IAEA Safety Standards Applications — TranSAS-5

Provision for the Application of the IAEA Safety Standards

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

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

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IAEA SAFETY STANDARDS APPLICATIONS — TRANSAS-5

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

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FOREWORD

Within the family of the United Nations, the IAEA has the specific statutory function of establishing standards of safety for the protection of health against exposure to ionizing radiation. As a result, in 1959 the United Nations Economic and Social Council requested that the IAEA be entrusted with the drafting of recommendations on the transport of radioactive substances. Within its statutory mandate and pursuant to this request, in 1961 the IAEA issued the Regulations for the Safe Transport of Radioactive Material (the Transport Regulations). The Transport Regulations have been periodically reviewed and, as appropriate, amended or revised. Moreover, several guides and technical documents supporting the Transport Regulations have been issued by the IAEA. The latest version of the Transport Regulations was issued in 2000 by the IAEA as Safety Standard 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.

On 11 January 2002 the IAEA received, through the Permanent Mission of Panama to the international organizations in Vienna, a request from F. Gracia García, the Minister of Health of Panama, for a TranSAS appraisal. In preparation for the appraisal, a preparatory mission was undertaken from 21

to 28 November 2002 in Panama City. 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 IAEA Department of Technical Cooperation provided support for this TranSAS appraisal under project number RLA/9/044.

The TranSAS appraisal for Panama involved a team of ten independent experts from the IAEA, the International Maritime Organization and seven Member States of the IAEA. The team was complemented by a technical writer. The TranSAS appraisal for Panama was conducted between 9 and 20 June 2003. This report presents its findings.

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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 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 January 2002 the IAEA received, through the Permanent Mission of Panama to the international organizations in Vienna, a request from F. Gracia García, the Minister of Health of Panama, for a Transport Safety Appraisal Service (TranSAS) appraisal. To lay the groundwork for the appraisal, a preparatory mission was undertaken from 21 to 28 November 2002 in Panama City. 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 Panama, specific attention was given to the evaluation of the regulations and procedures applicable to the Panama Canal Authority (ACP) with regard to the transport of radioactive material through the Panama Canal. The appraisal considered in detail all relevant aspects of the regulation of the transport of radioactive

material in Panama and the Panama Canal 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 contains detailed questions in the following key areas:

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

Tasks and activities prior to the appraisal

S06. Panama provided the IAEA with overview papers and copies of several laws and regulations relevant to the implementation of the Transport Regulations. In addition, the Ministry of Health of Panama (MINSA), the ACP, the Panama Maritime Authority (AMP) and the Panama Civil Aeronautic Authority (AAC) provided completed questionnaires.

Appraisal team

S07. The team for the appraisal in Panama was composed of ten independent experts and a technical writer. The members of the team included representatives from regulatory authorities responsible for the transport of radioactive material in six IAEA Member States and a legal expert with experience in the transport of radioactive material from a seventh Member State. The team was led by a transport safety expert from the IAEA.

Appraisal process

S08. The appraisal process included the following:

(a) A preparatory session for the appraisal team;
(b) An entrance meeting involving presentations by key representatives of the Panamanian authorities concerning their responsibilities for the safe transport of radioactive material;
(c) Discussions to obtain clarification and additional or more comprehensive information;
(d) Preparation of the draft findings;
(e) Ongoing feedback on updates of the draft findings;
(f) Visits to the Panama Canal locks, the Marine Traffic Control Centre, the Incident Management Centre, the emergency response facilities at the Miraflores locks, the simulator training facilities for the Panama Canal pilots, the Emergency Centre of MINSA and the radiation and health facilities of the Social Security Fund (CSS);
(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 PANAMA

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 ten recommendations and 14 suggestions for areas in which the implementation of the Transport

Regulations can be streamlined or improved. The appraisal also identified 19 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: The unique legal framework established for the Panama Canal promotes a high level of effectiveness and in practice results in technical and management systems that are of a high level and ensure proper protection of the public, ACP workers, the environment and the Panama Canal itself against the potential hazards associated with the transport of radioactive material.

S16. Recommendation: The various competent authorities, in particular MINSA, the AAC and the AMP, should review the legislative requirements for the transport of radioactive material in areas of overlapping responsibilities for harmonization as related to the requirements of the 1996 edition of the Transport Regulations.

S17. Good practice: The recent cooperation agreement between the ACP and MINSA helps them to optimize their responsibilities regarding human health, property and the environment.

S18. Recommendation: Legislation in Panama should set out the arrangements for the provision of financial security, as already established for transit through the Panama Canal with respect to financial liability for the various modes of the transport of radioactive material.

S19. Recommendation: Legislation should set out the arrangements that address criminal actions that jeopardize the safe transport of radioactive material.

Authority, responsibilities, functions and organization of the regulatory body

S20. Good practice: In the past, when problems and issues arose, inter-institutional commissions were formed on an informal basis to address these problems or issues. This is considered good practice.

S21. Suggestion: It is suggested that a permanent commission or committee be established, to provide for the regular contact and liaison necessary between those authorities and other bodies concerned with the safe transport of radioactive material.

S22. Recommendation: Consideration should be given to establishing and maintaining suitable memoranda of understanding or agreements between the different authorities and groups involved in the safe transport of radioactive material, in order to secure the necessary immediate and long term cooperation.

Authorization process

S23. Recommendation: All land transport activities associated with the use of radioactive material should be clearly recognized as a condition of authorization and included in the authorization process carried out by the Radiation Health Department (DSR) on behalf of the General Directorate of Health (DGS).

S24. Suggestion: It is suggested that the need for the issuance of competent authority approval certificates be reviewed and the means for the issuance of such approvals established. A suitable flow chart of departmental responsibilities and involvement in the consideration and issuance of approval certificates would be most helpful.

S25. Recommendation: MINSA regulations should be amended to provide for the implementation of the requirements of the 1996 edition of the Transport Regulations as soon as practicable.

S26. Suggestion: It is suggested that the role and responsibilities of the competent authority's advisers be reviewed to ensure that the necessary independence is maintained.

Review and assessment process

S27. Recommendation: The needs and capabilities of the competent authority (MINSA) and its technical advisers should be reviewed, taking into account future requirements to issue appropriate competent authority approvals. Suitable written procedures should be developed to enable a clear understanding of what kind of review and evaluation must be done, what qualifications and experience are needed for those involved and how the process is to be managed.

S28. Recommendation: The current arrangements for the review and assessment of land transport applications for authorizations should be reviewed and amended as necessary to ensure that all pertinent aspects of the Transport Regulations are met.

Inspection and enforcement

S29. Good practice: The ACP conducts inspections on all INF class vessels with INF cargo on board and all vessels with fissile material. While the total number of such shipments is relatively low, the practice of 100% inspection of such shipments goes well beyond IAEA requirements, which call for periodic inspection of transport activities.

S30. Suggestion: It is suggested that the AAC consider performing thorough and independent package inspections, at a frequency consistent with the nature and number of such shipments. It is further suggested that the AAC use personnel from the DSR in the same manner that the DSR assists the AAC when inspection of suspicious packages is performed.

S31. Suggestion: It is suggested that the AAC complete its plan to implement a formalized process together with the Customs Service that would allow for timely notification to the AAC concerning the presence of shipments of interest to the AAC.

S32. Suggestion: It is suggested that the AMP review its responsibilities for the inspection of imports of radioactive material by sea and have a process in place, for example through an agreement with MINSA, at such time that radioactive material such as ^{60}Co starts arriving by ship.

S33. Recommendation: MINSA should implement an authorization process for land transport that will in turn provide the DSR with the authority to

perform inspections of transport activities by land. Such inspections by the DSR should be carried out in a manner consistent with the nature and number of shipments of radioactive material.

Development of regulations and guides

S34. Suggestion: To ensure that new and revised editions of the Transport Regulations and other IAEA safety standards are implemented by the proper jurisdiction within Panama, it is suggested that internal and external communication routes be reviewed and clarified to ensure that the competent authority and other responsible organizations receive timely notification of new and revised editions.

S35. Suggestion: As the legislation creating the Transit and Land Transport Authority (ATTT), the AMP and the AAC has been promulgated, it is suggested that a review be undertaken to ensure that each authority is clearly aware of who is responsible for radioactive material transport issues within its respective jurisdiction.

S36. Suggestion: It is suggested that the new Deputy Administrator leading the new commission within the Department of Maritime Protection of the AMP be specifically charged with ensuring that the obligations with respect to implementing the requirements of the International Maritime Dangerous Goods Code (IMDG Code) under the International Convention for the Safety of Life at Sea (SOLAS Convention) are met.

S37. Suggestion: It is suggested that a procedure be developed for informing and/or consulting those organizations that have to apply the requirements of the regulations issued or endorsed by a competent authority.

S38. Suggestion: It is suggested that consideration be given to amending Article 136 of the Regulation on Navigation in Panama Canal Waters to reflect more accurately the nature of the 'permission to transit' given to vessels before they transit the Panama Canal.

S39. Good practice: The ACP requirements for adequate notification and liability provisions relating to shipments of radioactive material through the Panama Canal are both comprehensive and effectively implemented. Appropriate steps are in place to ensure that the competent authorities are informed for emergency planning and national security purposes. These are considered good practices.

Emergency preparedness for transport

S40. Good practice: The National Civil Protection System (SINAPROC), which comprises all relevant governmental organizations involved in emergency coordination, meets four times per year to share experiences. This is considered good practice in that it enables lessons learned during emergency incidents and exercises to be shared.

S41. Suggestion: It is suggested that the current draft revised national radiological emergency plan be finalized and issued in such a way that subsequent changes or amendments to the plan, or components of the plan, can be promoted and put into effect in a timely and efficient manner. It is further suggested that all documents be within a 'controlled document format' and be signed by the authorized parties to the plan. Each issue or edition of the plan should be identified and controlled so that all officials needing to use the plan can readily confirm that they have the correct issue or edition.

S42. Suggestion: It is suggested that Section 8a of Resolution No. 69 of 23 July 1998 be revised to ensure that the reference to the National Commission for Radiological Health of the CSS not be confused with the Radiation Health Department of the CSS.

S43. Good practice: The responsibilities of the authority in charge of radiological emergencies (MINSA) and its technical adviser, the DSR, are stated in the legislation. This is considered good practice.

S44. Suggestion: It is suggested that a coordinated approach involving all jurisdictions and responsible agencies identified in the national radiological emergency plan be undertaken using tabletop drills and field exercises. Following the drill or exercise, it is suggested that a report be prepared and the report and its findings shared among all participating organizations.

S45. Good practice: The web based incident management system developed by the ACP is extensive, powerful and flexible, and provides an ideal model for other organizations wishing to implement emergency response plans for the transport of dangerous goods. This is considered good practice.

S46. Good practice: The ACP's practice of defining theoretical source terms to be used in accident scenario planning, combined with practical workshops in which scenario resolution issues are agreed among people with field experience, is considered good practice.

S47. Good practice: The ACP's systematic approach of conducting exercises that cover a range of potential accidents, using a variety of methods and realistic scenarios in combination with a high frequency of testing, is considered good practice.

