air.

4.104. The DTT has overall responsibility for the transport of dangerous goods by road, rail and inland waterways, and the implementation and enforcement of the relevant legislation. The DTT has specific responsibilities for all classes

of dangerous goods except radioactive material for civilian use (Class 7). The DGSNR has, via appropriate ministerial orders, road and rail regulation and enforcement responsibilities for the transport of radioactive material for civilian use (Class 7).

4.105. The DAMGM reports to the Ministry of Transport on matters of ship safety. The DAMGM is supported at the local level by the CSN. The safety of merchant ships relative to the transport of Class 7 material is jointly addressed by the DGSNR and DRIRE, reporting to the Ministry of Industry and the Ministry of Environment. Port safety is the responsibility of the DTMPL, reporting to the Ministry of Transport, with individual port authorities operating at the local level.

4.106. Protocols have been agreed and signed between the DGSNR (under its former name of the DSIN) and the DAMGM (Note No. 01/98 of 11 May 1998, the DSIN/DAMGM protocol), the DGAC (Note No. 01/99 of 4 June 1999, the DGAC/DSIN protocol) and the IGTMO (Note No. 01/2001 of 12 June 2001, the IGTMO/DSIN protocol). These memoranda of understanding appear to work well and provide for effective liaison and cooperation between the respective organizations. It was confirmed that currently there is no protocol between the DGSNR and DTT concerning their respective responsibilities in the transport of radioactive material, although ministerial orders and decisions are jointly or singly signed by the DTT and DGSNR as the need arises.

4.107. The CITMD is presided over by an appointee of the Ministry of Transport and meets once per year. It is intended to bring together all of the responsible governmental organizations concerned with the transport of dangerous goods. It was established by Decree No. 95-1029 of 13 September 1995 and has been subsequently amended by Decree No. 97-1169 and Decree No. 2002-850. This commission has two subcommittees, which meet more frequently and specifically address waivers, licences and agreements, and maritime ports.

4.108. There are also regular separate and collective meetings between the DGSNR and the various interfacing authorities mentioned above that generally contribute to effective communication and understanding between those authorities regarding the safe transport of radioactive material within France.

Findings

4.109. Basis: Ref. [4] states, inter alia, in para. 404, that “*When a compliance assurance programme has been developed and introduced, it should not be considered to be completed. Instead, the compliance assurance programme should be reviewed periodically by the competent authority in the light of regulatory changes and taking into account experience with the users’ performance since the programme was established. While the programme should be updated in a timely fashion when any specific change takes place, it is also desirable that the programme be reviewed periodically in order to ensure that it meets the goals it was designed to achieve.*” The DGSNR, as the competent authority, has a well developed compliance assurance programme, generally commensurate with the size and complexity of the industry of radioactive material transport in France. Most elements of the programme are recognizably in place, although there are some aspects of the compliance assurance programme as mentioned in Ref. [4] that could be improved, given appropriate review, consideration and planning. Areas such as further and/or refresher training for appropriate personnel, improved distribution of information to industry, such as a comprehensive applicant’s guide, and more complete inter-departmental liaison arrangements covering all responsible authorities are examples where improvements to the overall effectiveness of the compliance assurance programme could be made.

Suggestion: It is suggested that a review of the totality of the compliance assurance programme by the DGSNR, as the competent authority, may be beneficial, so as to confirm that all necessary aspects of the compliance assurance programme are in place and are fully effective (e.g. refresher training for both industry and inspectors, distribution of information to industry and more complete interdepartmental liaison).

4.110. Basis: Ref. [4] states, inter alia, in para. 203, that “*More than one organization may be responsible for the regulatory control of transport in a country, depending on the existing regulations, as well as the mode of transport and the type of radioactive material... Where there are several responsible authorities, close co-operation between them is essential, and there should be formal agreements covering the responsibilities of each authority. Each competent authority should establish and maintain liaison with the other governmental and non-governmental organizations having related responsibilities.*” While there are protocols between the former DSIN (now the DGSNR) and the DAMGM, DGAC and IGT MOT, and a convention between the DGSNR and IRSN, there is no formal memorandum of understanding, protocol or other similar defining

document between the DTT and DGSNR. There are important responsibilities that need to be established and confirmed between the DTT and DGSNR regarding the regulation and enforcement of dangerous goods (Class 7) and other classes of dangerous goods. The working arrangements between the DTT and DGSNR that recognize and address their respective responsibilities could be beneficially set out in an appropriate protocol.

Suggestion: It is suggested that a suitable protocol be developed and implemented to recognize the respective responsibilities and the range of separate and joint activities of the DTT and DGSNR relative to the safe transport of dangerous goods, including Class 7, radioactive material.

4.111. Basis: Ref. [4] states, inter alia, in para. 4114, that *“Any system for compliance assurance should include provisions for enforcement. In this context, enforcement means any formal actions by the competent authority against the user of the regulations when cases of violation or non-compliance by that user have been observed. These observations are most often made during routine inspections of the competent authority. A range of enforcement actions may be applied, depending on the safety implications of the circumstances of the non-compliance. Enforcement sanctions should be applied in an appropriate manner and within the legal framework of the individual state. These sanctions could include, for example, the following measures:... (c) Prosecution. In circumstances where non-compliance has occurred and where the above measures are considered inappropriate or have failed to prevent the user from continuing with the non-compliance, the competent authority may wish to initiate legal action against the user; this would be a higher form of sanction.”* In addition, para. 109 of Ref. [4] states, inter alia, that *“Secondly, the competent authority should ensure through a regulatory inspection and enforcement programme that all the regulatory requirements are correctly fulfilled in practice. The competent authority needs to be provided with adequate resources to perform these review, inspection and enforcement activities.”*

4.112. Currently the DGSNR personnel in the SD1 division have established training requirements to equip them to carry out most of their duties. However, these specialists have not received training to enable them to pursue legal enforcement action. It is understood that to date there have not been any cases of prosecution brought by the DGSNR of non-compliant transporters of radioactive material. In order to maintain an effective and fully capable competent authority, the necessary training consistent with the legal requirements prevailing in France needs to be provided to appropriate competent

authority personnel. Such training would significantly improve the likelihood of securing a successful prosecution when necessary.

Suggestion: It is suggested that suitable legal training for appropriate competent authority personnel be provided, in order to significantly contribute to the success of future legal actions pursued by the competent authority.

4.113. Basis: Ref. [4] states, inter alia, in para. 457, that “*The competent authority should have an auditing programme to determine that the quality assurance programmes are implemented and followed correctly. The quality assurance programmes used by designers and manufacturers, and by users of Type B packages and packages containing fissile materials will be of particular interest to the competent authority. However, the competent authority should also ensure by periodic audits that suitable quality assurance programmes are implemented in the transport of other types of packages.*”

4.114. There does not appear to be full auditing of quality assurance programmes by the DGSNR or by its supporting DNSR inspectors. Some aspects of quality control are reviewed during inspections, but a full review against the requirements of a suitable standard such as ISO 9001:2000 or Ref. [5] or Appendix IV of Ref. [2] is not often carried out. In some cases the existence of a certificate of assessment by a third party is the only evidence considered by the DGSNR in confirming that an organization has an adequate quality assurance programme. Such certification, while being a useful indicator of the existence of a quality assurance programme, cannot always be relied upon to ensure that the certified quality assurance programme is fully effective, relative to the safe transport of radioactive material.

Suggestion: It is suggested that the DGSNR review and improve, if necessary, its arrangements for confirming the adequacy and completeness of the quality assurance programmes in use for all phases of the transport of radioactive material.

4.115. Basis: Ref. [11] states, inter alia, in para 5.9, that “*A primary basis for review and assessment is the information submitted by the operator. A thorough review and assessment of the operator’s technical submission shall be performed by the regulatory body in order to determine whether the facility or activity complies with the relevant safety objectives, principles and criteria... (2) the information contained in the operator’s submissions is accurate and sufficient to enable confirmation of compliance with regulatory requirements;...*” Reference [4] states, inter alia, in para. 413, that “*Upon receipt of an application for*

approval, the competent authority should evaluate whether or not all relevant requirements are fulfilled and whether the applicant and other organizations involved are competent and capable to meet in practice the regulatory requirements.” Paragraph 415 states, inter alia, that “For each application, the competent authority should evaluate compliance with the regulatory requirements. On the basis of the results of the evaluation, the shipment or shipments should be accepted or rejected.” Paragraph 419 states, inter alia, that “Appropriate records should be maintained by the competent authority to demonstrate that correct and due consideration was given to each application before the necessary approval was issued.”

4.116. The DGSNR frequently requests technical assistance and advice from the IRSN, particularly with regard to applications from industry for competent authority approval certificates as required by the Transport Regulations. In its request to the IRSN, the DGSNR seeks advice in the context of an assessment of the safety analysis report submitted by the applicant against complete compliance with the relevant aspects of the transport regulations, primarily the 1996 edition of the Transport Regulations [1]. The IRSN conducts an assessment of the safety analysis report against established criteria, based on an overview of the complete safety analysis report, focusing on experience and feedback from previous assessments. The assessment is not focused on demonstration of compliance to the requirements that the IRSN has ever recorded any difficulty with in the past. The IRSN is of the opinion that any non-compliance would, however, be detected during the overall review of the safety analysis report. When presenting its written advice to the DGSNR, the IRSN will often state that it has not found any non-compliances during its assessment. It is not explicitly recorded that the assessment has been carried out against all applicable requirements of the transport regulations. The DGSNR subsequently uses the advice given as the basis for issuing a competent authority approval certificate. The DGSNR can and does consider the technical advice provided upon request from the IRSN before issuing certificates of approval. However, on certain occasions and when there are differences of opinion, the DGSNR can issue certificates of approval. When issuing such certificates of approval, the DGSNR records the decision taken and the basis for taking such a decision.

Recommendation: It is recommended that the DGSNR’s convention with the IRSN for nuclear safety, transport and radiation protection should be reviewed, and an additional specification should be developed; this specification should

clarify and record the current understanding of the completeness and recording of transport related assessment work carried out on the DGSNR's behalf.

4.117. Basis: The 1996 edition of the Transport Regulations [1] states, in para. 311, that “*The competent authority is responsible for assuring compliance with these Regulations. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, special form radioactive material and low dispersible radioactive material, and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of these Regulations are being met in practice.*” Reference [4] states, in para. 441, that “*The compliance assurance programme should also cover the design, manufacture and use of packages and the maintenance of packagings that do not require competent authority approval.*”

4.118. Currently, the DGSNR has no systematic means within its compliance assurance programme to consider the compliance of Type A and IP packages, for example relative to the regulatory requirements of the 1996 edition of the Transport Regulations [1]. Some recent ad hoc requests for technical assessment by the IRSN of Type A package designs have been initiated by the DGSNR, and such advice has been forthcoming. However, a consistent programme of review, to confirm package design, manufacture and use has not yet been formulated.

Recommendation: It is recommended that the DGSNR should consider what an appropriate review programme for non-competent authority approved package design, manufacture and use would consist of, and how such a programme could be incorporated within its compliance programme.

AUTHORIZATION PROCESS

Overview

4.119. When transporting radioactive material, the safety of transport personnel, the general public, property and the environment can only be ensured if the requirements of the transport regulations are complied with. Although these regulations authorize several cases in which transport can be made without the involvement of the competent authority or without the approval by the competent authority of the package design, a key function of the competent authority is the conduct of a systematic programme for issuing

documents that approve the transport of radioactive material. Examples of these approval documents, often referred to as certificates of approval, include special form radioactive material approvals, design approvals for packages containing fissile material, Type B(U) and Type B(M) package design approvals, shipment approvals and special arrangement approvals.

4.120. A review of the information from the DGSNR has confirmed that the responsibility for issuing authorizations in France rests with the DGSNR. For example, according to Article 36 of the Ministerial Order for ADR (ADR order), the DGSNR acts as the competent authority to issue approvals for:

- (a) Radioactive material in special form;
- (b) Low dispersible radioactive material;
- (c) All packages containing fissile material;
- (d) Packages containing 0.1 kg or more of uranium hexafluoride;
- (e) Type B(U), Type B(M) and Type C packages;
- (f) Special arrangements;
- (g) Certain shipments;
- (h) Unlisted A_1 and A_2 values.

These types of approval are in compliance with the 1996 edition of the Transport Regulations [1]. It is further stated in Article 36 that the IRSN supports the DGSNR in this activity. Good record keeping of approval certificates and supporting documents exists. Other authorization processes as stated above regarding the safe transport of radioactive material are not required.

Findings

4.121. Basis: The DGSNR annual report for 2002, on page 236, and the statistical data of the DGSNR presentation on organization of the supervision of nuclear safety and radiation protection, March 2004, show that in the past six years the number of special arrangements is relatively high in comparison with the number of approvals of package designs. The statistics for 2003 indicate a decrease in the issuing of special arrangement certificates. Paragraph 312.2 of Ref. [2] stresses the short term interest of the application of special arrangements. The 1996 edition of the Transport Regulations [1] requires, inter alia, in para. 825(a), that “*A statement of the respects in which, and of the reasons why, the consignment cannot be made in full accordance with the applicable requirements;...*” has to be provided by the applicant and has subsequently to be checked by the competent authority.

Suggestion: It is suggested to continue with the efforts to minimize the application of special arrangement approvals, as indicated by the statistical data for 2003, and to take appropriate actions in order that fully approved or validated package designs are used.

4.122. Basis: According to para. 819 of the 1996 edition of the Transport Regulations [1], the competent authority shall be informed of the serial number of each packaging manufactured to a design approved under paras 806, 809, 812, 816 and 817. The competent authority should, consistent with para. 311, maintain a register of such serial numbers. The DGSNR goes beyond this and has implemented a comprehensive database that registers and updates annually all users and owners of approved package designs in France. Furthermore, a process has been started by the DGSNR that requests information from all known users in France on package designs that are used and that do not require competent authority approval; this is being done with the aim of developing a database for planned inspection activities on these package designs.

Good practice: The DGSNR–IRSN register of serial numbers of approved package designs provides a comprehensive and annually updated database for all users and owners of approved package designs in France. It goes beyond the requirements of para. 819 of the 1996 edition of the Transport Regulations by providing more information, and is very useful for the preparation of inspections. In this regard the development of a database on package designs not requiring competent authority approval is also considered to be good practice.

4.123. Basis: According to para. 829(c) of the 1996 edition of the Transport Regulations “*The revision of [an approval] certificate shall be indicated by parenthetical expression following the identification mark on the certificate... Certificate revision numbers may only be issued by the country issuing the original approval certificate.*” The system of revision of certificates in France does not use revision numbers, but letters and letter combinations, which may be considered to be complicated, in particular for validations of French certificates in foreign countries. A sheet recently attached to the certificate that contains a correspondence list between all applicable revisions and revision letters provides clarification and useful background information.

Good practice: The addition of a revision sheet to the certificates of approval provides useful information and clarification about the current revision status of the certificate and its development since the original issuance.

REVIEW AND ASSESSMENT

Overview

4.124. Although it is the role of the users of the transport regulations, including applicants, to evaluate and ensure compliance with all relevant regulatory documents, the competent authority also has a key responsibility — to review and assess compliance. The regulations stipulate that for the most safety significant transport activities, packages require competent authority approval and package design assessments prior to their use. Furthermore, for certain shipments and special arrangements not only the package designs themselves but specific shipment provisions need pre-approval by the competent authority.

4.125. In France, the DGSNR is the competent authority for all approvals in accordance with the 1996 edition of the Transport Regulations [1] and implements its responsibilities to review and assess package designs and specific shipments. In performing the required review and assessment work, the DGSNR relies on the technical support of the IRSN. There is an agreed working procedure between the DGSNR and IRSN and related correspondence and documentation to start and finish this process.

4.126. A high volume of design approvals is processed annually in France — approximately 100 approvals per year, which includes new designs, extensions and amendments, renewals, validations of approvals issued by other countries and special arrangements. The review and assessment programme covers all fissile and non-fissile radioactive material used in a comprehensive range of industrial, medical and nuclear fuel cycle activities for civilian use. The DGSNR and IRSN staff involved in these review procedures are well trained and qualified in the technical disciplines relevant for reviews. The review experience gained in France is then invested in the form of a substantial participation by this country in the development of international transport requirements and guides. In parallel, the experience gained feeds an active research programme by the IRSN for transport safety and specific inspection activities by the DGSNR.

4.127. The use of package designs approved by France has resulted in an exceptional safety record, both domestically and around the world. There has never been an accident resulting in the loss of material from a package nor injury attributable to the radioactive nature of its contents.

4.128. Review and assessment work for competent authority approvals is carried out in detail by the IRSN. If the IRSN has completed its assessment work, it sends a recommendation letter together with an assessment report and the draft of the certificate to the DGSNR for final consideration. The final decision on an approval is taken by the DGSNR and is documented on a final approval sheet. The DGSNR also has the responsibility to review and assess the safety of package designs not requiring competent authority approval, such as excepted packages, industrial type packages and Type A packages. This is performed by inspection and with the support of the IRSN as needed.

4.129. The application procedure for the applicant is supported in such a way that an experience feedback document is sent to the known applicants about every two years by the DGSNR. This document contains a list of technical safety problems that were identified by the IRSN during previous assessment work on Type B package designs, package designs for fissile material and special form material designs. This experience feedback document is updated continuously by the IRSN. The TranSAS team reviewed the feedback document and found it to provide outstanding technical guidance for applicants on key compliance review topics. Use of this document by applicants should result in a more effective and efficient review and assessment process, and the document demonstrates the commitment of the IRSN and DGSNR to continuous improvement.

4.130. Within the IRSN, working procedures are established for review and assessment of application documents. The review and assessment work is performed according to BEST/MM/EXP-01, 24-02-2004, for the assessment process, according to EASE/PRO No. 4, Rev.0, for the pre-review procedure and according to EASE/Pro-05, Rev.0, and SSTR/00-1474 ind.0 for the assessment procedures. These documents contain: (a) a checklist of the presence in the safety report of justifications for the required package safety performances and the issues in the experience feedback document; and (2) procedures for using technical support from the specialized criticality group within the IRSN and for documentation and record keeping of the results of the review and assessment process.

Findings

4.131. Basis: The 1996 edition of the Transport Regulations [1] states, in para. 808, that “*The competent authority shall establish an approval certificate stating that the approved design meets the requirements for Type B(U) or Type C packages and shall attribute to that design an identification mark.*” Paragraphs 804, 805(c), 811 and 814 of the 1996 edition of the Transport Regulations [1] contain provisions that address specifically other types of approvals. Reference [11] states, inter alia, in para. 5.4, that “*The regulatory body shall issue guidance on the format and content of documents to be submitted by the operator in support of applications for authorization.*” Reference [11] states, inter alia, in para. 5.9, that “*A primary basis for review and assessment is the information submitted by the operator. A thorough review and assessment of the operator’s technical submission shall be performed by the regulatory body in order to determine whether the facility or activity complies with the relevant safety objectives, principles and criteria.*” Reference [2] states, inter alia, in para. 802.4, that “*The relationship between the competent authority and the applicant has to be clearly understood. It is the applicant’s responsibility to ‘make the case’ to demonstrate compliance with the applicable requirements. The competent authority’s responsibility is to judge whether or not the information submitted adequately demonstrates such compliance.*” Reference [4] states, inter alia, in para. 477, that “*It is the responsibility of the competent authority to determine that the designs of packages are assessed against all the relevant parts of the Regulations.*” Reference [4] states, in para. 475, that “*Design is defined in the Regulations as ‘the description of special form radioactive material, package, or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation’. Thus, ‘design’ should be considered to include much more than the drawings/specifications that enable the packaging to be manufactured. The ‘design’ to be assessed includes the supporting reports and documents which substantiate or verify statements or assumptions made by the designer. It also includes all relevant package preparation arrangements, maintenance and servicing instructions/provisions and any approved repair or modification procedures.*”

4.132. The IRSN performs its review and assessment work on the basis of an overview of the complete safety analysis report and focuses on the experience feedback document and the pre-review procedure and checklist. This checklist itself highlights the essential paras of the 1996 edition of the Transport Regulations [1] to demonstrate safety under normal and accident conditions. On page 6 of the above mentioned assessment document EASE/Pro-05, Rev.0,

of the IRSN it is stated that *“The appraisals are not exhaustive and do not consist in systematically repeating numerical assessment to confirm the results presented by the applicant.”* On the same page it also states that *“the technical areas are listed on which the analysis focuses on more specially.”* In the preamble of the IRSN document SSTR/00-1474 ind.0 it is stated that *“The IRSN is responsible for checking the conformity of the package concepts on behalf of the competent authority.”*

4.133. The IRSN checklist is not complete in such a way that it reflects explicitly all applicable paras of the 1996 edition of the Transport Regulations [1] for the package design to be approved. The assessment does not focus on demonstrations of compliance with requirements for which the IRSN has not noted difficulty in the past. The IRSN takes into account that the applicant is demonstrating in its safety analysis report compliance with all applicable requirements in detail. An example presented by the IRSN showed that the applicant had attached a list of all applicable requirements to the safety analysis report, including references to the appropriate chapters of the safety analysis report. However, there is currently no requirement in France for the applicant to provide such a complete list to demonstrate compliance with all the applicable requirements of paras 606–682 of the 1996 edition of the Transport Regulations [1].

4.134. Regarding the review and assessment of safety files for shipment approvals and special arrangements, the IRSN explained that it applied the same procedure as for package design approvals. A checklist or experience feedback document specific to the applicable requirements of shipment approvals and special arrangements in accordance with the 1996 edition of the Transport Regulations [1] is not available.

Recommendation: It is recommended that the DGSNR, supported by the IRSN, modify the review and assessment procedures in such a way that demonstration of compliance with each applicable requirement of the 1996 edition of the Transport Regulations is documented explicitly for design approvals, shipment approvals and special arrangements.

Suggestion: It is suggested to develop and publish an application guide for design approvals, shipment approvals and special arrangements, in addition to the experience feedback document, to describe a complete and consistent format to reflect all applicable requirements of the 1996 edition of the Transport

Regulations for such applications for approvals and to provide guidance on the contents of the corresponding safety analysis reports.