Maritime operations

S48. Good practice: The ACP's use of a general updating provision in the context of international safety instruments such as the IMDG Code, which is substantially updated and revised every two years, is considered good practice.

S49. Recommendation: The ACP should as soon as practicable delete the explanatory list of IMDG classes of dangerous goods from Article 114 of the Regulation on Navigation in Panama Canal Waters, since this list is unnecessary and potentially confusing.

S50. Good practice: The ACP undertakes essential verifications to ascertain that INF Code requirements for the transport of INF cargoes are met. This is done within the context of a certified quality assurance programme. This is considered good practice.

S51. Good practice: In the application of the INF Code by the ACP, the detailed critique of shipboard emergency plans for INF ships and their comprehensive incorporation into the ACP's contingency plan, as well as the imposition of special conditions on ships in transit with INF cargo, represent good practice.

S52. Good practice: Adaptation and inclusion of the obligations under the Convention for the Physical Protection of Nuclear Material by the ACP in the measures taken to ensure the smooth passage of INF ships in transit is considered good practice.

S53. Good practice: Making the Solid Bulk Cargoes Code of the International Maritime Organization (IMO) mandatory in regulations issued by the ACP, and associating its requirements for the transport of radioactive material with those of the IMDG Code, is considered good practice.

S54. Good practice: Early introduction by the ACP of the IMO's Automatic Identification System (AIS) as a proven new safety aid in the transit of all ships, including those carrying radioactive material, is considered good practice.

S55. Good practice: The inspection by the ACP of ships carrying radioactive material in the context of Port State Control (PSC) type procedures is considered good practice.

S56. Good practice: In so far as all the enhanced security measures to be required under the International Ship and Port Facility Security (ISPS) Code in the circumstances of today are being applied by the ACP to ships carrying radioactive material, early introduction is considered good practice.

S57. Good practice: The comprehensive training given by the ACP to all its personnel involved in handling dangerous goods, including INF and other radioactive material, which goes beyond the recommendations in the IMDG Code, is considered good practice.

GENERAL CONCLUSIONS

S58. The TranSAS appraisal team completed a thorough appraisal of the implementation of the Transport Regulations in Panama. The cooperation of the authorities in Panama, and of all those who participated in the discussions, was excellent and contributed much to the value of the appraisal.

S59. The responsibilities for the implementation of the regulations for the transport of radioactive material in Panama and through the Panama Canal are clearly defined in the laws and regulations and are well understood by the authorities involved. Highly qualified personnel are available to carry out the activities required for the small number of radioactive material shipments in Panama. Highly qualified personnel and significant resources are used to ensure the safe transport of radioactive material through the Panama Canal.

S60. With regard to radioactive material shipments in Panama, procedures and resources need to be developed to take care of the increasing regulatory requirements resulting from revisions to the Transport Regulations and an expected increase in the number of shipments of radioactive material in Panama.

S61. A considerable number of good practices have been identified with regard to shipments through the Panama Canal, which are under the jurisdiction of the ACP. A very high level of safety is achieved owing to the rigorous requirements concerning compliance with all applicable regulations, the control of the shipments through the Panama Canal and highly developed emergency preparedness capabilities.

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 Secretariat to provide for the application of the Transport Regulations by, inter alia, providing a service for carrying out, at the request of any State, an appraisal of the implementation of the Transport Regulations by that State.

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

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

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

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

REQUEST FROM PANAMA

1.7. On 11 January 2002 the IAEA received, through the Permanent Mission of Panama to the international organizations in Vienna, a request from F. Gracia García, the Minister of Health of Panama, for a TranSAS appraisal. The basic objectives of the appraisal were discussed with the Ambassador at the Permanent Mission of Panama, J.E. Halphen-Pérez. The contacts for further preparation were established in June 2002: they were J. Quijano, Director of the Maritime Operations Department, F. Chen, Chemist with the Transit Operations Division (MRT) of the Panama Canal Authority (ACP) and G. Dicke of the IAEA. The points of contact in Panama and the IAEA exchanged initial information and arranged a preparatory mission that was conducted in Panama from 21 to 28 November 2002. 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 Panamanian 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 PANAMA

1.9. The general scope of any TranSAS includes:

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

1.10. The more specific scope for Panama, pursuant to the request of this State and to further considerations during the November 2002 preparatory mission, included the following:

(a) An evaluation of the regulations of the ACP for approving the safe passage of vessels carrying radioactive material through the Panama Canal;
(b) An evaluation of the procedures implemented by the ACP to ensure the safe transit of radioactive material through the Panama Canal.

ACTIVITIES COMPLETED PRIOR TO THE APPRAISAL

1.11. Preparations completed by Panama included the following:

(a) The completion and transmittal to the IAEA of the detailed TranSAS questionnaire. The ACP provided completed questionnaires on its responsibilities for the transport of radioactive material through the Panama Canal. The Ministry of Health (MINSA), the Panama Maritime Authority (AMP) and the Civil Aeronautic Authority (AAC) provided completed questionnaires concerning their respective areas of responsibility for the transport of radioactive material in the rest of Panama.
(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 Panama.

APPRAISAL TEAM

1.13. The team for the appraisal in Panama was composed of ten independent experts and a technical writer. The experts were representatives from regulatory authorities responsible for the transport of radioactive material in Argentina, Australia, Japan, Spain, the United Kingdom and the United States of America, as well as an expert from the International Maritime Organization (IMO) and a legal expert from Germany with experience in the transport of radioactive material. The team was led by a transport safety expert from the IAEA. Further details on the members of the appraisal team are provided in Appendix II.

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. The experts were provided with guidelines for the appraisal and copies of the completed TranSAS questionnaires submitted by Panama. 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 from the Panamanian authorities concerning their responsibilities for the safe transport of radioactive material;
(c) Discussions to obtain clarifications 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 Panama Canal locks, the Marine Traffic Control Centre, the Incident Management Centre, the emergency response facilities at the Miraflores locks, the simulator training facilities for the Panama Canal pilots, the Emergency Centre of MINSA and the radiation and health facilities of the Social Security Fund (CSS);
(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 Panama from 9 to 20 June 2003. It includes, in Section 4, the findings for each area considered in the appraisal, together with a background discussion and a basis for any finding (tied to an international regulatory requirement or recommendation). The findings are presented as recommendations, suggestions and good practices, which for the purposes of a TranSAS appraisal have been defined as follows:

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

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

2. DOCUMENTS RELEVANT FOR THE TRANSAS APPRAISAL

IAEA SAFETY STANDARDS

2.1. The Transport Regulations are key to the development of a regulatory regime for the safe transport of radioactive material. These regulations were first developed in the late 1950s at the request of the United Nations Economic and Social Council. The first edition of the Transport Regulations was published in 1961, and has been updated regularly. The latest edition of the Transport Regulations was issued in 1996 and revised in 2000 to accommodate editorial changes [1]. The previous edition, upon which some States still base their national transport regulations, was issued in 1985 and amended in

1990 [6]. There are also additional guidance publications issued by the IAEA to support the application of the Transport Regulations by regulators and users [2–5]. Explanatory material [7] and advisory material [8] related to the 1985 edition of the Transport Regulations is relevant where that edition is still being applied.

2.2. These publications provide a sound basis for competent authorities in States to regulate the transport of radioactive material. Specifically, the Transport Regulations [1], and their preceding editions (e.g. the 1985 edition (as amended in 1990) [6]), have provided and continue to provide a model to be followed by relevant international organizations and States in developing binding regulations for the international and national transport of radioactive material. The guidance publications [2–5] also are valuable tools for competent authorities, consignors, carriers and consignees for describing how they may apply specific requirements of the regulations. For example, the general advisory publication [2] and its predecessor publications [7, 8] provide insight into why various regulatory requirements have been established and define 'a way', or 'ways', but not 'the way' in which specific requirements may be satisfied in practice. Guidance is also provided in specific key areas, inter alia planning and preparing for emergencies [3], compliance assurance [4] and quality assurance [5].

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

2.4. Finally, a key publication for the application of the Transport Regulations in a State is the 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. These model regulations of the United Nations serve as a basis for national and international regulations for the transport of dangerous goods by the various modes of transport.

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

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

2.11. For States in Europe, the United Nations Economic Commission for Europe (UNECE) and the Intergovernmental Organization for International Carriage by Rail (OTIF) publish dangerous goods regulations (including requirements derived from the Transport Regulations [1]) for road (Annexes A and B of ADR) [17] and rail (RID) [18]. These regulations apply through agreements and conventions (respectively ADR and COTIF) that make their

application to the international carriage of dangerous goods by road and rail between Contracting Parties mandatory. The ADR/RID requirements are also mandatory for national transport for 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 PANAMA

OVERVIEW OF THE APPRAISAL PROCESS

3.1. The appraisal process in Panama included the following:

(a) A preparatory session for the appraisal team;
(b) An entrance meeting involving presentations by key representatives from the Panamanian authorities concerning their responsibilities for the safe transport of radioactive material;
(c) Discussions to obtain clarifications 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 Panama Canal locks, the Marine Traffic Control Centre, the Incident Management Centre, the emergency response facilities at the Miraflores locks, the simulator training facilities for the Panama Canal pilots, the Emergency Centre of MINSA and the radiation and health facilities of the CSS;
(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 Panama and to review the programme for the appraisal, the procedures to be followed, the reference material to be used and the work to be carried out.

3.3. The team for the appraisal in Panama was composed of ten independent experts and a technical writer. The experts were representatives from regulatory authorities responsible for the transport of radioactive material in Argentina, Australia, Japan, Spain, the United Kingdom and the United States of America, as well as an expert from the IMO and a legal expert from Germany with experience in the transport of radioactive material. The team was led by a transport safety expert from the IAEA. Further details on the members of the appraisal team are provided in Appendix II.

3.4. 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.

ENTRANCE MEETING

3.5. The following authorities and representatives participated in the entrance meeting.

Principal representatives of Panama:

A. Alemán, Administrator, ACP;
N. Castrellón, Deputy Minister of Foreign Affairs;
E. Morales, Director General of Health, MINSA;
Captain L. Pérez Salamero, Deputy Administrator, AMP.

TranSAS team members:

P. Colgan (Australia);
G. Dicke (IAEA, team leader);
L. Grainger (UK);
W. Huck (Germany);
J. López Vietri (Argentina);
E. Luraschi (IAEA);
P.J. Pecover (UK);
I. Rahim (IMO);
H. Tani (Japan);
R. Temps (USA);
F. Zamora (Spain).

Other representatives from Panama:

M. Acedo, observer, ACP;
E. Álvarez, Admiralty Counsel, ACP;
G. Arana, Director of Emergencies, MINSA;
Captain M. Blair, United States Coast Guard Adviser, ACP;
Á. Cabal, General Legal Counsel, ACP;
F. Chen, Chemist, ACP;
J. Constantino, General Directorate of Organizations and International Conferences, Ministry of Foreign Affairs;
F. Corro, observer, ACP;
N. De Bernal, Chief, Prevention and Pollution Control, AMP;
O. De Meza, observer, ACP;
F. Espinosa, Prevention and Pollution Control, AMP;
M.I. Esquivel, Director of Health and Environment Programs, MINSA;
D. Francis, Manager, Training and Hazardous Materials Branch, ACP;
U. Gonzal, observer, ACP;
A. González, Manager, Emergencies and Contingencies Division, ACP;
Captain A. Hartley, Manager, MRT, ACP;
T. Meneses, Radiation Protection Specialist, Radiation Health Department (DSR) of the CSS;
M. Nuñez, Dangerous Goods Specialist, AAC;
M. Ortega, Legal Counsel, MINSA;
E. Panamá Barría, representative, Transit and Land Transport Authority (ATTT);
E. Pardo, Chief, Dangerous Goods, AAC;
J. Probst, Legal Counsel, MINSA;
J. Quijano, Director, Department of Maritime Operations, ACP;
A. Regis, observer, ACP;
S. Rodríguez, Acting Manager, Canal Protection Division, ACP;
R. St. Malo, Director, International Affairs, MINSA;
E. Velarde, Deputy Director General of Health and Environment, MINSA;
R. Villalaz, Admiralty Counsel, ACP.

AGENDA FOR THE TRANSAS MISSION TO PANAMA

Venue: Ascanio Arosemena Training Centre.

Monday, 9 June 2003, inauguration and presentations:

0830: Inauguration.
0930: Presentation, MINSA, E. Velarde.
1030: Presentation, judicial aspects, ACP, Á. Cabal.
1300: Presentation, maritime operations, ACP, J. Quijano.
1530: Presentation, emergency response, MINSA, G. Arana and M.I. Esquivel.

Tuesday, 10 June 2003, presentations:

0900: Presentation, AAC, E. Pardo.
1000: Presentation, Emergency and Contingency Management Division, ACP, D. Francis.
1100: Presentation, Canal Protection Division, ACP, S. Rodríguez.
1330: Presentation, AMP, F. Espinosa.
1400: Presentation, inspection, DSR, T. Meneses.
1500: Presentation, inspection, ACP, F. Chen.

Wednesday, 11 June 2003, visits and interview:

0800: Visit to Marine Traffic Control, ACP, S. Mann.
0845: Visit to the Canal Protection Division Control and Emergency Room, A. Michel.
0930: Visit to Miraflores locks, ACP.
1030: Visit to Miraflores East Fire Station and the Hazardous Materials Training Centre, ACP, A. González.
1430: Interview, General Legal Council, ACP, Á. Cabal.

Thursday, 12 June 2003, interviews and visits:

0815: Interviews, Maritime Operations, Captains A. Hartley and M. Rodriguez, E. Alvarez and R. Villalaz.
0830: Interviews, MINSA, E. Velarde.
1300: Interviews, AMP, N. De Bernal.
1400: Visit to the emergency centre, MINSA, G. Arana.
1500: Visit to the DSR, E. Gibbs.

Friday, 13 June 2003, visit and report writing:

0830: Visit to the maritime training facilities, ACP, Captain R. Altafulla.
0915–1600: Report writing.

Sunday, 15 June 2003, visit to the Atlantic side, by launch from Las Cruces landing:

0815: Depart hotel. Visit the ACP administration building, Gatun locks and the offices of the Senior Atlantic Canal Port Captain and Atlantic Port Entry Coordinator.
1630: Return to hotel.

Monday, 16 June 2003, interviews and report writing:

0830: Interviews, AAC, E. Pardo.
1500: Interview, inspection, DSR, E. Gibbs.
1600: Interview, inspection, ACP, F. Chen.

Tuesday, 17 June 2003, report writing:

0830–1845: Report writing.
1130: Courtesy visit, Minister of Health, F. Gracia García.

Wednesday, 18 June 2003, report writing:

0830: Report writing.
1000: Additional interview, MINSA and DSR, E. Velarde and E. Gibbs.
1430: Report review, AMP and AAC.

Thursday, 19 June 2003, report and findings review:

0830: Report review, ACP, Captain A. Hartley and F. Chen.
1000: Report review, MINSA, E. Velarde.
1500: Report review, DSR, E. Gibbs and T. Meneses.
1600–2100: Findings review.

Friday, 20 June 2003, exit visits:

0830: Exit meeting with the ACP, J. Quijano, Á. Cabal, Captain A. Hartley and A. González.

0945: Exit meeting with MINSA, DSR, AMP and AAC representatives.
1130: Courtesy exit meeting, Ministry of Foreign Relations, R. Alemán.
1200: Completion of the TranSAS appraisal.

EXIT MEETING

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

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

INTRODUCTION

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

(a) Legislative and governmental responsibilities;
(b) The authority, responsibilities and function of the regulatory body;
(c) The organization of the regulatory body;
(d) The authorization process;
(e) Review and assessment;
(f) Inspection and enforcement;
(g) The development of regulations and guides;
(h) Emergency preparedness for transport;
(i) 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. Panama has a unique legal system for the transit of dangerous cargo, including radioactive material. On the one hand, the Political Constitution of the Republic of Panama (Constitution) allows the ACP to regulate the transit of dangerous cargo through the Panama Canal considering the legal regime established in the Treaty Concerning the Permanent Neutrality and Operation of the Panama Canal (Neutrality Treaty). On the other hand, there is a general legal system applicable to the introduction and movement of dangerous cargo, including radioactive material, outside the international waterway. The ACP regime considers the international normative established in the Neutrality Treaty, which declares the Panama Canal to be an international waterway that shall be permanently neutral (Article 1 of the Neutrality Treaty). Moreover, in Article II(b), Panama declares that the applicable rules and regulations are to be complied with. Article III, Part 1(a), of the Neutrality Treaty states, inter alia, that "*the Canal shall be operated efficiently in accordance with the conditions of transit through the canal, and the rules and regulations shall be… limited to those necessary for safe navigation and efficient sanitary operation of the Canal;…*" The Neutrality Treaty guarantees the use of the Panama Canal for the transit of vessels on the basis of its status as an international waterway.

4.3. The legislative and governmental responsibilities of the authorities in Panama are 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.

Prerequisites for the safe transport of radioactive material

4.4. Reference [11] states in para. 1.5, inter alia, 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 in para. 2.2, inter alia, that there are "*certain prerequisites for the safety of facilities and activities.*" These prerequisites are addressed in subparagraphs of para. 2.2.

4.5. Reference [11] states in para. 2.2, inter alia, 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 through the Panama Canal

4.6. The legal framework for the transport of radioactive material through the Panama Canal is provided by the Constitution, organic law[1] and the relevant regulations.

Constitution

4.7. Panama assumed full responsibility for the administration, operation and maintenance of the Panama Canal at noon on 31 December 1999. Panama complies with this responsibility through a legal entity designated as the ACP. The ACP is the only authority created directly through a special constitutional title (Title XIV of the Constitution) as an autonomous legal organization. Pursuant to the Constitution, the Panama Canal constitutes an inalienable patrimony of the Panamanian State; it shall be open to peaceful and uninterrupted transit by all nations and its use shall be subject to the requirements and conditions established by the Constitution, the law and its administration (Article 309, the Constitution). The ACP is exclusively in charge of the administration, operation, conservation, maintenance and modernization of the Panama Canal and related activities, pursuant to current constitutional and legal provisions in force, in order that it may operate the Canal in a manner that is safe, continuous, efficient and profitable (Article 310, the Constitution).

Organic law

4.8. The ACP's unique legal regime created by the Constitution is organized under Law No. 19 of 11 June 1997 (organic law of the ACP), which spells out the statutory authority that governs the waterway and establishes the ACP's legal rights and responsibilities.

[1] The main difference between organic and ordinary laws is in the way that they are approved as defined under Article 159 of the Constitution. Organic laws require the vote of the majority of all legislators, while ordinary laws only require the vote of the majority of the legislators present.

Regulations

4.9. Regulations on navigation in Panama Canal waters are issued by the Board of Directors of the ACP. Aspects of safety requirements are established by the ACP through Agreement No. 13 of 3 June 1999 (the Regulation on Navigation in Panama Canal Waters) of the ACP. This agreement includes international standards and applicable international laws (SOLAS Convention, IMDG Code). On the subject of dangerous cargo, reference to codes, international agreements or other regulations shall also be deemed to refer to any amendments or additions thereto on or after the date such amendments or additions become effective (Article 113). Specifically, vessels carrying packaged dangerous goods must meet the requirements on anchoring, transit and cargo, and the requirements established by the IMO conventions and codes on the subject as set forth in the annex (Article 128 and Annex Article 128.2). Vessels carrying radioactive substances (Class 7) shall comply with the same requirements set forth in the IMO conventions and codes, the cargo requirements set forth in Article 128 of the annex, as well as the IMDG Code (Article 135).

4.10. The basic legal instruments governing the transport of radioactive material through the Panama Canal are therefore:

(a) Title XIV of the Constitution;
(b) Law No. 19 of 11 June 1997 (organic law);
(c) Agreement No. 13 of 3 June 1999 of the Board of Directors of the ACP, Regulation on Navigation in Panama Canal Waters, Chapter IX, Dangerous Cargo.

Regulations for the safe transport of radioactive material through the Panama Canal

4.11. The regulations applied to the safe transport of radioactive material through the Panama Canal include the IMDG Code, as amended, and therefore currently include the requirements of the 1996 edition of the Transport Regulations [1]. In addition to applying the IMDG Code, the ACP also applies other international regulations relevant for safety in maritime transport. Further details on these other regulations are included in the Maritime Operations section of this report.

Finding

4.12. Basis: Ref. [11] states in para. 2.2, inter alia, that "*(1) A legislative and statutory framework shall be established to regulate the safety of facilities and activities;…*" The unique legal system that is relevant for the transport of radioactive material through the Panama Canal, based on the Constitution, organic law and the Regulation on Navigation in Panama Canal Waters, is very clear and precise. The application of the IMDG Code, as amended, ensures that the applicable regulations are always up to date with the latest internationally applicable edition of the Transport Regulations.

Good practice: The unique legal framework established for the Panama Canal promotes a high level of effectiveness and in practice results in technical and management systems that are of a high level and ensure proper protection of the public, ACP workers, the environment and the Panama Canal itself against the potential hazards associated with the transport of radioactive material.

Legal framework for the transport of radioactive material in Panama outside the Panama Canal

4.13. The legal framework that is relevant for the transport of radioactive material in Panama outside the Panama Canal is provided by the laws, decrees, resolutions and regulations that are described below.

Laws and decrees

4.14. MINSA was established by Cabinet Decree No. 1 of 15 January 1969 in order to execute, promote, protect and improve the health of the people in accordance with the Constitution. The main legal provision that grants MINSA authority in matters of radiological protection throughout the territory of Panama is established in Executive Decree No. 1194 of 3 December 1992. This decree was approved so that MINSA could have the authority to act in protecting the health of the population in accordance with Article 26 of the Constitution. This decree also covers all public and private activity involving radiological exposure and the production, treatment and storage of ionizing sources and requires a licence and authorization granted by MINSA through the General Directorate for Health (DGS). It requires that any person (natural or juridical) that handles, transports, imports or exports radioactive substances use the appropriate equipment to ensure safety.