4.135. Basis: Ref. [4] states, in para. 433, that “*When assessing safety the competent authority should, as appropriate, make independent assessments to verify the results presented in the application. In making such assessments, the competent authority should ensure that proper codes and models have been used, that they have been adequately verified by appropriate experiments and that all input data have been defined conservatively. Depending on the package type, expertise in different areas is needed. The evaluation should also cover specifically the applicant’s or designer’s provisions for manufacture, servicing, maintenance and use of the package.*” Reference [4] states more specifically, in para. 480(b), that “*The assessor should examine in detail the shielding features and radiation safety aspects of the design; he should satisfy himself that with regard to the maximum proposed radioactive contents the design of the finished package will provide sufficient radiological shielding in all dimensional planes to comply with the relevant Regulations and the ALARA philosophy. The assessor should satisfy himself that the material used for shielding is physically and chemically stable and is not likely to move or deteriorate during transport, since this would decrease the degree of shielding provided by the packagings. Particular care should be taken to verify the absence of any ‘shine paths’ through package closures and ports used for package testing. The need to decontaminate the packagings in use should also be considered, and the creation of contamination traps or the use of materials that are difficult to decontaminate should be avoided in the design.*” It follows in para. 480(h) that “*The assessor should examine the in-service handling, inspection, maintenance and servicing instructions in sufficient depth to confirm that all such instructions/specifications are accurate and adequate, and that they will allow the original designer’s intentions for the package to be upheld and not to be compromised. These ‘in-service’ instructions/specifications should also provide for authorized repairs/modifications of the packaging, and the repair/modification procedures must be agreed to or approved by the competent authority’s assessor. (The assessor should also bear in mind that such package instructions may well have to be followed by persons and organizations who, as consignees, may be unfamiliar with the package and its design principles).*”

4.136. The IRSN has its own resources to perform assessment work in the different areas of package design. The discussion with the IRSN showed that those capabilities seem not to be applied equally. In particular, for the shielding assessment work it was understood that comprehensive, independent shielding calculations are not performed, whereas in other fields, such as criticality safety

and mechanical and thermal stability, more advanced computer codes may be used and comprehensive, independent calculations may be performed.

Suggestion: It is suggested that the IRSN review the capability and the application of the available computer codes, and staff training on these codes, for different areas of package design assessment, to ensure a comparable standard and quality level of safety demonstration in all areas, when needed.

4.137. Quality assurance requirements are assessed by the IRSN only in principle, because the detailed instructions and specifications, such as those for manufacture, use and maintenance, are subject to later inspection by the DGSNR. This inspection is not guaranteed to be performed before the first use of a new package design that has been approved, so non-compliances may not be found in a timely manner.

Suggestion: It is suggested to review the current assessment practice of looking at quality assurance requirements in a general way during the approval procedure of the package design, in relation to looking at them in detail through later inspection procedures.

4.138. Any change or modification to the approved design during use that is not considered to be safety related (no change to the safety analysis report and the drawings are as presented in the safety analysis report) by the certificate holder is allowed without notification to the IRSN or DGSNR. Such changes may be subject to later inspection but there is no systematic procedure in place for notifying the IRSN or DGSNR of such minor changes.

Suggestion: It is suggested to review the practice of handling design changes and modifications in such a way that, independent of the decision taken by the certificate holder on classifying the change being safety or non-safety related and independent of inspection activities, a complete and actual status of each packaging as used is maintained by the certificate holder and is available to the competent authority upon request.

INSPECTION AND ENFORCEMENT

Overview

4.139. Consistent with the Transport Regulations and supporting documents, competent authorities perform audits and inspections as part of compliance

assurance programmes. Inspections help monitor the degree of compliance with the regulations by users, and are structured to produce evidence of compliance. Inspections are also necessary to identify instances of non-compliance that may call for corrective action by the user or enforcement action by the competent authority. Enforcement is used as a deterrent to emphasize the importance of compliance with the requirements, and to encourage prompt identification and prompt, comprehensive correction of non-compliance. The type, severity and timing of the enforcement taken are usually graded commensurate with the safety implications of the non-compliance.

4.140. In France, the DGSNR manages a robust inspection programme, consistent with the large French nuclear programme. The programme includes inspections by DGSNR inspectors, regional inspectors of the DRIRE and technical support for inspections by the IRSN. Inspections are planned on an annual basis along specific themes or areas of emphasis. The DGSNR conducts an average of 60 transport inspections per year, and includes designers, fabricators, maintainers and consignors of transport packages, subcontractors to these groups, as well as inspections of road, rail, air and sea carrier transports. About 700 000 radioactive material packages are transported in France each year, representing close to 4% of the traffic of dangerous goods. The transport inspections represent approximately 10% of all inspections performed at nuclear facilities. Given that the user has the primary responsibility for safety, and that it is not possible to inspect all shipments, the DGSNR programme appropriately focuses on reviewing the programmatic aspects of a sample of users selected each year. Reactive inspections, in response to findings or events, are also conducted as warranted.

4.141. A normal inspection involves one or two days on the site for a two to three person inspection team, with one week for preparation, inspection and documentation. Inspections can be announced or unannounced, and are based upon inspection plans that are tailored to each visit. Inspection reports are documented, forwarded by letter for corrective action if necessary, placed on the DGSNR web site and publicly available. A synthesis of all inspection findings is created by the DGSNR each year, and summaries of the main findings are published in the DGSNR annual report on safety. All inspection findings of non-compliance with the regulations are rated and reported using the International Nuclear Event Scale (INES) system.

4.142. All inspectors complete a formal, written qualification programme that includes training and job experience before their certification as inspectors.

Due in part to high staff turnover rates, there is no formal refresher training programme for transport inspectors. However, the SD1 division of the DGSNR and the DRIRE have initiated a seminar programme to improve communication between inspectors that includes updates on the latest practices and the implications of revisions to the transport regulations. In the context of these seminars, the DGSNR may wish to further consider the possible benefits of periodic refresher training as a means towards maintaining inspector expertise on the latest technologies and industry practices.

4.143. The DGSNR relies on inspections as a primary tool for a wide range of activities:

- (a) Conducting periodic, routine inspections of the users of the transport regulations;
- (b) Following through on residual issues from the review and assessment activities for particular package designs;
- (c) Reviewing the existence of and adequacy of programmatic requirements, including quality assurance programmes, user personnel qualifications and competency, and radiation protection programmes;
- (d) Following up on incidents and events.

4.144. The TranSAS team observed that, in France, some review activities that are accomplished through the inspection programme are more of a component of the review and assessment activities in some other countries. Examples include quality assurance issues, operating and maintenance procedures, radiation protection and shielding design provisions, and design change control processes. With respect to the allocation of resources and responsibilities between inspection activities and review and assessment activities, many strategies can result in effective and complete compliance assurance programmes. As described above in the review and assessment section, the TranSAS appraisal suggested that some review and assessment practices be reviewed with the aim of ensuring an efficient and effective use of resources.

4.145. The DGSNR has developed, documented and implemented cooperative inspection protocols for the air and sea transport of radioactive material with the DGAC (Note No. 01/99 of 4 June 1999, the DGAC/DSIN protocol) and the DAMGM (Note No. 01/98 of 11 May 1998, the DSIN/DAMGM protocol) regarding checks of packages and radiation protection. The protocol between the DSIN and the IGMOT (Note No. 01/2001 of 12 June 2001), on labour regulations during transport, specifies concerted and or joint actions for checks on the application of the rules for radiation protection

during transport. However, only a limited number of joint inspections have been conducted under these protocols in recent years.

4.146. The DGSNR does not have a protocol with the DTT to address the roles and responsibilities for inspection for radioactive safety. DGSNR staff explained that an agreement was unnecessary, as road and rail operations that were subject to the DTT did not have facilities that could be inspected, such as airports or seaports, as were covered by the agreements between the DGAC and the DAMGM. For example, Areva owns the Valognes intermodal facility, and the DGSNR has full access to it. In addition, the DGSNR has made arrangements on a case by case basis with the SNCF (the French rail authority) for certain rail inspections.

4.147. With respect to enforcement for any identified non-conformances, the DGSNR requires written responses detailing corrective actions for all inspection findings. The DGSNR also has the authority to issue prosecution actions, with potential monetary penalties of up to €30 000 (in accordance with Law No. 2002-3 of 3 January 2002), and to require actions up to and including the cessation of transport activities. The DGSNR was able to provide two examples that demonstrated that it had recently exercised this authority: the first event involved contamination with a spent fuel cask in 1997 that affected international commerce, the second involved a non-compliance by a radiography consignor on 9 April 2002. DGSNR inspectors do not have the authority to take on the spot enforcement actions while they are carrying out their inspection duties.

Findings

4.148. Basis: Ref. [4] states, inter alia, in para. 462, that *“A major feature of any competent authority’s compliance assurance programme will be the performance of inspections of the transport operations, since these inspections can be used to monitor both the adequacy of the various regulations and the degree of compliance with those regulations by the user, as well as to produce evidence of compliance.”* Paragraph 463 states that *“Transport inspections should be carried out by the competent authority or by its nominated agent. In some countries such inspections are carried out on a modal basis, by examining all types of dangerous goods, with the aviation authority inspecting air shipments, the maritime department inspecting marine shipments, etc. The competent authority acts as an adviser and co-ordinator. It is important that all types and aspects of transport, consistent with the size of the radioactive material transport industry within a country, are periodically inspected.”*

4.149. The decree creating the DGSNR, Decree No. 2002-255 of 22 February 2002, which modifies Decree No. 93-1272 of 1 December 1993, provides the DGSNR with a firm legal basis for organizing safety inspections of BNIs and, together with the competent services of the Minister for Transport, of the transport of radioactive and fissile material for civilian use. The DGSNR is the competent authority for the transport of Class 7 (radioactive or fissile) material, regardless of the mode of transport. The SD1 division of the DGSNR has a centralized inspection programme that covers all aspects of transport activities, and has mechanisms in place to call on specialized inspection expertise from other DGSNR subdirectorates and other transport agencies (the DGAC and DAMGM), as well as on technical assistance from the IRSN. For example, pressure vessel experts from the SD5 division are called upon to inspect transport fabrication activities. This has the practical effect of increasing the overall consistency of inspection findings, focusing resources commensurate with the risks involved, and calling on the right level of expertise when specific problems are encountered.

Good practice: France has consolidated competent authority responsibilities for radioactive material transport into a single entity, the DGSNR, and has put into place interagency agreements, where necessary, to jointly define the roles and responsibilities for inspection. This exceeds IAEA transport guidance and results in increased effectiveness and efficiency of the French inspection programme and facilitates the allocation of resources around safety issues.

4.150. Basis: Currently, when they carry out inspections on behalf of the DGSNR, the local DNSR inspectors working under the DRIRE are not able to serve legal enforcement notices or letters immediately. The information and inspector's recommendations must be passed on to the DGSNR, which will then issue an appropriate legal enforcement notice or letter to the non-compliant organization. Consequently, there can be a significant delay between the detection of a non-compliant, safety related situation, and the issuing of a legal instrument to prevent its continuance. In practice, however, it appears that in cases of real urgency, telephone communication between local inspectors and the DGSNR can expedite the provision of appropriate legal instruments. Indeed, when the non-compliant organization is verbally informed of the need to comply with an inspector's opinion, it is usual for the non-compliant organization to comply with this opinion before receiving the legal enforcement notice or letter.