4.15. The DSR acts as the technical adviser to MINSA in matters involving ionizing radiation and radioactive material. The DSR is part of the CSS, an autonomous governmental entity created by Law No. 134 of 27 April 1943, modified by Law Decree No. 14 of 27 August 1954, which is responsible for providing social security services (such as medical services, workers' compensation and maternity leave) to the population.

4.16. Law No. 52 of 30 November 1959 adopts the International Convention on Civil Aviation of 1944. As a result, the applicable regulations include the ICAO Technical Instructions for the international air transport of dangerous goods, including radioactive material.

4.17. The AAC was created by Law No. 22 of 29 January 2003. The AAC is responsible for directing and regulating air transport services and for offering services to ensure safe transport by air. Law No. 22 incorporates the Chicago Convention with all its annexes. Under Article 3(8) of this law it is stated that one of the AAC's functions is to adopt, as part of the national regulation when feasible, the norms and methods recommended by the ICAO. These norms include the ICAO Technical Instructions. The AAC is also in charge of implementing and regulating national aviation within Panama, as provided under Law No. 21 of 29 January 2003.

4.18. The ATTT, created by Law No. 34 of 28 July 1999, is the entity responsible for regulating the transport of dangerous cargo by land throughout the country. It is also in charge of the land transit system within Panama.

4.19. Executive Decree No. 160 of 7 June 1993 (the transit regulation) establishes in Chapter III some references according to which every vehicle used for the transport of dangerous substances should be equipped in accordance with Fire Department requirements; these requirements include a certificate of inspection.

4.20. The AMP, created pursuant to Law Decree No. 7 of 10 February 1998 and Law No. 21 of 1980, is the State entity in charge of regulating the maritime transit of all ships on Panamanian navigable waters except those that are in transit through Panama Canal waters. The AMP is the legal representative of Panama to the IMO. According to Article 13 of Law Decree No. 7 of 10 February 1998, the functions and responsibilities given to the AMP by law should not interfere with the responsibilities given to the ACP by the Constitution.

4.21. Law No. 7 of 27 October 1977 approves the SOLAS Convention. Law No. 7 establishes, under Article VIII, several procedures for amendment of the SOLAS Convention.

4.22. Law No. 38 of 4 June 1995 adopts and ratifies the United Nations Convention on the Law of the Sea (UNCLOS), which defines maritime spaces and interior waters. The concepts of territorial sea, contiguous zone, interior waters, exclusive economic zone and continental shelf are defined in this convention. Article 4(6, 12) of Law Decree No. 7 of 10 February 1998 establishes that the AMP is responsible for enforcing the provisions of UNCLOS to protect the coastal area that is part of the natural marine resources.

4.23. Law No. 47 of 21 November 1980 attributes to several governmental authorities, through the Ministry of Government and Justice, the responsibilities for controlling the movement of dangerous substances into and out of Panama; however, as new competent authorities have been created for these purposes, this legislation can be deemed to be superseded.

4.24. Law No. 101 of 30 December 1998 approves the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

4.25. Law No. 102 of 30 December 1998 approves the Convention on Early Notification of a Nuclear Accident.

4.26. Law No. 103 of 30 December 1998 approves the Convention on the Physical Protection of Nuclear Material.

Resolutions

4.27. Resolution No. 59 of 9 October 1995 gives the DSR certain responsibilities involving radiological protection. This resolution designates the DSR as the competent unit to (a) authorize the use of radioactive substances and other ionizing sources and (b) ensure compliance with the radiological requirements.

4.28. Resolution No. 27 of 24 October 1995 adopts the standard norms of radiological protection.

4.29. Resolution No. 7 of 11 July 1996 adopts Regulation No. 120, on the safe transport of radioactive material, in accordance with Executive Decree No. 1194 of 3 December 1992.

4.30. Resolution No. 8 of 11 July 1996 approves Regulation No. 100, on the notification, registration and licensing of radioactive material and equipment that produce ionizing radiation; this resolution contains six annexes. This legislation includes the main requirements for the registration, licensing and responsibilities of the persons authorized to conduct inspections.

4.31. Resolution No. 69 of 23 July 1998 approves the regulation on planning, preparation and response to emergency radiological situations.

4.32. Resolution No. 111-JD of 16 November 1995 establishes the civil aviation in Panama regulation, as amended by Agreement No. 79-JD, which creates Titles I–XIX of this regulation.

4.33. Resolution No. 95-JD of 27 August 2002 modifies two titles of Agreement No. 79-JD. It is in this regulation that the AAC adopts the international norms and principles of the ICAO, as established under Article 37 of the International Civil Aviation Convention; these norms and principles are mandatory for countries party to this convention. Title XVII refers to the transport of dangerous cargo without any risk.

4.34. Resolution No. 62/DSA/AAC of 21 May 2003 amends the Dangerous Goods Department Procedure Manual as an official working document that provides the guidelines for implementing the regulations that have been established and approved by Panama.

Regulations for the safe transport of radioactive material in Panama

4.35. The basis for the Panamanian regulations covering the safe transport of radioactive material (apart from those governing the ACP) is Resolution No. 7 of 11 July 1996 of the DGS, which provides that, in accordance with Executive Decree No. 1194 of 3 December 1992, Regulation No. 120, on the safe transport of radioactive material, which is based on the 1985 edition of the Transport Regulations as amended in 1990 [6], would enter into force one day after publication of the resolution. Regulation No. 120 is included in Resolution No. 7 in the Official Gazette of 29 July 1996. Article 116 of Regulation No. 120 states that MINSA, through the DGS, is the competent authority with regard to these regulations.

4.36. Article 102 of Regulation No. 120 states that Regulation No. 120 is applicable to the transport of radioactive material on land, by water and by air.

4.37. Article 108 of Regulation No. 120 states that the DGS has the authority to make decisions in cases where the transport regulations may contain conflicting requirements.

4.38. Article 109 of Regulation No. 120 states that the DGS has, inter alia, the authority to develop guidance documents to facilitate the understanding of the regulations and also has the authority to modify the regulations.

4.39. Article 701 specifies the various cases for which competent authority approval from MINSA is required (as specified also in para. 701 of the 1985 edition of the Transport Regulations [6]). Further details on these approvals are provided in Articles 702 and 722 (in accordance with paras 702 and 722 of the 1985 edition of the Transport Regulations [6]).

4.40. The modal transport authorities for air transport, the AAC, and for sea transport, the AMP, have the responsibilities for issuing regulations for the transport of dangerous goods, which include radioactive material as Class 7 of the nine classes of dangerous goods.

4.41. For air transport, the current ICAO Technical Instructions were adopted into Panamanian law by Laws No. 21 and 22 of 29 January 2003, and in the civil aviation regulations of Panama (RACP) and Resolution No. 95-JD of 27 August 2002 (Section 1, Articles 1 and 2). The current ICAO Technical Instructions have incorporated the requirements of the 1996 edition of the Transport Regulations. The ICAO Technical Instructions apply also to international air transport to and from Panama.

4.42. Panama has not applied for any variations to the ICAO Technical Instructions. However, the Panamanian airline Copa Airlines has applied for several operator variations to the IATA Dangerous Goods Regulations (which include all the requirements of the ICAO Technical Instructions). One of these variations, CM-04, states that radioactive material will not be accepted for carriage.

4.43. For sea transport under the jurisdiction of the AMP, the IMDG Code is the basis for the regulations that are applied. The current IMDG Code incorporates the requirements of the 1996 edition of the Transport Regulations. Many of the requirements of the IMDG Code became mandatory as of 1 January 2004.

Finding

4.44. Basis: The regulations for the safe transport of radioactive material as applied by MINSA, the AAC and the AMP. The current ICAO Technical Instructions were adopted into Panamanian law by Laws No. 21 and 22 of 29 January 2003, and in the RACP and Resolution No. 95-JD of 27 August 2002 (Section 1, Articles 1 and 2). The IMDG Code is the basis for the AMP regulations. The current ICAO Technical Instructions and the current IMDG Code have incorporated all the requirements of the 1996 edition of the Transport Regulations [1]. This creates an apparent discrepancy with other Panamanian regulations, specifically Resolution No. 7 of 11 July 1996, which refers to the 1985 edition of the Transport Regulations [6]. There are overlapping areas with respect to the legislative requirements governing the transport of radioactive material in Panama. Such areas may cause legal difficulties in the field of the international transport of radioactive material and in the import and export of radioactive material into and out of Panama.

Recommendation: The various competent authorities, in particular MINSA, the AAC and the AMP, should review the legislative requirements for the transport of radioactive material in areas of overlapping responsibilities for harmonization as related to the requirements of the 1996 edition of the Transport Regulations.

Other prerequisites for the safe transport of radioactive material

4.45. 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.*" The legislation establishing the ACP, MINSA and the modal transport authorities, the AAC and the AMP, has been outlined in the summary of the relevant legal documents. These authorities are all independent of organizations or bodies charged with the promotion of nuclear technologies.

4.46. 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 reviewed in detail in the specifically related sections of this report covering: authority, responsibilities and functions of the regulatory body; the authorization process; review

and assessment process; inspection and enforcement; development of regulations and guides; and emergency preparedness for transport.

4.47. Reference [11] states, inter alia, in para. 2.2, that "…*(4) The regulatory body shall be provided with adequate authority and power, and it shall be ensured that it has adequate staffing and financial resources to discharge its assigned responsibilities.*"

4.48. The authority and power of the ACP are outlined under Title XIV of the Constitution and Law No. 19 of 11 June 1997 (organic law). The ACP also has financial autonomy granted by Title XIV of the Constitution. The ACP prepares its budget in accordance with the applicable legislation. The Panamanian Legislative Assembly receives the ACP budget for consideration and review, approval or rejection independently of the rest of the budget of the State. The ACP Department of Maritime Operations presents its annual budget to the administration of the ACP, which includes funding for the MRT. The MRT is the unit within the Department of Maritime Operations in charge of conducting the daily functions of the regulatory body. The Senior Canal Port Captain, Pacific Office, carries out the daily operations activities for the MRT on the Pacific side of the Panama Canal, while the Senior Canal Port Captain, Atlantic Office, carries out the daily operations on the Atlantic side. Their adequate staffing and financial resources are provided by the Department of Maritime Operations (Articles 310 and 313 No. 2, the Constitution; Articles 7, 33–38, organic law, 1997).

4.49. The authority and power of MINSA are outlined in, inter alia: Cabinet Decree No. 1 of 15 January 1969 establishing MINSA; Executive Decree No. 1194 of 3 December 1992; Resolution No. 27 of 24 October 1995 of MINSA. MINSA's financial resources are made available through the general budget of the State, and the DSR, as a technical unit, operates with a budget that is allocated by the CSS.

4.50. 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 ACP, MINSA, the AAC and the AMP do not have responsibilities that jeopardize or conflict with their assigned regulatory responsibilities for transport safety.

4.51. Reference [11] states, inter alia, in para. 2.2, that "…*(7) Adequate infrastructural arrangements shall be made for the safe transport of radioactive material.*" The full implementation of all regulations for the safe transport of

radioactive material by MINSA is difficult. The resources of MINSA are limited, and in Panama there is only a small number of radioactive material shipments each year. The ACP and MINSA developed a cooperation agreement dated 17 February 2003 that facilitates optimizing their resources for the transport of radioactive material.

Finding

4.52. Basis: Ref. [11] states, inter alia, in para. 2.2, that "…*(7) Adequate infrastructural arrangements shall be made for the safe transport of radioactive material.*" The cooperation agreement developed between the ACP and MINSA facilitates optimizing limited resources for the transport of radioactive material.

Good practice: The recent cooperation agreement between the ACP and MINSA helps them to optimize their responsibilities regarding human health, property and the environment.

4.53. 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.

Specific legislative requirements concerning transport safety

4.54. 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.*" Specific requirements under this legislation as outlined in subparagraphs of para. 2.4 are reviewed in the following, with emphasis on the ACP and MINSA.

4.55. 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;…*" ACP: The radiation protection programme is implemented by performing vessel cargo inspections after the vessel arrives in Panama Canal waters. This inspection is additional to other inspections of the vessel. (All vessels with INF or with fissile cargo are inspected, and selected vessels with non-INF or non-fissile cargo are also inspected.) The radiation levels of the radioactive cargoes at the surface and 1 m from containers are measured to ensure compliance with the requirements of the 1996 edition of the Transport Regulations [1]. In general, the

public is not permitted within Canal operating areas. Access by the public is permitted only in approved tourist stands. MINSA: Regulation No. 120, adopted in Resolution No. 7 of 11 July 1996, in accordance with Executive Decree No. 1194 of 3 December 1992, states in Article 101 that the purpose of these regulations (Regulation No. 120) is to establish standards of safety that provide an acceptable level of control of the radiation hazards to persons, property and the environment that are associated with the transport of radioactive material. (This purpose is also stated in Section 1 of Chapter I of Resolution No. 27 of 24 October 1995.)

4.56. 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 the legislation;…*" ACP: The Regulation on Navigation in Panama Canal Waters considers transport activities as those that relate to the transit of vessels through the Panama Canal. The regulation also specifies that radioactive material is that classified under Class 7 by the IMO. Article 112 of the regulation states that "*War or auxiliary vessels, as defined in the Treaty Concerning the Permanent Neutrality and Operation of the Panama Canal, shall not be subject to the rules relative to the transportation of dangerous cargo contained in these regulations.*" MINSA: Regulation No. 120, adopted in Resolution No. 7 of 11 July 1996, in accordance with Executive Decree No. 1194 of 3 December 1992, addresses the scope and the exclusions in several articles. Article 102 states that Regulation No. 120 applies to the land, water or air transport of radioactive material other than that which is an integral part of the means of transport, including transport that is incidental to the use of the radioactive material. In Article 103 the definition of transport is deemed to include all operations and conditions relating to the transfer of radioactive material, including the design, manufacture and maintenance of packaging and the preparation, shipping, handling, carriage, in-transit storage and receipt at the final destination of packages. Transport includes both normal and accident conditions arising during carriage and storage in transit. Radioactive material is defined in Article 139 as material having a specific activity greater than 70 kBq/kg (2 nCi/g) (as in para. 139 of the 1985 edition of the Transport Regulations [6]). Article 104 (as in para. 104 of the 1985 edition of the Transport Regulations [6]) states that these regulations (Regulation No. 120) do not apply in the following cases: (a) in establishments where radioactive material is produced, used or stored other than during transport, provided that these establishments are subject to other appropriate safety regulations; or (b) to persons who have had cardiac pacemakers or other radioisotope devices implanted, or who have been treated with radiopharmaceuticals.

4.57. 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;…*" ACP: Article 136 of the Regulation on Navigation in Panama Canal Waters establishes that the "*Canal waters will be considered a country en route for the transportation of radioactive substances, for the purpose of prior notification and approval of shipments, in accordance with the IMDG Code.*" In addition, Article 135 states that vessels with radioactive cargo aboard shall comply with the IMDG Code. Article 137 states that "*Notification shall be given to the Authority 30 days in advance of the arrival of the vessel in Canal waters for all fissionable materials, to obtain approval to transit such cargo.*" Article 141 states that "*Vessels carrying low specific activity or low level solid radioactive substances, as well as radioactive substances carried in limited quantities, shall provide no less than 48-hour advance information, as required under article 30 of the annex, including the specifics required by the IMDG Code set forth in the annex.*" MINSA: Notification requirements are specified in Articles 455 and 458 of Regulation No. 120, which correspond to the related paragraph numbers of the 1985 edition of the Transport Regulations [6].

4.58. 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;…*" ACP: Vessels that do not submit evidence of compliance with the IMDG Code and other requirements are not permitted to transit until they do provide the required compliance. The vessels (shippers or consignors) may present to the manager of the Division of Transit Operations, the Director of the Department of Maritime Operations or the ACP Administrator (if necessary) any unusual circumstances or reasons for not being able to comply with the regulations when they appeal against any regulatory decision. MINSA: Reviews are initiated when there is an action brought officially or by personal complaint, within five working days after notification. Once these means of redress have been exhausted, it is possible to file an appeal for administrative review supported by any of the reasons described in Article 166 of Law No. 38 of 31 July 2000. In some cases the aggrieved person will have the option of resorting to administrative review or bringing a complaint or appeal in accordance with the provisions of Law No. 38.

4.59. 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;…*" ACP: The regulations do not provide for the creation of independent advisory

bodies to provide expert opinion for the ACP on the transport of radioactive material. MINSA: At present MINSA may request advice from experts in the CSS, which is independent of MINSA.

4.60. 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;…*" Liability and insurance matters are comprehensively covered by the ACP organic law. Regulations of the ACP provide broad definitions of liabilities. Article 57(4) of the ACP organic law provides the authority to establish the requirement of insurance coverage to be provided by vessels transiting the Panama Canal, to cover liabilities resulting from damages caused by such vessels to the Panama Canal, its properties, its workers and third parties. In addition, Article 78 of the ACP organic law states, inter alia, that "*The Authority may require, as a previous condition for transit, that vessels clearly establish the financial responsibility and guarantees for payment of a reasonable and adequate amount, consistent with the rules of international practice, to cover any damages that may result from their transit through the Panama Canal. In the case of a government-owned or government-operated vessel, or for which the government of a country has accepted responsibility, it shall suffice to guarantee such financial responsibility by means of a certification by the respective country stating that it shall comply with its obligations, in accordance with International Law, to pay any damages arising from actions or omissions of such ships during their passage through the Canal. These requirements will not be applicable when the vessel, property of a State or operated by the same, is engaged in maritime trade.*" Article 139 of the Regulation on Navigation in Panama Canal Waters states, inter alia, that "*Vessels carrying radioactive substances shall be required to provide current proof of financial responsibility… to the Republic of Panama, the Authority, or any agency thereof, covering public liability and loss as a result of accidents owing to radioactive cargo.*"

4.61. The specific requirements applicable to coverage are listed in Marine Directive No. 1-2002, Item 5(f), and the Department of Maritime Operations' Notice to Shipping No. 1-2002, Item 14 (i):

> "*The following requirements of coverage will apply for transiting vessels that carry specific radioactive cargoes:*

(a) For radioactive cargoes classified under IMO Class 7, Schedules 1–8 as listed in the IMDG Code (2000 Edition), transiting vessels must provide either/or,

— *A "coverage in full" certificate issued by any P&I Club that belongs to the International Group, or*
— *A minimum amount of US $20 000 000 (twenty million dollars) of liability insurance per TEU container. The ACP may request an increase in the amount of insurance as a result of risk evaluation made by the ACP officials.*

(b) For radioactive cargoes classified under IMO Class 7, Schedules 9–14 as listed in the IMDG Code (2000 Edition), transiting vessels must provide:

— *A minimum amount of US $30 000 000 (thirty million dollars) of liability insurance per TEU container. The ACP may request an increase in the amount of insurance as a result of risk evaluation made by the ACP officials, or*
— *A "coverage in full" certificate issued by any P&I Club that belongs to the International Group.*

(c) For radioactive cargoes such as INF cargo or any other radioactive cargo not specifically identified in this Notice, the ACP is to be contacted."

4.62. MINSA: The applicable private law (civil code) does define exactly liabilities in respect of nuclear damage arising from a transport accident. In the case of nuclear damage, the provisions of the civil code regarding civil liability are applied. Panama is not a signatory of the Vienna Convention or of the Paris Convention on Civil Liability.

Finding

4.63. Basis: Ref. [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;…*" Panamanian legislation has only defined the liability of the shipper with respect to nuclear damage (maritime law: Article 19, Chapter IV of Law No. 21 of 1980). The civil liability of proprietary and business operators is not contemplated in the maritime law. Further, the regulations involving civil liability for radioactive material transported by air or by ground are not clearly defined.

Arrangements for the provision of financial security with respect to liability for the transport of radioactive material are not stipulated in the legislation.

Recommendation: Legislation in Panama should set out the arrangements for the provision of financial security, as already established for transit through the Panama Canal with respect to financial liability for the various modes of the transport of radioactive material.

Finding

4.64. Basis: Ref. [11] states, inter alia, in para. 2.4, that "*This legislation… (14) shall define what is an offence and the corresponding penalties;…*" ACP: In accordance with ACP Agreement No. 13, offences are considered administrative offences, which are related to maritime safety and the pollution of Canal waters. Sanctions are imposed for these offences, according to their severity, to a maximum of 1 million balboas ($1 million) (Articles 142–154, Agreement No. 13, 3 June 1999). MINSA: In criminal law (Law No. 18 of 22 September 1982, Articles 233 and 236) no specific offence is defined concerning activities that jeopardize the safe transport of radioactive material (only fire, water and explosion are considered).

Recommendation: Legislation should set out the arrangements that address criminal actions that jeopardize the safe transport of radioactive material.

4.65. Reference [11] states, inter alia, in para. 2.4, that "*This legislation… (15) shall implement any obligations under international treaties, conventions or agreements;…*" The Regulation on Navigation in Panama Canal Waters requires vessels with dangerous cargo to comply with the requirements of the SOLAS Convention and the IMDG Code. In addition, the Convention on Physical Protection of Nuclear Material has been ratified by Panama and is implemented by the Canal Protection Division together with the security agencies of Panama. The ACP automatically adopts the IMDG Code, as a part of the SOLAS Convention, as amended (Chapter I, Section One, General Provisions and Definitions, IMO Class, in Agreement No. 13, 3 June 1999, the Regulation on Navigation in Panama Canal Waters).