Suggestion: It is suggested that the enforcement powers of local DNSR inspectors be reviewed, to consider legislation enabling them to directly serve a legal

notice that would immediately prevent a non-compliant or unsafe process from continuing.

DEVELOPMENT OF REGULATIONS AND GUIDES

Overview

4.151. In France the revision and development of regulations for the transport of radioactive material is the responsibility of the DGSNR. The DGSNR is designated as the competent authority for the safe transport of radioactive and fissile material by Article 2 of Decree No. 2002-255 of 22 February 2002 (this decree amends Article 17, Subarticle III, Section 2, of Decree No. 93-1272 of 1 December 1993). The DGSNR must work jointly with the Minister for Transport and specifically the modal administrations of the Ministry of Transport in the preparation of these regulations. Table 17 shows the authorities in France charged with developing the regulations for the safe transport of radioactive material.

4.152. Regulations adopted in France must be published in the Official Journal, the official publication for all government business. Ministries do not have a specific budget for publishing — all costs are borne by the State. The General Secretariat of Government establishes the priority for publication in the Official Journal; no plans or schedules are therefore necessary. Usually within two days of a ministerial order being signed by delegation of signature it will be officially published and take effect immediately, unless otherwise indicated in the order.

4.153. Generally, the adoption of regulations for the safe transport of radioactive material is accomplished through the publication in the Official Journal of ministerial orders that may be signed by delegation of specifically named individuals. If there is a change in the responsible minister or in the person who has specifically been assigned the delegated signature, the delegation of signature is no longer valid and a new delegation must be issued. This assignment of a new delegation may take upwards of three weeks and could delay the implementation of safety requirements. However, during this period of administrative transition, the responsible minister may sign ministerial orders.

TABLE 17. AUTHORITIES IN FRANCE CHARGED WITH DEVELOPING THE REGULATIONS AND GUIDES FOR TRANSPORT

Activity	Competent authority	Office in charge of developing regulations	Technical adviser	Office in charge of applying the regulations
Packaging: transport of radioactive and fissile material for civilian use	Ministry for Industry Ministry for the Environment	DGSNR ^a	IRSN ^b	DGSNR ^a
Means of transport by road (ADR requirements)	Ministry for Industry Ministry for the Environment Ministry for Transport	DTT ^c	CITMD ^d	DTT ^e
Means of transport by rail (RID requirements)	Ministry for Industry Ministry for the Environment Ministry for Transport	DTT ^f	CITMD ^d	DTT ^e
Means of transport by waterways (ADNR requirements)	Ministry for Industry Ministry for the Environment Ministry for Transport	DTT ^f	CITMD ^d	DTT ^f
Means of transport by sea	Ministry for Industry Ministry for the Environment Ministry for Transport	DAMGM ^g	CMD ^h	DAMGM ^g
Means of transport by air	Ministry for Civil Aviation Ministry for Transport	DGAC ⁱ	CITMD ^d	SFACT (Dangerous Goods Department)

TABLE 17. AUTHORITIES IN FRANCE CHARGED WITH DEVELOPING THE REGULATIONS AND GUIDES FOR TRANSPORT (cont.)

Activity	Competent authority	Office in charge of developing regulations	Technical advisor	Office in charge of applying the regulations
By post ⁱ	Ministry for Industry Ministry for the Environment	DSIN ^k DIGITIP ^k	CITMD ^d	DSIN ^k DIGITIP ^k

Statutory authority:

^a Decree No. 2002-255 of 22 February 2002;

^b Law No. 398 of 9 May 2001;

^c Ministerial Order of 5 December 2002;

^d Decree No. 2002-850 of 3 May 2002;

^e Ministerial Order of 5 December 2002;

^f Ministerial Order of 5 December 2002;

^g Law No. 83-581 of 5 July 1983;

^h Decree No. 84-810 of 30 August 1984;

ⁱ Ministerial Order of 12 May 1997;

^j The international transport of radioactive material by post is prohibited (Article 1-2 of the Ministerial Order of 22 March 2001);

^k Ministerial Order of 22 March 2001.

Findings

4.154. Basis: The Transport Regulations are in force in France through the adoption by France of European and international modal regulations. The regulations for air and sea are mandatory upon all member States of the ICAO and IMO, respectively. For States in Europe, the UNECE Inland Transport Committee develops dangerous goods regulations, including requirements derived from the Transport Regulations for road (the ADR requirements) [17], rail (the RID requirements) [18] and inland waterways (the ADNR requirements) [19]. France, as a member of the EU, is bound by European Commission directives to abide by the ADR and RID requirements. Through three separate ministerial orders (all dated 5 December 2002), the DGSNR adopted these European directives, which came into effect on 1 January 2003.

4.155. By way of the Ministerial Order of 6 January 2003, France has adopted the IMDG Code.

4.156. A protocol dated 4 June 1999 between the Minister for Industry and the Minister for the Environment (the DGAC/DSIN protocol) identifies the tasks for the drafting and implementation of safety policy concerning the air transport of radioactive material and fissile material for civilian use.

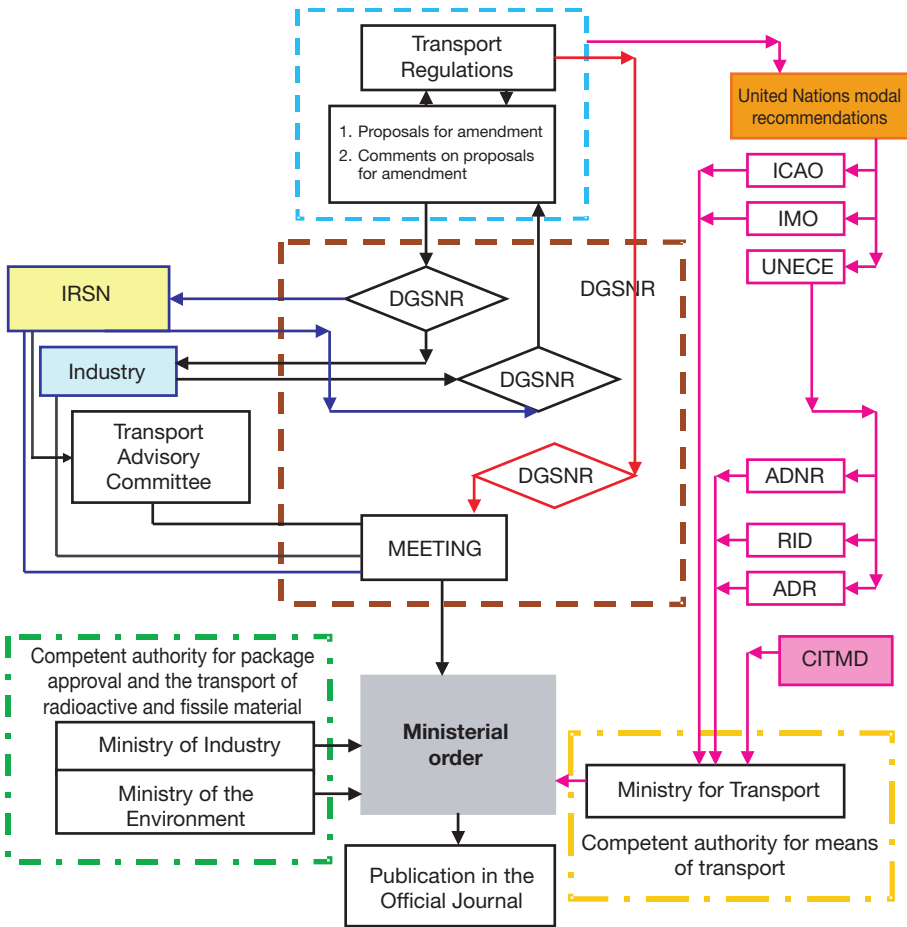
4.157. The competent authority in France for the transport of radioactive material participates throughout the IAEA regulatory review process. The DGSNR formally receives notification of the initiation of the review process through a letter sent by the IAEA to the Ministry of Foreign Affairs (through the Permanent Mission of France in Vienna) requesting proposals for amendment to the Transport Regulations. At the beginning of the IAEA two year review cycle, the DGSNR solicits other governmental agencies and interested organizations for proposals for amendment. It considers the views of these interested parties in developing a French position on these proposals for amendment to the Transport Regulations. Representatives from the DGSNR and technical experts from the IRSN attend the review panel meetings in which the proposals for amendment are reviewed and endorsed during the two year review cycle. As the competent authority for the Transport Regulations, the DGSNR, often accompanied by technical experts from the IRSN, attends the IAEA Transport Safety Standards Committee (TRANSSC), at which time the Transport Regulations are approved and forwarded to other bodies within the IAEA for final approval and publication.

4.158. The DGSNR and the Department of Transport have created two formal consultative bodies to assist in the revision and development of the Transport Regulations and other modal regulations: the Transport Advisory Committee and the CITMD. In a decision dated 1 December 1998, the French Government, through a formal agreement signed by the Minister for Industry and the Minister for the Environment, created an advisory committee responsible for examining the technical aspects of the safe transport of radioactive and fissile material for civilian use. Membership of this Transport Advisory Committee is specified as a three year term of 16 experts from technical and modal administrations (i.e. the DGAC, DAMGM and IRSN) in France, two experts from industry in France and four foreign experts in the field of the transport of radioactive material. The committee meets approximately twice per year to facilitate effective liaison and communication and to provide opinions that may be accompanied by proposals or recommendations to the DGSNR.

4.159. The process in France that leads to the implementation of regulations for the safe transport of radioactive material into national regulations is represented in Fig. 7.

Findings

4.160. Basis: The IAEA issued Ref. [11] to establish the basic requirements for the legal and governmental infrastructure for nuclear, radiation, radioactive waste and transport safety. Reference [11] states, inter alia, in para. 5.28, that “In developing regulations and guides, the regulatory body shall take into



The ministerial order takes effect within two days of its signature, unless otherwise indicated

FIG. 7. The implementation in France of the regulations for the transport of radioactive material.

consideration comments from interested parties and the feedback of experience.” The Transport Advisory Committee is established by a decision of the relevant ministries.

4.161. Decree No. 95-1029 of 13 September 1995 created the CITMD. This advisory body is composed of 49 representatives from administrations (including the DGSNR and the modal authorities) and experts in the transport and production industries. The CITMD meets once per year, with its subcommittees meeting more frequently. Its purpose is to provide advice to the DTT on the transport of dangerous goods, including radioactive material.

4.162. Basis: Ref. [11] states, inter alia, in para. 4.9, that *“The government or the regulatory body may choose to give formal structure to the processes by which expert opinion and advice are provided to the regulatory body; the need or otherwise for such formal advisory bodies is determined by many factors. When the establishment of advisory bodies is considered necessary, on a temporary or permanent basis, such bodies shall give independent advice.”*

4.163. Both the Transport Advisory Committee and the CITMD provide independent advice to the DGSNR and the Ministry of Transport.

4.164. The French competent authority has instituted an internal system for scrutiny and assessment to confirm the adequacy of any regulation or guide prior to its implementation. There is an advisory committee as well as an inter-ministerial committee for the safe transport of radioactive material. The DGSNR also seeks technical advice from organizations such as expert groups and the IRSN.