AUTHORITY, RESPONSIBILITIES, FUNCTIONS AND ORGANIZATION OF THE REGULATORY BODY

Overview

4.66. Panama has five independent entities that are directly involved in the transport of radioactive material through its territory: MINSA, the ACP, the AAC, the ATTT and the AMP. Only MINSA is part of the Cabinet Council and is represented, through the Minister of Health, at the cabinet level, which is the interface between the President of the Republic, who presides over it, along with the two Vice Presidents, and the ministers who deal with issues stated under Article 195 of the Constitution. Three cabinet members, as indicated in Fig. 1, serve as chairpersons of the board of three entities (the ACP, AAC and AMP), which are autonomous. Currently, the Deputy Minister of Government and Justice is serving as the chairperson of the board of the ATTT, which is also an autonomous entity. Figure 1 also shows the CSS, which is another autonomous entity. The Minister of Health participates as one of the three Panamanian Government representatives on the Board of Directors of the CSS. The DSR acts as technical adviser to MINSA; this role is described in para. 4.70.

4.67. The ACP is administratively controlled by the Board of Directors and by the Administrator and the Deputy Aministrator. The Board of Directors, which is comprised of 11 members, establishes policies for the operation, improvement and modernization of the Panama Canal, and supervises its management pursuant to the Constitution, organic law and the regulations of the ACP. The Administrator is the highest ranking executive officer and the legal representative of the ACP and is responsible for the administration and implementation of the policies and decisions of the Board of Directors. Within the ACP, the Department of Maritime Operations and its MRT act as the competent authority. The MRT is responsible for verifying compliance of any radioactive cargo with the IMDG Code requirements and for approving its transit. The director of the Department of Maritime Operations is in direct contact with the division managers within his department. In turn, the manager of the MRT works closely with his subordinate units and with the supporting units outside the MRT. The size of the Department of Maritime Operations is commensurate with the extent and nature of the activities related to the safe transport of radioactive material that it regulates. Financial resources provided to the Department of Maritime Operations and the MRT are made available through their operating budgets, which are agreed annually with the ACP administration. The ACP budget is approved by the Panamanian Legislative

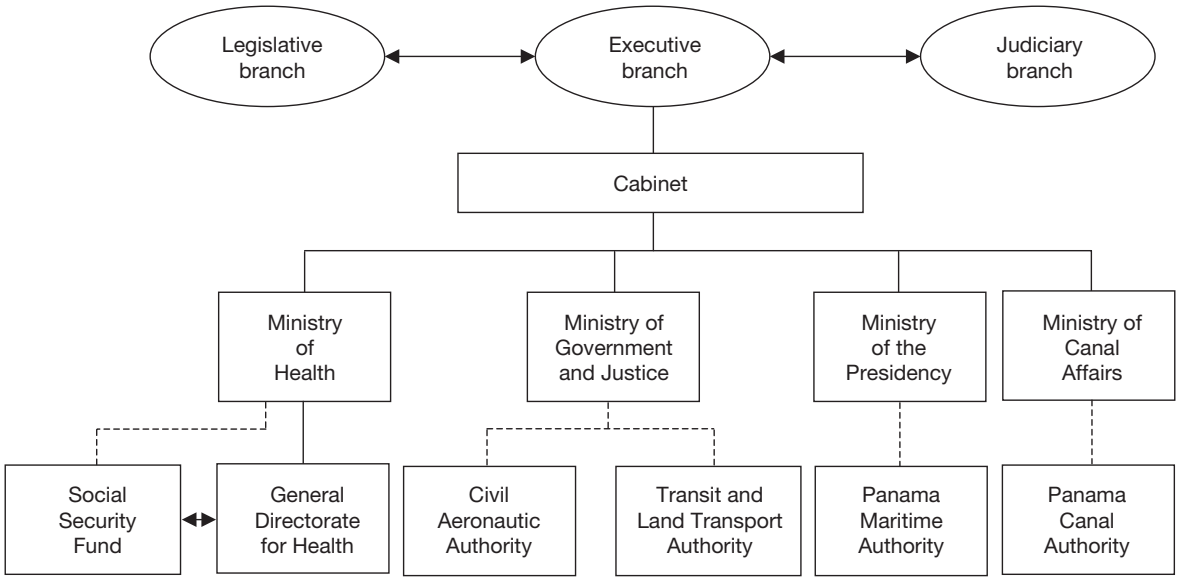

FIG. 1. Legal and organizational structure in Panama for regulating the transport of radioactive material.

Assembly separately from the rest of the budget of the State. The reporting lines within the ACP ensure that the Department of Maritime Operations is independent of any organization in charge of promoting nuclear technology or responsible for facilities and activities.

4.68. The ACP is entirely self-sufficient in all technical and functional areas with respect to the transit of radioactive cargo through the Panama Canal. The MRT has many employees with various skills, such as chemists for review and assessment, Canal Port captains, pilots, boarding officials, transiting vessel inspectors, industrial hygienists and legal staff to prepare regulations or guides on legal matters. The ACP has position descriptions that define the responsibilities and requirements for each position. In general, each position requires advanced degree education and professional experience. Additionally, technical and professional staff have attended specific courses and seminars presented in Panama, by the IAEA, on the safe transport of radioactive material and on the transport of radioactive cargo in accordance with the IMDG Code.

4.69. MINSA is the competent authority responsible for formal and institutional affairs. In order to perform its responsibilities for the safe transport of radioactive material and to obtain technical inter-institutional assistance in radiological matters, MINSA is connected through its DGS to the DSR, which is a division within the CSS. The DGS works at the headquarters of MINSA, and the technical staff work in the DSR at the headquarters of the CSS and in other offices.

4.70. For a better utilization of resources, the size and structure of MINSA are limited with regard to the oversight of the transport of radioactive material. However, this is reasonable given the small number and type of shipments of radioactive material per year in Panama. Resources provided to MINSA are fixed annually through the general budget of the State; the CSS is an autonomous entity. The group within MINSA specifically tasked with the oversight of radioactive material transport is the DGS, which is headed by a director who is assisted by lawyers from the Legal Advice Directorate. Technical aspects related to the safe transport of radioactive material are dealt with by staff from the DSR of the CSS: four people are involved in review and assessment, three in inspection and recommending enforcement, and two in the preparation of regulations or guides on legal matters. The director of the DGS must hold a doctorate in medicine and be a specialist in public health; the legal advisers must hold a university degree in law; and the technical staff must be specialized in radiation protection. The staff have received training through

specific courses, seminars and scientific visits at the national, regional and inter-regional levels.

4.71. The actions of the ATTT focus on the technical aspects of vehicle control, including vehicles involved in the transport of radioactive material. Vehicles should be authorized by the ATTT and be listed in a national register of motorized vehicles. However, the ATTT does not have personnel involved in the control of the transport of radioactive material. The competent authority for the land transport of radioactive material through the territory of Panama is therefore the DGS of MINSA, as indicated in Section 1 of Resolution No. 7 of 11 July 1996.

4.72. The AAC has an Operative Airport Department in each airport, which is in charge of verifying that goods transported in aircraft entering or leaving national or international airports have complied satisfactorily with loading and packaging requirements. The AAC has at its headquarters two inspectors who verify that dangerous goods are transported in compliance with the regulations. With respect to the transport of radioactive material, inspectors are involved in activities for review and assessment, inspection and enforcement, as well as the preparation of regulations and guides on legal matters. Inspectors are college graduates, have a technical certification in dangerous goods and take part in ICAO and IATA annual training courses on the transport of dangerous goods.

4.73. Currently in Panamanian maritime ports and waterways other than the Panama Canal there is no transport of radioactive material. Consequently, the AMP regulates the transport of dangerous goods but does not regulate the transport of radioactive material. It does not have an administrative organization that specifically addresses such transport, although it many need one in the future. If the AMP needs advice on the transport of radioactive material, the authority can request assistance from the other competent authorities. During the months leading up to the TranSAS appraisal, the authorities in Panama made considerable efforts to meet and coordinate the provision of information. On various occasions, informal commissions were convened that included representatives of the authorities involved, to discuss and identify where organizational interfaces existed and where improvements needed to be made. The results have demonstrated that a practical way to address such organizational interfaces is to form a commission that meets, identifies the problems and objectives and then works informally to achieve the objectives. When there is good liaison between the responsible organizations, problems can easily be avoided because information is being passed to or shared with the

other organizations involved. The benefits gained through these commissions include the following:

(a) Misunderstandings did not occur about which edition of the Transport Regulations were in force for each mode of transport;
(b) Upcoming changes to international regulations were clearly understood by all parties who needed to know;
(c) Significant differences in the implementation of internal modal regulations were avoided;
(d) Respective procedures and inspection arrangements could be understood and shared, where appropriate, to avoid overlap and gaps;
(e) Experience and knowledge obtained during inspection, authorization, enforcement and incident response activities could be shared, and misunderstandings avoided.

4.74. The initial experience indicates that establishing a permanent committee or similar collective body, with consistent representation, to promote common understanding and cooperation in matters of the transport of radioactive material, as well as of other dangerous goods, would be beneficial. Such a permanent committee could help to identify and minimize areas of overlap and, of equal importance, areas where gaps exist in regulatory control. This could certainly assist in the efficient use of existing and future human resources, which are scarce. There is provision for support to MINSA from the DSR via Executive Decree No. 1194 of 3 December 1992. There is also a cooperation agreement between the ACP and MINSA dated 17 February 2003. However, no other formal agreements seem to exist between the other authorities involved.

Findings

4.75. 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.*"

Good practice: In the past, when problems and issues arose, inter-institutional commissions were formed on an informal basis to address these problems or issues. This is considered good practice.

Suggestion: It is suggested that a permanent commission or committee be established, to provide for the regular contact and liaison necessary between those authorities and other bodies concerned with the safe transport of radioactive material.

Recommendation: Consideration should be given to establishing and maintaining suitable memoranda of understanding or agreements between the different authorities and groups involved in the safe transport of radioactive material, in order to secure the necessary immediate and long term cooperation.

AUTHORIZATION PROCESS

Overview

4.76. When transporting radioactive material, the safety of the transport personnel, the general public, property and the environment can only be ensured if the accepted 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 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 materials containing fissile material, Type B(U) and Type B(M) package design approvals, shipment approvals and special arrangement approvals.

4.77. A review of the information from MINSA, the ACP, the AMP and the AAC has confirmed that the principal responsibility for issuing authorizations in Panama rests with MINSA. The ACP allows the transit of vessels carrying radioactive material through the Panama Canal provided that all regulatory requirements are met, but it does not issue formal transport authorizations or approvals. Authorizations issued by MINSA go beyond those required for the safe transport of radioactive material. The DSR provides technical assistance to MINSA in the assessment of applications for authorizations. Executive

Decree No. 1194 of 3 December 1992 provides for this interactive assistance. The authorizations issued so far have been associated with radiation protection and radiation safety in general at installations, but have not specifically addressed the transport of radioactive material.

4.78. While some authorizations are issued for the use of radioactive material and for equipment that emits ionizing radiation, currently no authorizations are issued by MINSA that cover the transport on land of radioactive material. This is because current assessments by MINSA advisers (who are staff of the DSR) of requests for authorization do not cover the regulatory aspects for land transport.

Findings

4.79. Basis: Executive Decree No. 1194 of 3 December 1992 requires in accordance with Article 16 of the decree that "*Any person or organization that uses, installs, transports, repairs, supplies, imports or exports radioactive sources shall use packages, packaging, conveyances, and tools and equipment for loading and unloading, which shall be authorized by the DGH.*"

Recommendation: All land transport activities associated with the use of radioactive material should be clearly recognized as a condition of authorization and included in the authorization process carried out by the DSR on behalf of the DGS.

4.80. Basis: Currently within Panama no approvals of the types specified in the Transport Regulations are issued; and there appears to be no need to issue such certificates at this time, owing to the nature and volume of radioactive material being transported. Paragraph 802 of the 1996 edition of the Transport Regulations [1] (and Article 701 of Regulation No. 120) states, inter alia, that "*Competent authority approval shall be required for the following: (a) designs for… (b) special arrangements… (c) certain shipments… (d) radiation protection… (e) calculation…*"

4.81. With the most recent changes to the international rules in the transport regulations (particularly concerning the amounts of ^{60}Co that can be transported by air), a need will likely arise in the near future for some types of approval certificate to be issued or validations of foreign certificates to be carried out. There will also be a need to consider the change in status of some approvals for the design of packages for the transport of radioactive material issued by other competent authorities in the countries of origin of the goods

transported; paras 816 and 817 of the 1996 edition of the Transport Regulations [1] (and Articles 713 and 714 of Regulation No. 120) provide for the continued use of packages approved against earlier editions of the Transport Regulations, but with multilateral approval. Hence there will be a need for such approvals to be considered in Panama.

Suggestion: It is suggested that the need for the issuance of competent authority approval certificates be reviewed and the means for the issuance of such approvals established. A suitable flow chart of departmental responsibilities and involvement in the consideration and issuance of approval certificates would be most helpful.

4.82. Basis: IAEA Member States are encouraged to keep their regulations for the transport of radioactive material up to date. The Foreword of the 1996 edition of the Transport Regulations [1] states, inter alia, that "*It is further recommended that adoption of these revised Regulations occur within a period of five years from publication to achieve worldwide harmonization of their application.*" The requirements of the 1996 edition of the Transport Regulations [1] were implemented for international air and sea transport in 2001 through the ICAO Technical Instructions [14] and the IMDG Code [16]. Currently, the regulations of MINSA for the safe transport of radioactive material (Regulation No. 120, adopted in Resolution No. 7 of 11 July 1996) are based on an earlier edition of the Transport Regulations. The ACP applies the requirements of the 1996 edition of the Transport Regulations [1] by applying the current IMDG Code.

Recommendation: MINSA regulations should be amended to provide for the implementation of the requirements of the 1996 edition of the Transport Regulations as soon as practicable.

4.83. Basis: Ref. [4] states, inter alia, in para. 207, that "*The competent authority may not be entirely self-sufficient in all technical areas. It may delegate some of its specific activities to organizations having the necessary technical abilities… These organizations and consultants shall be independent of the organizations whose work they are evaluating. However, the responsibility for these activities remains with the competent authority, which must evaluate the results of delegated work. Suitable subjects for consultancy are, for example, inspections and material tests, and verification analysis of safety reports.*"

4.84. The DSR acts as the technical adviser to MINSA for all matters concerning radiation protection. There is a potential for the necessary

independence of the competent authority's adviser to be compromised, as the DSR is part of the same body (i.e. the CSS), which is the major user of the authorizations being issued.

Suggestion: It is suggested that the role and responsibilities of the competent authority's advisers be reviewed to ensure that the necessary independence is maintained.

REVIEW AND ASSESSMENT PROCESS

Overview

4.85. A review of the information from MINSA, the AMP and the AAC has confirmed that review and assessment activities relative to the issuance of approvals by the competent authority for transport (i.e. those required by the Transport Regulations) do not currently take place. This situation occurs mainly because of the size of the radioactive material transport industry in Panama and because of the relatively small number of shipments made. As mentioned in the preceding section (Authorization Process), some authorizations are issued, but so far they have been associated with radiation protection and radiation safety in general at installations, and have not specifically addressed the transport of radioactive material. Consequently, there have been some review and assessment activities carried out by the technical advisers to MINSA, which have focused on the information supplied by the applicant for authorizations. However, these review and assessment activities have not covered the specific land transport activities that would ensure that all pertinent aspects of the Transport Regulations are met. The personnel in the DSR are suitably qualified and experienced to provide the necessary technical advice to MINSA and have an understanding of the requirements of the Transport Regulations.

4.86. As also mentioned in the preceding section, it is expected that, as a result of changes already made to the Transport Regulations, it will become necessary for Panama to issue specific competent authority approvals. It will also become necessary for the competent authority to acquire the necessary expertise, either directly or indirectly through its nominated advisers, to be able to review and/or assess applications. The technical advisers (the DSR) to MINSA have some basic procedures for the evaluation of applications for authorization. However, these procedures do not currently extend to carrying out review and

assessment of applications for the competent authority approvals specified in the Transport Regulations.

4.87. Basis: Ref. [4] states, in para. 501, that "*It is one of the responsibilities of the competent authority to issue approvals. The decision to give an approval is based upon the competent authority's evaluation of the applicant's demonstration of compliance with the relevant regulations. As described in Section IV, the competent authority should complete and record these safety evaluations, which provide the basis for the issue of approvals.*"

Recommendation: The needs and capabilities of the competent authority (MINSA) and its technical advisers should be reviewed, taking into account future requirements to issue appropriate competent authority approvals. Suitable written procedures should be developed to enable a clear understanding of what kind of review and evaluation must be done, what qualifications and experience are needed for those involved and how the process is to be managed.

Recommendation: The current arrangements for the review and assessment of land transport applications for authorizations should be reviewed and amended as necessary to ensure that all pertinent aspects of the Transport Regulations are met.

INSPECTION AND ENFORCEMENT

Overview

4.88. The competent authority has to perform audits and inspections as part of its compliance insurance programme in order to confirm that the users are meeting all the applicable requirements of the Transport Regulations and are applying their quality assurance programmes. Inspections are also necessary to identify instances of non-compliance that may necessitate either a call for corrective action by the user or enforcement action by the competent authority. For the Panama Canal, the ACP has the sole authority and responsibility to perform inspections and take enforcement action if needed. With respect to the domestic transport of radioactive material, several agencies and authorities are involved in the inspection of transport activities. The three authorities with respect to transport by land, air and sea are, respectively, the ATTT, the AAC and the AMP. Additionally, certain responsibilities are also assigned to MINSA and to the DSR.

Findings

4.89. 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.*" With respect to the ACP, inspection activities are carried out in a well planned and thorough manner. The ACP procedures clearly identify what information needs to be submitted by shippers and when the information needs to be submitted to the ACP for review. Further, the internal procedures of the ACP clearly specify the actions that the ACP inspection personnel need to take in reviewing the submitted paperwork, which includes checking attributes such as the types and quantities of radioactive material being shipped and the types of packages or shipping flasks being used, including certificates of approval where applicable. The ACP inspects all INF class vessels with INF cargo on board and all vessels with fissile cargo. The inspections include actual physical inspection of the packages (or shipping flasks) that are on board the vessel prior to transit through the Panama Canal. Trained and qualified inspectors carry out the inspections. The inspections include actions such as visual verification of package integrity as well as independent measurement of radiation levels, not only around the packages but also in the areas where the ACP personnel could potentially be exposed at various work locations on board and adjacent to the vessel. A checklist inspection form is used for documenting the results of these inspections. With respect to enforcement for any identified non-conformances, vessels that do not meet inspection requirements are not permitted to transit until they are in conformance.

Good practice: The ACP conducts inspections on all INF class vessels with INF cargo on board and all vessels with fissile material. While the total number of such shipments is relatively low, the practice of 100% inspection of such shipments goes well beyond IAEA requirements, which call for periodic inspection of transport activities.

4.90. With respect to air transport, domestic transport by air is not conducted. Currently, all radioactive material brought into the country (excluding Panama Canal waters) comes in through international air transport and consists almost exclusively of radioactive material for medical uses. The authorization to import radioactive material into Panama has been granted to two international airlines. The extent of package inspections performed by the AAC consists of verification of shipment documentation and periodic visual inspections of package condition, including checking proper package labelling and marking. The AAC does not perform independent reviews of package radiation and contamination levels prior to the release of packages through the Customs Service, although these actions are required to be performed by the consignor. The AAC personnel stated that there is currently no formal agreement between the AAC and the Customs Service that would allow for customs notification to the AAC of the presence of shipments of interest, such as those with Class 7 material, so that the AAC can inspect them if it chooses to; however, such an agreement is currently under consideration by the AAC.

Suggestion: It is suggested that the AAC consider performing thorough and independent package inspections, at a frequency consistent with the nature and number of such shipments. It is further suggested that the AAC use personnel from the DSR in the same manner that the DSR assists the AAC when inspection of suspicious packages is performed.

Suggestion: It is suggested that the AAC complete its plan to implement a formalized process together with the Customs Service that would allow for timely notification to the AAC concerning the presence of shipments of interest to the AAC.

4.91. With respect to transport by sea, currently no radioactive material is imported into Panama by ship, and no material is transported domestically by ship. Currently, the AMP does not have any procedures or trained personnel to perform inspections of packages containing radioactive material. Further, current legislation as applied to the AMP does not specifically address the regulation of the transport of radioactive material; however, legislation is currently being developed that will address this lack of specificity in the AMP's regulatory authority.

Suggestion: It is suggested that the AMP review its responsibilities for the inspection of imports of radioactive material by sea and have a process in place, for example through an agreement with MINSA, at such time that radioactive material such as ^{60}Co starts arriving by ship.

4.92. With respect to transport by land, it is understood that the ATTT's responsibilities do not extend to radioactive material being transported, and that MINSA has responsibility for this area. MINSA plays a central role in the area of the transport of radioactive material. By law, all entities within Panama wishing to use radioactive material are required to notify and obtain authorization from MINSA, which has been designated as the competent authority for Panama. MINSA processes authorizations with technical assistance provided by the DSR. The personnel of the DSR are responsible for the periodic inspection of those entities within Panama that have been authorized by MINSA to use radioactive material. Currently the DSR does not perform land transport inspections, as there are currently no authorizations issued for transport by land. Notwithstanding, land transport is being conducted when radioactive material is collected from the airport and delivered to the various points of use by the authorized users.

4.93. With respect to enforcement action, the DSR can and does identify non-conformances. Nonetheless, it cannot take direct action to have non-conformances corrected. Instead, non-conformances are reported to MINSA, which then has the responsibility to develop and implement any enforcement actions necessary. Within MINSA there is no defined system to link specific enforcement action to the seriousness of the non-compliance. Instead, enforcement actions taken by MINSA for non-conformances can vary, and will be in accordance with various articles of Resolution No. 27 of 24 October 1995, on the basic radiation protection standards.