Guidance material

Overview

4.165. Guidance material has been issued to inspectors in monitoring compliance with the Transport Regulations. As part of a European directive on radiation protection programmes, industries involved with ionizing radiation require a radiation protection programme. In this case, these requirements are more restrictive than those for the Transport Regulations. However, in certain aspects of the transport field, there often is no radiation protection programme in place.

4.166. Basis: Ref. [4] states, inter alia, in para. 306, that “*Guides and standards may be circulated by the competent authority in order to provide detailed and specific information on the acceptable technical and administrative approaches to satisfying the safety requirements.*”

4.167. Guidance material on radiation protection programmes for transport purposes has been prepared by the National Radiological Protection Board (NRPB), Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) and the IRSN. This guidance material is currently distributed upon request to applicants.

Suggestion: It is suggested that the DGSNR post on its web site the available guidance material on radiation protection programmes produced by the NRPB, GRS and IRSN, in order to assist users in complying with the requirements.

EMERGENCY PREPAREDNESS FOR TRANSPORT

Overview

4.168. The legal bases for emergency preparedness and response for incidents involving the transport of radioactive material consist of the following legislation:

- (a) Law No. 87-565 of 22 July 1987, concerning the organization of civil defence, the protection of forests against fire and the prevention of major risks;
- (b) Law No. 96-369 of 3 May 1996, relating to fire and rescue services;
- (c) Decree No. 88-531 of 2 May 1988, organizing the assistance, search and rescue of persons in distress at sea;
- (d) Decree No. 88-622 of 6 May 1988, on emergency plans, implementing Law No. 87-565 of 22 July 1987, concerning the organization of civil defence, the protection of forests against fire and the prevention of major risks;
- (e) Decree No. 89-360 of 2 June 1989, a decree publishing the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, adopted in Vienna on 26 September 1986;
- (f) Decree No. 2000-571 of 26 June 2000, modifying Decree No. 88-622 of 6 May 1988, on emergency plans;

- (g) Decree No. 2001-470 of 28 May 2001, on information for the public, and modifying Decree No. 88-622 of 6 May 1988, on emergency plans;
- (h) Decree No. 2002-367 of 13 March 2002, amending Decree No. 88-622 of 6 May 1988, on emergency plans;
- (i) Decree No. 2002-645 of 23 April 2002, publishing the 1989 International Convention on Salvage, adopted in London on 28 April 1989;
- (j) Permanent Instruction No. 26 from the Prime Minister of 7 September 1989, related to the action required to protect the public in the event of an accident following the transport of radioactive material by sea (NUCMAR plan);
- (k) Circular NOR/INT/E/03/00129/C of 7 November 2003, from the Minister for the Interior, relating to the revision of specialist departmental emergency plans for the transport of nuclear, radioactive and fissile material (PSS-TMR).

4.169. Emergency response arrangements in the event of an accident are defined in special emergency plans for radioactive material transport accidents, in accordance with Decree No. 88-622 of 6 May 1988, implementing Law No. 87-565 of 22 July 1987. These actions are supervised by the DDSC at the Ministry of the Interior, which the ASN assists. In the event of an emergency, the organization of the response consists both of a national and a local response.

4.170. For incidents other than marine incidents at the national level, the DDSC activates an interministerial group called COGIC to advise on the management of radiological risks. In addition, the Minister for Industry, the Minister for Health and the Minister for the Environment are involved.

4.171. The DGSNR is responsible for the control of radiation safety, with the technical assistance of the ISRN. These activities are coordinated from a national emergency response centre at the DGSNR. In addition, there is input from the relevant transport authority, depending on the mode of transport; these authorities include the DAMGM, DGAC and DTT. The DGSNR has signed a memorandum of understanding with the DAMGM, DGAC and IGTMD. The DGSNR also has a representative on the CITMD.

4.172. At the local level, the prefect of the department decides on the necessary countermeasures to protect the public, property and the environment in the event of an emergency. These measures are outlined in a specific intervention plan for off-site emergencies (the PPI). In addition, the operator must have a specific internal emergency plan for on-site emergencies

(the PUI). There is a requirement for a prefect to have a specialized emergency plan for the transport of radioactive material (the PSS-TMR) for a transport incident involving radioactive material. The DDSC/Nuclear Risk Management Aid Committee (MARN) has provided a guidance document to assist in the preparation of this plan, issued in November 2003. This guide also addresses the requirements of para. 309 of the 1996 edition of the Transport Regulations [1]. For example, in the case of uranium hexafluoride packages, the specified exclusion zone in the event of a fire is extended to 1000 m to take account of the chemical toxicity hazard.

4.173. There is also provision for mobilizing expert emergency teams from the ISRN, specialist emergency services personnel of the Mobile Radiological Intervention Cells, as well as expert assistance from consignors, carriers and operators, as described in their own emergency plans, for example the COGEMA Logistics plan relating to the transport of radioactive material (the PUI-T-GEN) and the CIS bio international emergency plan, CSS-01012001, of March 2004.

4.174. For marine incidents, operational responsibility is delegated from the Prime Minister to the Naval Superintendent. The Operational Regional Centres of Monitoring and Rescue (CROSS), including the DAMGM, liaise with various ministries and organizations for the response. Specific details, including responsibilities, communication and public information, types of accident, and actions and recovery, are described in the relevant NUCMAR plan covering territorial waters, for example Plan NUCMAR Manche/Mer du Nord 2003, coordinated by the Prefect for the Channel and the North Sea.

4.175. Full scale emergency exercises involving the national and local response for a transport accident involving radioactive material are carried out annually. The last such exercise was carried out in September 2003. In addition, local emergency plans are exercised routinely. For example, it was verified that the COGEMA Logistics plan (PUI-T-GEN) is exercised annually. The COGEMA Logistics plan comprehensively describes the responsibilities, communication and actions for transport accidents with and without radiological consequences.

4.176. Incident and accident reporting criteria were circulated by the ASN on 7 May 1999 to all consignors. Consignors are required to inform the ASN of any event during transport, whether or not there were radiological consequences. There are several categories of event reported, for example non-conformity of the container and contents with the general regulations or package model approval requirements; package handling events, incidents or accidents during

actual transport; loss of a package; and a flaw in the safety demonstration on which the issuing of an approval certificate was based.

4.177. It was noted that approximately 60 events per year are reported and rated on the INES scale. The DGSNR has an INES officer. Information relating to transport incidents rated at least at Level 1 on the INES scale is published on the DGSNR web site and in the bimonthly publication *Contrôle*. These events are also reported to the IAEA Events in the Transport of Radioactive Material (EVTRAM) database where appropriate.

4.178. In the event that a radioactive source is detected at a metal recycling facility, the local and/or national emergency plan may be invoked as necessary. In addition, France has nominated a point of contact to provide or receive relevant information for the IAEA illicit trafficking database. The annual State budget for the DGSNR includes resources for emergency preparedness and response.

Findings

4.179. Basis: France has well established emergency preparedness and response capabilities covering all modes of transport. The arrangements meet the requirements as specified in Appendix V of Ref. [10]. The arrangements comply with the Transport Regulations. Specifically, the 1996 edition of the Transport Regulations [1] provides the following requirements concerning emergency response: para. 308 states, inter alia, that *“In the event of accidents or incidents during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment.”* Paragraph 309 states that *“Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of an accident.”*

4.180. In addition, the arrangements address the recommendations and guidelines described in Ref. [3].

Good practice: France has a well established framework for emergency preparedness and response, covering all modes of transport. In particular, the preparation of a guidance circular to assist the prefects in drafting and implementing the PSS-TMR (specialized emergency plan for the transport of radioactive material) facilitates effective response to land based incidents throughout the country. In addition, the Plan NUCMAR Manche/Mer du Nord 2003 is a good

example of effective response arrangements and provision of public information in the event of marine incidents in territorial waters.

Good practice: The COGEMA Logistics emergency and intervention plan for the transport of radioactive material (PUI-T-GEN), Revision 6, September 2003, is a good example of an emergency plan covering the transport operations of a major transport company.

MARITIME OPERATIONS

Overview

4.181. Law No. 83-581 of 5 July 1983, as amended, covers the safety of life at sea, shipboard living conditions and the prevention of pollution. Decree No. 84-810 of 30 August 1984, as amended, covers the application of the 1983 law. The Ministerial Order of 23 November 1987, as amended, concerns ship safety. The regulations appended to the Ministerial Order of 23 November 1987 comprise six volumes: Volume 2 implements the SOLAS Convention and the INF Code; Volume 6 implements in detail the IMDG Code. The Ministerial Order of 6 January 2003 implements the mandatory IMDG Code Amendment 31-02 in Volume 6, Division 411, 2003 edition. Provisions for enforcement and the penalties for infringements of the SOLAS Convention, including the IMDG Code, are included in the 1983 law and 1984 decree.

Implementation of the IMDG Code

4.182. The Minister for Transport is responsible for the implementation of the IMDG Code at sea in accordance with the following:

- (a) Commission for the Carriage of Dangerous Goods by Sea: the Commission for the Carriage of Dangerous Goods by Sea may be consulted by the Minister for Transport concerning all questions relating to the carriage of dangerous goods by sea (Division 411, Article 411-1.08).
- (b) Competent authority: when Division 411 or the IMDG Code requires a decision from the French competent authority, or the issuing of a certificate by this authority, the competent authority shall be the Minister for Transport. However, this authority shall be exercised:

- (i) Jointly by the Minister for Industry and the Minister for the Environment when dealing with transports of radioactive and fissile material for civilian use;
- (ii) The head of the CSN in the cases stipulated by this division.

Note No. 01/98 of 11 May 1998, the DSIN/DAMGM protocol

4.183. Note No. 01/98 of 11 May 1998, the DSIN/DAMGM protocol, was developed “*Concerning the gradual creation of an administrative organization for the drafting, application and monitoring of rules covering maritime transport of radioactive materials.*” In this note the responsibilities of each of the two directorates in the field of the maritime transport of radioactive material are clearly defined. For each field of action, it is clearly defined which directorate is in charge of the application of, at the international level, the rules of the IMO and its subcommittees and of the EU and the IAEA; and, at the national level, the application of the INF Code, the IMDG Code and checks on board ships. In addition, the participation of ISPN inspectors is provided during inspections or visits organized by the CSN on board vessels transporting radioactive material.

4.184. During inspections or visits organized by the CSN on board vessels transporting radioactive material, ASN inspectors may:

- (a) If dealing with foreign ships, and under the terms of the Paris Memorandum in the company of ship and maritime works safety inspectors, take part in visits to these ships with the aim of checking the packages and, if necessary, the radiation protection measures.
- (b) If dealing with French ships, be appointed by the head of the CSN as members of commissioning inspection commissions and periodic inspection commissions. They will first have been designated by the regional director for maritime affairs.
- (c) Take part, with ship and maritime work safety inspectors, in checking packages and, if necessary, checking radiation protection measures during visits arising from complaints by the crew. They will first have been designated by the head of the CSN.

Application of the IMDG Code

4.185. Division 411, 2003 edition, was implemented into French law (Ministerial Order of 6 January 2003) to bring the IMDG Code Amendment 31.02 into force from that date. Since the effective date agreed at the IMO was 1 January 2004, the mandatory implementation in France was much earlier.

Good practice: Early implementation at the national level of new international mandatory requirements under the IMDG Code is considered to be good practice.

Training

4.186. This implementation of the IMDG Code includes Chapter 1.3, which deals with training of personnel. In Amendment 31-02 this chapter remains recommendatory. However, France has made it mandatory for all shore based personnel engaged in the transport of dangerous goods by sea in France.

Good practice: Implementation at the national level on a mandatory basis of international recommended requirements on training of personnel under the IMDG Code is considered to be good practice.

Carriage of the IMO publications Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) and the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS)

4.187. Division 411, 2003 edition, Article 411-1.05(3), requires all French flagged ships likely to transport dangerous goods to carry the most recent editions of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) and the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS). In Chapter 7.3 of the IMDG Code Amendment 31-02, this requirement remains recommendatory.

Good practice: Implementation at the national level on a mandatory basis of the carriage of the most recent editions of the IMO's Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) and the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS) is considered to be good practice.

Application of the INF Code

4.188. Although the INF Code did not become mandatory until 1 January 2002, it entered into force in France on 20 January 1996, when there was an INF ship under the French flag. Although there are currently no French flagged INF ships, the rules and procedures are in place in accordance with the INF Code. The INF Code was implemented in French law much earlier than required.

Good practice: Early implementation at the national level of recommended international requirements under the INF Code, well before they were made mandatory, is considered to be good practice.

Application of the ISM Code

4.189. The IMO's International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) entered into force on 1 July 1998 or on 1 July 2002, depending on the type of ship. This code applies to all ships for international voyages, but France has extended this to all roll on, roll off passenger ships for national voyages. Radioactive material for medical use is carried on such ships, for example those that ply the Marseilles to Corsica route, which are now included in this wider application of the ISM Code.

Good practice: Extension of the requirements of the ISM Code at the national level to additional types of ship is considered to be good practice.

Emergency response

4.190. Three NUCMAR plans exist for each maritime prefecture (North Sea–English Channel, Atlantic and Mediterranean). These plans set up detailed procedures and responsibilities for use in the event of a maritime incident involving radioactive material. These procedures include response participation by French authorities (landside, port and maritime authorities). In the case of the North Sea and Atlantic areas, these NUCMAR plans can be operated together with the established general international emergency response agreements between France and the United Kingdom and between France and Spain. However, no similar response agreements appear to be in place in the Mediterranean area.

Good practice: The capability of operating, if necessary, the North Sea–English Channel and Atlantic NUCMAR plans together with the established general international emergency response agreements with the United Kingdom and Spain is considered to be good practice.

Suggestion: It is suggested that the establishment of general international response agreements for the Mediterranean area be explored, so that the Mediterranean NUCMAR plan could be operated, if necessary, in a wider context.

Security provisions

4.191. The French navy and maritime security authorities provide security at the port of Cherbourg during INF cargo operations.

Availability of information

4.192. A system for the collection centrally of information concerning ships carrying radioactive material appears not to be available in the DAMGM, although such information is routinely notified to all ports in the context of established procedures for the advance notification of all dangerous goods transported on ships.

Suggestion: It is suggested that the possibility be explored that the DAMGM collect the information on the transport of radioactive material that is available from the ports.

Summary of maritime transport activities

4.193. A limited number of radioactive material shipments are carried out in the maritime mode. These maritime shipments can be classified into three types:

- (a) INF cargoes imported into or exported from France. In 2003 there were two INF Code cargo shipments that were imported into or exported from France by COGEMA. These shipments were loaded and off-loaded at the port of Cherbourg and consisted of a high level vitrified waste (HLVW) shipment being sent to Japan and the receipt of a research reactor spent fuel shipment from Australia. These INF cargo shipments were carried out using a UK flagged INF Class 3 and a Danish flagged INF Class 2 vessel, respectively.
- (b) INF cargoes transiting through France. France is also a transit country for INF shipments, for example shipment of spent fuel packages from Switzerland or Germany bound for Sellafield in the UK, which are taken on board ships at Dunkirk. There were fewer than 20 transit shipments in 2003.
- (c) Non-INF cargoes imported into or exported from France. There were around 50 shipments of radioactive material, which ranged from empty packages (Schedule 4), to enriched uranium hexafluoride fissile shipments (Schedules 9 and 13) at different French ports.

COGEMA

4.194. COGEMA makes its INF shipments in accordance with the SOLAS Convention, the IMDG Code (which incorporates the Transport Regulations), the INF Code and the DGSNR Certificate of Approval F/323/B(U)F-96 (Fh). The completeness of the packages for shipment is in accordance with the technical specifications and the amount and content of radioactive material permitted in the French Certificate of Approval F/323/B(U)F-96. An extensive dossier, including maintenance records, is kept for each cask used in individual shipments.

AIR TRANSPORT

Overview

4.195. The DGAC in the Ministry of Transport has the overall responsibility for implementing and enforcing the legislation (Article 133-5 of the civil aviation code). This responsibility is delegated to the Dangerous Goods Department within the Operations Division of the SFACT. Responsibilities are assigned to named individuals in the Official Journal.

4.196. The areas of competence of the DGAC concern the air carrier, transport authorizations, handling, storage at the airport, flight conditions, separation of radioactive material from other dangerous goods and stowage on board the aircraft.

4.197. The DGAC monitors the operation of aircraft in France in accordance with three decrees that provide the legal framework for the transport of radioactive material by air in France, namely:

- (a) JAR-OPS 1 (12 May 1997) for air transport airlines (aircraft);
- (b) JAR-OPS 3 (23 September 1999) for air transport airlines (helicopters);
- (c) JAR-OPS 1T (13 September 2000) for air transport overseas airlines (aircraft).

4.198. The latest effective edition of the ICAO Technical Instructions is made mandatory through JAR-OPS 1.1160. Three State variations of the ICAO Technical Instructions pertaining to the transport of radioactive and fissile material were noted (i.e. FR3, FR4 and FR5). FR3 identifies the contacts in France for questions related to the air transport of radioactive and fissile

material, FR4 identifies radioactive material that may not be transported to, from, through or over French territory without a shipping permit issued by the DSIN (now the DGSNR) and FR5 provides the conditions for the reuse of an aircraft whose internal surfaces have been contaminated.

4.199. An air operator cannot transport dangerous goods unless it has been approved by the DGAC. There are four French airlines that currently have a permit to transport radioactive material with no restrictions other than those described in the ICAO Technical Instructions (Air France, Air Tahiti Nui, Air Calin and Aigle Azur). In addition, there are six French airlines permitted to transport category I-WHITE radioactive material packages (Air Tahiti, Air Calédonie, Air Austral, Air Saint-Pierre, Air Guyane and Corse Méditerranée) and two French airlines permitted to transport radioactive material providing the maximum transport index combined for all the packages does not exceed 10 (Carry Air and Icare Franche-Comté). In addition, there are requirements for air operators to have training programmes for the carriage of dangerous goods, and the training programme must be approved by the DGAC. The specific requirements are described in JAR-OPS 1 1.220.

Findings

4.200. The DGAC carries out compliance monitoring and enforcement of the dangerous goods regulations. The DGAC has a total of 26 inspectors dedicated to ramp inspections (air side), which includes dangerous goods inspections of all classes. There are approximately 2 million flights per year in France (take-offs and landings), involving 327 airports. The vast majority of the air transport of radioactive material is conducted by Air France, with the principal consignor being the CIS bio international radiopharmaceutical company.

4.201. It was noted that while approximately 50% of all flights are to or from the Paris airports and that CIS bio international (based in Paris) consigns approximately 50 000 Class 7 packages by air annually, only five of the 26 DGAC inspectors are actually assigned to the Paris area. With regard to the inspection format, it was noted that there is no specific audit check sheet used for Class 7 material inspections. In addition, the DGAC conducts some combined inspections with the DGSNR. In 2003, three airlines and 11 handling companies were inspected jointly, and the same number of combined inspections is scheduled for 2004.

4.202. DGAC inspectors receive mandatory training in the transport of radioactive material in the form of a one day course run by the DGSNR and

the DGAC. Refresher training is conducted every two years. In addition, more advanced training in the transport of radioactive material, consisting of a three day course, is made available to some DGAC inspectors, although this training is not mandatory.

4.203. The DGAC communicates changes in regulations and requirements for the transport of radioactive material by writing to operators. In addition, there is a transport working group for Class 7 material chaired by the DGSNR and attended by the DGAC and representatives from the aviation industry. The group meets approximately once per year.

4.204. A protocol dated 4 June 1999 between the Minister for Industry and the Minister for the Environment, the DGAC/DSIN protocol, identifies the tasks for the drafting and implementation of safety policy concerning the air transport of radioactive material and fissile material for civilian use. Under this protocol and the civil aviation code, the DGAC has the responsibility for the drafting of regulations for the air transport of radioactive material. Amendment 6 to JAR-OPS 1, effective 1 August 2003, and section JAR-OPS 1.1160 of the Joint Aviation Authorities (European Aviation Authority), require that operators comply with the latest effective edition of the ICAO Technical Instructions. Operators are only informed of these new requirements at the time they take effect through a letter from the DGAC. It is important that all users are kept informed of future changes to the regulations so that they can plan for implementation and adapt their training programmes and resources accordingly.

4.205. During the visit by the TranSAS team to the Air France cargo hall at the Charles de Gaulle airport at Roissy, outside Paris, and the meeting with Air France cargo officers, it was noted that Air France has a well developed quality system that takes account of and implements regulatory requirements. A comprehensive radiation protection programme is in place that includes, for example, contact details, technical data, controls, segregation and training. Charles de Gaulle airport has set up a committee of freight handlers and professional organizations that discusses cargo handling matters at the airport and seeks continuous improvement in the management of dangerous goods.

4.206. Regarding the implementation of new regulations, it was reported that Air France Cargo has adopted a strategy of anticipating relevant changes and has representation at the relevant international bodies.

Suggestion: It is suggested that the DGAC undertake a review of resources available to conduct compliance monitoring and inspections, in particular in the Paris region.

Suggestion: It is suggested that consideration be given to the compilation of an audit form or check sheet for Class 7 inspections undertaken by DGAC inspectors.

5. GENERAL CONCLUSIONS

5.1. The TranSAS appraisal team completed a thorough appraisal of the implementation of the Transport Regulations in France. The cooperation of the authorities in France, and of all those who participated in the discussions, was excellent and contributed to the success of the appraisal.

5.2. The comprehensive legal framework, with responsibilities identified in considerable detail and with memoranda of understanding in areas of overlapping responsibilities, provides a good basis for the implementation of the Transport Regulations.

5.3. Generally, the implementation of the Transport Regulations is performed in accordance with IAEA requirements. Some areas for possible improvements have been identified. In general, these relate to keeping guides and procedures up to date and being able to demonstrate that all the requirements of the regulations have been met.

5.4. The findings include a considerable number of good practices, in particular in the area of maritime transport.

Appendix I

ABBREVIATIONS

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

ADNR	Regulations for the Carriage of Dangerous Substances on the Rhine
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ASN	Autorité de sûreté nucléaire (Nuclear Safety Authority, comprises the DGSNR and the DSNR)
BNI	basic nuclear installation
CIINB	Commission interministérielle des installations nucléaires de base (Interministerial Commission for Basic Nuclear Installations)
CITMD	Commission interministérielle du transport des matières dangereuses (Interministerial Commission for the Transport of Dangerous Goods)
CMD	Commission du transport maritime de matières dangereuses (Commission for the Transport of Dangerous Goods by Sea)
CROSS	Centres régionaux opérationnels de surveillance et de sauvetage (Operational Regional Centers of Monitoring and Rescue)
CSN	Centre de sécurité des navires (Centre of Safety of Ships)
CSSIN	Conseil supérieur de la sûreté et de l'information nucléaires (High Council for Nuclear Safety and Information)
DAMGM	Direction des affaires maritimes et des gens de la mer (Directorate for Maritime Affairs and Seafarers)
DDSC	Direction de la défense et de la sécurité civile (Directorate for Civil Defence and Security)
DGAC	Direction générale de l'aviation civile (General Directorate for Civil Aviation)

DGSNR	Direction générale de la sûreté nucléaire et de la radioprotection (General Directorate for Nuclear Safety and Radiation Protection)
DIGITIP	Direction générale de l'industrie, des technologies de l'information et de la poste (General Directorate for Industry, Information Technologies and the Postal Service)
DRIRE	Direction régionale de l'industrie, de la recherche et de l'environnement (Regional Directorate for Industry, Research and the Environment)
DSIN	Direction de la sûreté des installations nucléaires (Directorate for the Safety of Nuclear Installations, became the DGSNR on 22 February 2002)
DSNR	Division de la sûreté nucléaire et de la radioprotection (within the DRIRE, the Division for Nuclear Safety and Radiation Protection)
DSU	Direction de la sûreté des usines, des laboratoires, des transports et des déchets (Directorate for the Safety of Factories, Laboratories, Transport and Waste (in the Transport, Fuel Cycle Facilities and Waste Safety Division of the IRSN))
DTMPL	Direction du transport maritime, des ports et du littoral (Directorate for Maritime Transport, Ports and Coastlines)
DTT	Direction du transport terrestre (Directorate for Inland Transport)
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IGTMOT	Inspection générale du travail et de la main d'oeuvre du transport (General Inspectorate for Labour and Workers in Transport)
IMDG Code	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
INF	irradiated nuclear fuel
INF Code	International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships

IPSN	Institut de protection et de sûreté nucléaire (Institute for Nuclear Safety and Protection, became the IRSN on 22 February 2002)
IRSN	Institut de radioprotection et de sûreté nucléaire (Institute for Radiological Protection and Nuclear Safety)
MARN	Mission d'appui à la gestion du risque nucléaire (Nuclear Risk Management Aid Committee of the Ministry of the Interior)
NUCMAR	nucléaire et maritime (emergency plan for the maritime transport of nuclear material)
Paris Memorandum	Paris Memorandum of Understanding on Port State Control
PPI	Plan particulier d'intervention
PSS-TMR	Plan de secours spécialisé–transport de matière radioactive
PUI	Plan d'urgence interne
PUI-T-GEN	Plan d'urgence interne–transport-général
RID	European Regulations Concerning the International Carriage of Dangerous Goods by Rail
SFACT	Service de la formation aéronautique et du contrôle technique (Service for Aviation Training and Technical Supervision)
SOLAS Covention	International Convention for the Safety of Life at Sea

Appendix II

TEAM FOR THE TRANSAS APPRAISAL FOR FRANCE

F. ABDEL-RAHMAN – Team member

F. Abdel-Rahman has been certified as a professor of nuclear engineering by the Government of Egypt. Within the Atomic Energy Authority of Egypt, he heads the Division for the Safety of Nuclear Installations and is Vice President of the National Centre of Nuclear Safety and Radiation Control. He has been with the Atomic Energy Authority of Egypt since May 1971.

F. Abdel-Rahman holds a Bachelor of Science degree (1970), a Master of Science degree (1973) and a PhD (1977) in nuclear engineering from the Faculty of Engineering, University of Alexandria, as well as a Bachelor of Laws degree (BLL, 1991) from the Faculty of Law, Ain-Shams University, and a Bachelor of Commercial Science degree (BCS, 1987) from the Faculty of Commerce, Ain-Shams University.



FIG. 8. The France TranSAS team. Left to right: F. Chen, R. Clark, M.E. Wangler, C. Ardouin, J. Duffy, R. Lewis, H. Tani, L. Grainger, F. Abdel-Rahman, E. Luraschi, C.J. Pecover, G.J. Dicke, F. Nitsche and W. Huck.

He has experience in the operation of nuclear research reactors and has conducted research in the field of nuclear engineering, reactor operation and the design of spent fuel casks for transport. He has developed regulations for regulatory inspections for the safe operation of Egyptian research reactors. In the framework of the IAEA technical cooperation programme, he developed the quality assurance chapter for the safety analysis report for the first Egyptian research reactor. He has harmonized with international and IAEA regulations the Egyptian regulations and legislation for ships that carry radioactive material in the Suez Canal. F. Abdel-Rahman is Head of the Nuclear Reactor Operators Licensing Group and acts as the coordinator and organizer for expert groups that inspect vessels that transport radioactive material on the Suez Canal and to and from Egyptian ports. He is a member of the IAEA Transport Safety Standards Committee (TRANSSC).

C. ARDOUIN – Team member

C. Ardouin is a Senior Adviser (Science) at the National Radiation Laboratory, Christchurch, New Zealand. He holds a Master of Science degree in radiation biology and a Bachelor of Science (Hons) degree in biochemistry from the University of London and a Graduate Diploma of Teaching from the Christchurch College of Education. He is a Member of the Australasian Radiation Protection Society.

C. Ardouin is responsible for licensing and compliance monitoring of the non-medical users of radiation throughout New Zealand. He also co-ordinates the national radiation incident response plan. He has 12 years of experience working as a health physicist in the nuclear power industry in the UK and served as a team member on the TranSAS appraisal for the UK in June 2002.

F. CHEN – Team member

F. Chen serves as the technical authority of the Panama Canal Authority on the chemical and physical properties of dangerous cargo, especially radioactive cargo, on board transiting vessels and on contingency planning. He also serves as the lead inspector of vessels with dangerous cargo on board, including those with radioactive cargo. He is a marine safety specialist who works closely with the Canal Operations Captain in a number of marine safety areas, such as risk analysis and verification of vessel compliance with the applicable international maritime regulations. He holds a PhD degree in chemistry from the University of California at Santa Barbara.

Since 1987, as the senior expert in the maritime transport of radioactive material for the Panama Canal, he has lectured in Panama and other countries and has participated in IMO and IAEA conferences dealing with the maritime transport of radioactive material. He was the alternate point of contact for the TranSAS appraisal for Panama.

R. CLARK – Team member

R. Clark is a radioactive material specialist with the Dangerous Goods Directorate of the Canadian Department of Transport, which is one of the two competent authorities in Canada for the transport of radioactive material. He holds a Bachelor's degree in public administration from Carleton University, Ottawa.

He has worked at the Department of Transport for over 16 years and has provided advice on regulations covering the conveyance of dangerous goods. Since 2001 he has been responsible for the development of departmental policy and regulations on the transport of radioactive material. He is a member of the IAEA Transport Safety Standards Committee (TRANSSC).

G.J. DICKE – Team leader

G.J. Dicke is a Transport Safety Specialist in the IAEA Safety of Transport of Radioactive Materials 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. He 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, he 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 Packaging, Transport, Storage and Security of Radioactive Material (RAMTRANS).

J. DUFFY – Team member

J. Duffy is currently a senior Scientific Officer and Inspector with the Regulatory Service of the Radiological Protection Institute of Ireland. He joined the Institute in 1987 and holds, inter alia, a Master of Applied Science degree (applied physics) from University College, Dublin. He is a Chartered Physicist and a Member of the Institute of Physics, Irish Branch, of the Institute of Physics (UK).

Since September 1998 he has been the Irish delegate to the Standing Working Group on the Safe Transport of Radioactive Material of the European Commission. In June 2002 Ireland nominated him as the point of contact for the IAEA Illicit Trafficking Database programme. In December 2002 he was nominated as a member of the IAEA's Transport Safety Standards Committee (TRANSSC). In 2003 he was nominated as the point of contact for EVTRAM, an IAEA database that compiles events that have been recorded in the transport of radioactive material.

Since 2001, he has acted as a consultant to the IAEA on the preparation of training modules under the IAEA Regional Model Project, has lectured to regulators on an IAEA regional training course and participated in an IAEA Peer Review Mission to assess the existing infrastructure for radiation protection and the safety of radiation sources. He has extensive experience in inspection, enforcement and incident investigation involving licensees who use and transport radioactive sources in industry, medicine and research activities.

L. GRAINGER – Team member

L. Grainger is an independent transport consultant and specialist writer. He has been Cargo Safety Adviser to the Bahamas Maritime Authority in London since 1996. He has represented the Bahamas at all levels within the committee process at the IMO in London. He has acted for the IMO since 2001 as a special envoy to Panama, lectured at the Academy in Trieste, assisted in preparing official amendments to the mandatory IMDG Code, and taken part in technical

cooperation missions to Southeast Asia, East Africa, North Africa and eastern Europe.

L. Grainger served in the UK Department of Transport for 40 years. He was promoted to Senior Principal Officer in 1993, awarded an OBE in 1995 and took early retirement from government in 1996. As a Principal Officer he was Head of the Dangerous Goods Transport Policy Branch for 17 years. He led the UK delegations to the United Nations Economic and Social Council Committee of Experts on the Transport of Dangerous Goods from 1979 to 1996 and became chairman of that committee in 1988. He represented that committee in many related international forums. He was responsible for most aspects of the land transport of dangerous goods within the UK and in mainland Europe, and for the coordination of UK policy globally and for all transport modes, including the integration in legislation of radioactive material with other classes of dangerous goods. In 1997–1998, as an IAEA consultant, he assisted in the exercise to incorporate the Transport Regulations into the United Nations model regulations. L. Grainger was nominated by the IMO to serve as a team member on the UK TranSAS appraisal, which took place in June 2002, and on the Panama appraisal, which was conducted in June 2003.

W. HUCK – Team member

W. Huck is Dean of the Faculty of Law at the University of Applied Sciences in Braunschweig/Wolfenbüttel, where he also lectures on the law of transport and the environment. Between 1991 and 1997 he was Head of the Division for Law and Strategy in the Department for the Nuclear Fuel Cycle, Transport and Storage of Radioactive Materials at the Federal Office of Radiological Protection in Salzgitter, Germany. The topic of his doctoral dissertation at the University of Bonn in 1991 was the transport of radioactive material.

R. LEWIS – Team member

R. Lewis is Chief of the Transportation and Storage Safety and Inspection Section at the US Nuclear Regulatory Commission (NRC). He has 12 years of experience in developing and enforcing nuclear regulations through inspections in the areas of waste management, fuel fabrication and transport. He holds a Bachelor of Science degree in physics from the State University of New York at Fredonia and a Master of Science degree in nuclear engineering from the University of Arizona.

His duties at the NRC include managing inspections of transport packages, spent nuclear fuel storage systems and independent spent nuclear fuel storage installations. In addition, he is charged with reviewing and approving NRC approval certificates for quality assurance programmes for transport and storage activities, developing policy, regulations and guidance for designers, users and fabricators of transport and storage packages, participating in the development of international transport standards and research activities and serving as the NRC point of contact on technical and safety matters with the US Department of Transportation.

E. LURASCHI – Technical writer

E. Luraschi is an editor of technical publications with the IAEA Department of Nuclear Safety and Security. He holds a Bachelor of Arts degree from New York University. He has over 10 years of experience in the preparation of manuscripts for publication at the international level and has been with the IAEA since 1996. His work with the IAEA includes the review of draft technical publications on nuclear safety, waste safety, transport safety, radiation safety and emergency preparedness. He is a contributing editor for the updating and revision of the IAEA safety standards and has finalized a number of IAEA reports on TransSAS appraisals.

F. NITSCHKE – Team member

F. Nitsche is a physicist. Since 1998 he has been Head of the Transport Section of the Federal Office for Radiation Protection (BfS), the competent authority for package design and shipment approvals in Germany.

He received his PhD degree in 1977 at the Technical University of Dresden and has more than 25 years of professional experience in the area of the safe transport of radioactive material. He worked until 1983 for the National Board for Radiation Protection and Nuclear Safety, Berlin, in matters relating to the licensing of package designs and shipments for radioactive material and in safety related research. From 1984 to 1991 he conducted research and development for the industry in the area of transport systems for fresh fuel, spent fuel and radioactive waste and in safety assessments for final repositories. He has been with the BfS since 1991 and is responsible for the assessment and approval of package designs and shipments. He conducts regulatory work and research that stem from national and international transport regulations.

F. Nitsche has been involved in the development of the Transport Regulations since 1979 and has been a member of various advisory and working groups at the IAEA, IMO and ICAO.

C.J. PECOVER – Team member

C.J. Pecover is currently Head of the Compliance and Quality Assurance Assessment Branch of the UK Department for Transport's Radioactive Materials Transport Division, which acts as the competent authority in the UK.

He previously worked in the UK Ministry of Defence for 16 years in related technical disciplines. He has worked for the UK competent authority for the past 20 years (since 1983), in a quality assurance and compliance assurance role. He therefore has 20 years experience in the safe transport of radioactive material, dealing with aspects of regulation, assessment, quality assurance, compliance assurance and enforcement. He has contributed to several IAEA Technical Committee Meetings on quality assurance, compliance assurance, training, requirements and advisory material. He has also been engaged at various times since 1984 by the IAEA as a consultant on quality assurance, compliance assurance and training. He was the original drafter of the IAEA Safety Series publications No. 112 and No. 113, and has recently led the review and redrafting of these two documents, which are due for reissue.

C.J. Pecover is an Incorporated Engineer and a Member of the UK Institution of Incorporated Engineers. He is also a Member of the UK Institute of Quality Assurance and is registered with the International Register of Certificated Auditors as a Lead Assessor of Quality Management Systems.

H. TANI – Team member

H. Tani graduated from the Maritime Safety Academy (the Academy of the Japanese Coast Guard) in 1963, and was trained in nuclear engineering by the Japan Atomic Energy Research Institute (JAERI) in 1967. In the Ministry of Transport of Japan he worked as Special Officer in charge of the transport of dangerous goods and as Deputy Director of the Ship Inspection and Measurement Division, Ship Bureau. He also advised the Secretariat of the Ministry of Transport and the Office of the Prime Minister. In 1984 he was appointed Director of the Technology Development and Safety Division in the Transport Policy Bureau of the Ministry of Transport, and in this capacity worked towards the coordination in Japan of the safety regulations on the transport of radioactive material for the different transport modes. In 1986 he

transferred to the Nuclear Safety Bureau of the Science and Technology Agency, where he was appointed to three posts in succession, namely Director of the Safeguards Division, Director of the Nuclear Safety Policy Division and Deputy Director General of the Bureau. While working in the Science and Technology Agency, he provided advice on various issues of nuclear safety, including on the introduction of the requirements of the Convention for the Physical Protection of Nuclear Material into Japanese law and on various safety assessments for nuclear facilities. In 1992 he was appointed Director of the Safeguards Information Treatment Division of the IAEA, where he worked until 1996. Upon his return to Japan he was appointed Executive Director of JAERI, where he was in charge of non-proliferation issues and safety management. He retired from JAERI in 2001. Since his retirement, he has acted as adviser to the Federation of Electric Power Companies in Japan.

M.E. WANGLER – Team member

M.E. Wangler is Head of the IAEA Safety of Transport of Radioactive Materials Unit of the Division of Radiation, Transport and Waste Safety, Vienna, Austria. He is the coordinator for the IAEA's Transport Safety Standards Committee (TRANSSC). He has two degrees in physics: a Bachelor of Arts degree from the University of Dallas and a Master of Science degree from the University of Massachusetts. His professional career of 33 years spans various fields – health physics, radiological protection and engineering – and includes 25 years of work dealing with the safety of the transport of radioactive material.

He has been active in the field of transport safety for the US Department of Transportation, the US Department of Energy and the Nuclear Regulatory Commission. In addition, he has worked in the licensing and inspection of medical and radiation equipment, in developing standards for equipment that use sources of ionizing radiation and in radiological assessments for environmental purposes. He has coauthored technical publications on transport safety and is on the editorial board of *Packaging, Transport, Storage and Security of Radioactive Material (RAMTRANS)*. He is a Member of the Health Physics Society in the USA.

Appendix III

PHOTOGRAPHS OF THE TRANSAS APPRAISAL FOR FRANCE



FIG. 9. Spent nuclear fuel on a wagon in Valognes terminal.



FIG. 10. A truck with vitrified waste arriving at the port of Cherbourg to load the cask on to the ship.



FIG. 11. The COGEMA Logistics rail to road trans-shipment terminal in Valognes.



FIG. 12. Unloading a vitrified waste cask from a truck and loading it on to a ship at the port of Cherbourg.

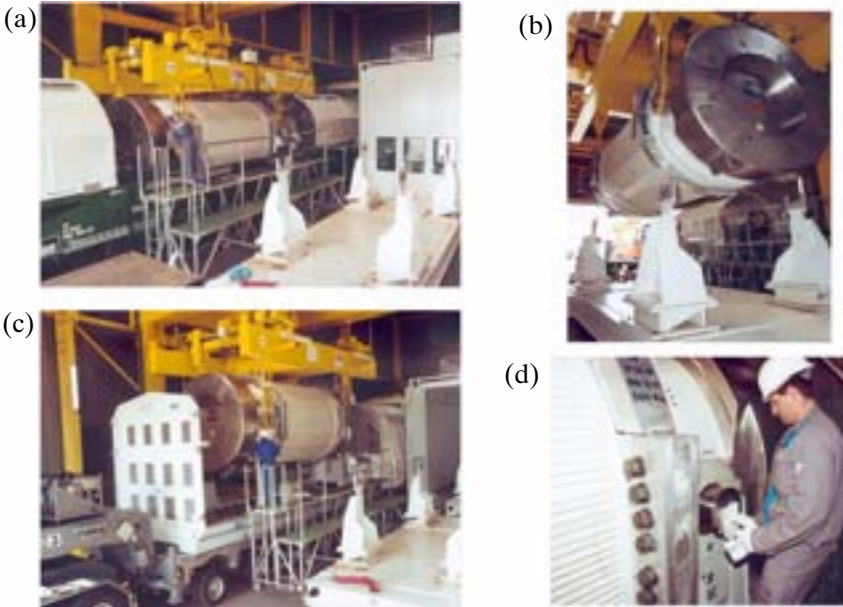


FIG. 13. Vitrified waste arriving from La Hague on a truck (b, c) and being loaded on to a wagon (a) to be transported to the port of Cherbourg. (d) Regulatory control of contamination.



FIG. 14. Vitrified residues: cask for shipment to Japan, Belgium and the Netherlands.



FIG. 15. Casks used for the transport of enriched uranium hexafluoride from enrichment facilities to fuel fabrication facilities.



FIG. 16. Unloading spent fuel at the La Hague facility.



FIG. 17. Departure of spent fuel on a wagon from a nuclear power plant to be reprocessed at the La Hague facility.

REFERENCES

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), Safety Standards Series No. TS-R-1 (ST-1, Rev.), IAEA, Vienna (2000).
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Standards Series No. TS-G-1.1 (ST-2), IAEA, Vienna (2002).
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY, Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, Safety Standards Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Compliance Assurance for the Safe Transport of Radioactive Material, Safety Series No. 112, IAEA, Vienna (1994).
- [5] INTERNATIONAL ATOMIC ENERGY AGENCY, Quality Assurance for the Safe Transport of Radioactive Material, Safety Series No. 113, IAEA, Vienna (1994).
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 1985 Edition (as Amended 1990), Safety Series No. 6, IAEA, Vienna (1990).
- [7] INTERNATIONAL ATOMIC ENERGY AGENCY, Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, 1985 Edition (as Amended 1990), Safety Series No. 7, IAEA, Vienna (1990).
- [8] INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, 1985 Edition (as Amended 1990), Safety Series No. 37, IAEA, Vienna (1990).
- [9] INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and the Safety of Radiation Sources, Safety Series No. 120, IAEA, Vienna (1996).
- [10] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).
- [11] INTERNATIONAL ATOMIC ENERGY AGENCY, Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, Safety Standards Series No. GS-R-1, IAEA, Vienna (2000).
- [12] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Safety Glossary – Terminology Used in Nuclear, Radiation, Radioactive Waste and Transport Safety, Version 1.0, April 2000, IAEA, Vienna (2000).

- [13] UNITED NATIONS COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS, Recommendations on the Transport of Dangerous Goods — Model Regulations, Rep. ST/SG/AC.10/1/Rev.12, United Nations, New York (2001).
- [14] INTERNATIONAL CIVIL AVIATION ORGANIZATION, Technical Instructions for the Safe Transport of Dangerous Goods by Air, Doc. 9284-AN/905, 2001–2002 Edition, ICAO, Montreal (2001).
- [15] INTERNATIONAL AIR TRANSPORT ASSOCIATION, Dangerous Goods Regulations, 44th edn, IATA, Montreal and Geneva (2002).
- [16] INTERNATIONAL MARITIME ORGANIZATION, International Maritime Dangerous Goods Code, including Amendment 30-00 — 2000 Edition, IMO, London (2000).
- [17] UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), ECE/TRANS/140, UNECE, New York and Geneva (2001).
- [18] INTERGOVERNMENTAL ORGANISATION FOR INTERNATIONAL CARRIAGE BY RAIL, Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) — 2003 Edition, OTIF, Bern (2003).
- [19] CENTRAL COMMISSION FOR NAVIGATION ON THE RHINE, Regulation Concerning the International Carriage of Dangerous Goods on the Rhine (ADNR), 2003 Edition, CCNR, Strasbourg (2003).
- [20] JOINT AVIATION AUTHORITIES, JAR-OPS Part 1: Commercial Air Transportation (Aeroplanes), Global Engineering Documents, Englewood, CO (2001).
- [21] JOINT AVIATION AUTHORITIES, JAR-OPS Part 3: Commercial Air Transportation (Helicopters), Global Engineering Documents, Englewood, CO (1999).