Recommendation: MINSA should implement an authorization process for land transport that will in turn provide the DSR with the authority to perform inspections of transport activities by land. Such inspections by the DSR should be carried out in a manner consistent with the nature and number of shipments of radioactive material.

DEVELOPMENT OF REGULATIONS AND GUIDES

Overview

4.94. The development of regulations and guides is reviewed separately for MINSA and for the ACP.

4.95. MINSA: The authority responsible in Panama for the revision and development of regulations and guides in the field of the transport of

radioactive material is the DGS of MINSA. MINSA is the designated competent authority for the safe transport of radioactive material for all modes of transport (Part 1 of Section 102 of Resolution No. 7 of 11 July 1996).

Findings

4.96. MINSA obtains information on new or revised editions of the Transport Regulations and other IAEA safety standards from the Ministry of Foreign Affairs (through the Permanent Mission of Panama in Vienna). The Mission in Vienna informs the General Directorate of Organizations and International Conferences of the Ministry of Foreign Affairs, which then informs MINSA for general matters, as the national competent authority, with copies as appropriate to the ACP for Panama Canal matters, the AMP for maritime matters and the AAC for aviation matters.

4.97. Basis: It was not apparent that the system of notification of new Transport Regulations and other IAEA safety standards was operating effectively. This system needs review, particularly regarding the flow of communication between the IAEA and the competent authority.

Suggestion: To ensure that new and revised editions of the Transport Regulations and other IAEA safety standards are implemented by the proper jurisdiction within Panama, it is suggested that internal and external communication routes be reviewed and clarified to ensure that the competent authority and other responsible organizations receive timely notification of new and revised editions.

4.98. Basis: According to Part 1 of Section 102 of Resolution No. 7 of 11 July 1996, MINSA, as the competent authority, is responsible for the implementation of the regulations for the safe transport of radioactive material for all modes of transport. However, the ACP, the AAC, the ATTT and the AMP were established after the promulgation of Resolution No. 7. The international modal transport bodies the ICAO and IMO contact the authorities with appropriate jurisdiction.

Suggestion: As the legislation creating the ATTT, the AMP and the AAC has been promulgated, it is suggested that a review be undertaken to ensure that each authority is clearly aware of who is responsible for radioactive material transport issues within its respective jurisdiction.

4.99. Basis: With regard to changes in the ICAO Technical Instructions, the AAC issues the Technical Instructions to be applied in Panama via Book 17, which is a section of the RACP. For regulations on transport by road and rail, MINSA has the lead responsibility and has implemented road transport regulations by adopting the 1985 edition of the Transport Regulations [6] under Resolution No. 7 of 11 July 1996. For transport by sea, the AMP is the responsible body in Panama for the implementation of the IMDG Code.

Suggestion: It is suggested that the new Deputy Administrator leading the new commission within the Department of Maritime Protection of the AMP be specifically charged with ensuring that the obligations with respect to implementing the requirements of the IMDG Code under the SOLAS Convention are met.

4.100. MINSA is responsible for the development and drafting of new resolutions, decrees and guides relating to the safe transport of radioactive material. The proposal for drawing up new standards and for the revision of current standards must be submitted to MINSA, which designates a project group or working group to accomplish this task. Consultation with the interested parties is not specifically defined as obligatory, but can be inferred from the provisions of Law No. 6 of 22 January 2002, which promulgates standards for transparency in public management (Articles 24 and 25). In accordance with Resolution No. 168 of 5 June 2001, MINSA intends to set up a radiation protection committee to provide a system of internal scrutiny and assessment of any draft resolutions, decrees or guides relating to, among other things, the transport of radioactive material. This committee has yet to be formed.

4.101. It is not clear how relevant authorities and users of the regulations for the transport of radioactive material in Panama are informed about changes to such regulations or involved in any consultation process. Appropriate consultations need to involve all users of the regulations, including consignors, carriers, freight forwarders and all responsible authorities and involved bodies. Those involved need to have the opportunity to provide their recorded or documented opinions and comments to the consultation process. It is equally important that all users are kept informed of future changes to the regulations, so that they can plan for implementation and adapt their systems and resources accordingly.

4.102. Basis: Concerning changes to the regulations, the relevant paragraphs of Ref. [4] are the following:

"*4110… Users of the regulations should draw the attention of the competent authority to problems of understanding, interpretation, ambiguity, inaccuracy, impracticality, etc.*

"*4111. The competent authority should carefully evaluate all reported and perceived problems and developments, as well as proposals for regulatory changes; then it should consider all aspects and implications of any proposed changes, and consult the relevant users of national regulations and acknowledged experts.*

"*4112. The competent authority should exercise great care when it considers changes to national regulations in order to prevent disharmony or conflict with the requirements of accepted international regulations and conventions or the requirements of other applicable national regulations.*

"*4113. Any change to regulations should be carefully monitored by the competent authority after implementation to confirm that the change has been effective and that the object or the desired result has been achieved without compromising safety and without adversely affecting other parts of the radioactive material transport industry.*"

Suggestion: It is suggested that a procedure be developed for informing and/or consulting those organizations that have to apply the requirements of the regulations issued or endorsed by a competent authority.

Overview

4.103. ACP: Regulations applicable to the Panama Canal are developed by the ACP and approved by its Board of Directors, which, under Article 317 of the Constitution, has the power to make regulations pertaining to the Panama Canal. Organic Law No. 19 of 11 June 1997 is a law of general policies given force of law through administrative regulations, the maritime regulations for the operation of the Panama Canal (the maritime regulations). Chapter IX of the maritime regulations controls the transit of dangerous cargo through the Panama Canal by requiring ships to comply with the provisions of the IMO requirements, in particular with the IMDG Code. Guides to be used by the maritime community are developed by the Department of Maritime Operations and approved by its director. These guides include Department of Maritime operations directives, notices to shipping and advisories to shipping.

Finding

4.104. Basis: The ACP currently requires advance notification of shipments of radioactive material (Articles 137 and 141 of the maritime regulations). Under

Article 136 of the maritime regulations the ACP permits the shipment of radioactive material after verifying all the relevant certificates (including valid certificates of approval for package design) and ensuring compliance with the requirements of the SOLAS Convention, the IMDG Code and the maritime regulations. In permitting the transit of ships carrying radioactive material, the ACP checks the competent authority listing in Ref. [19]. The ACP also confirms package approvals using Ref. [20]. The implementation of the maritime regulations for the safe transport of radioactive material through the Panama Canal is effectively carried out by the ACP.

Suggestion: It is suggested that consideration be given to amending Article 136 of the Regulation on Navigation in Panama Canal Waters to reflect more accurately the nature of the 'permission to transit' given to vessels before they transit the Panama Canal.

Finding

4.105. Basis: The ACP policy is that until the full requirements of the maritime regulations are complied with, no ship will be permitted to transit Canal waters. Article 139 of the maritime regulations states that "*Vessels carrying radioactive substances shall be required to provide current proof of financial responsibility and adequate provision for indemnity to the Republic of Panama, the Authority, or any agency thereof, covering public liability and loss as a result of accidents owing to radioactive cargo*." In an agreement between the ACP and MINSA dated 17 February 2003, both parties agreed to exchange information regarding the transit of radioactive material falling under the provisions of the International Code for the Safe Carriage of Packed Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code) [21]. For radioactive material not covered by the INF Code, the ACP agreed to share information with MINSA if so requested. Moreover, both parties agreed to handle information relating to radioactive material obtained under the agreement in a confidential and reserved manner for the purposes of national security.

Good practice: The ACP requirements for adequate notification and liability provisions relating to shipments of radioactive material through the Panama Canal are both comprehensive and effectively implemented. Appropriate steps are in place to ensure that the competent authorities are informed for emergency planning and national security purposes. These are considered good practices.

EMERGENCY PREPAREDNESS FOR TRANSPORT

Overview

4.106. All radioactive material needs to be managed so that the risk of accidental exposure of workers, members of the public and the environment is acceptably low. However, the possibility of accidents or incidents must be recognized and plans put in place to deal with such events. As part of establishing the basic framework for the national infrastructure, the Government needs to clearly identify the organizations that will have to be involved in emergency intervention and needs to specify their responsibilities. Panama is a signatory to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident. These conventions are adopted pursuant to Laws No. 101 and 102 of 30 December 1998.

4.107. Basis: Panama has established the National Civil Protection System (SINAPROC). SINAPROC is the governmental agency responsible for coordinating all response efforts at any geographic point in Panama. At the national level, SINAPROC has developed a National Emergency Operations Centre. This centre includes representatives from all governmental institutions with responsibilities for emergency response or support to emergency services, including the ACP.

Good practice: SINAPROC, which comprises all relevant governmental organizations involved in emergency coordination, meets four times per year to share experiences. This is considered good practice in that it enables lessons learned during emergency incidents and exercises to be shared.

4.108. Basis: Ref. [3] recommends that the organization for responding to radiological emergencies be an integral part of the Government's overall plans for dealing with emergencies in general, and that these organizations be assigned specific responsibilities for interventions in radiological accidents and incidents. For Panama, the role of the competent body is defined in the emergency regulations (Resolution No. 69). The director for radiological emergencies is MINSA, through the DGS, which convenes and directs the Committee for Assessment and Management of Radiological Emergencies (CEDER), which is the committee dedicated to dealing with radiological emergencies. MINSA has developed a national radiological emergency plan, which was implemented under Resolution No. 75 of 28 October 1997.

Resolution No. 75 was superseded by Resolution No. 69 of 23 July 1998; the national radiological emergency plan has been redrafted to reflect this change.

Suggestion: It is suggested that the current draft revised national radiological emergency plan be finalized and issued in such a way that subsequent changes or amendments to the plan, or components of the plan, can be promoted and put into effect in a timely and efficient manner. It is further suggested that all documents be within a 'controlled document format' and be signed by the authorized parties to the plan. Each issue or edition of the plan should be identified and controlled so that all officials needing to use the plan can readily confirm that they have the correct issue or edition.

4.109. Reference [3] acknowledges that the allocation of responsibilities for responding to accidents or incidents with radiation sources, and the emergencies they may entail, can be complex because it may involve combinations of registrants or licensees, employers, governmental organizations and other intervening organizations, depending on the nature of the emergency. The IAEA has issued in Ref. [3] detailed advice on emergency planning and preparedness for accidents involving radiation sources. MINSA created the Inter-institutional Committee for Radiological Emergencies, which is charged with the development of a plan for radiological emergencies: the national radiological emergency plan. All governmental agencies that may need to attend to a radiological emergency participate in this commission; namely:

(a) MINSA;
(b) The CSS;
(c) The Fire Department;
(d) The National Police;
(e) The Technical Police of the Judiciary;
(f) The National Civil Protection System;
(g) The ACP;
(h) The National Authority for the Environment;
(i) The National Maritime Service;
(j) The Red Cross of Panama;
(k) The National Air Service;
(l) The AAC.

The draft version of the national radiological emergency plan sets out the roles and responsibilities of the DSR as the coordinating body and the operational responsibilities of the involved agencies, as illustrated in Fig. 2.

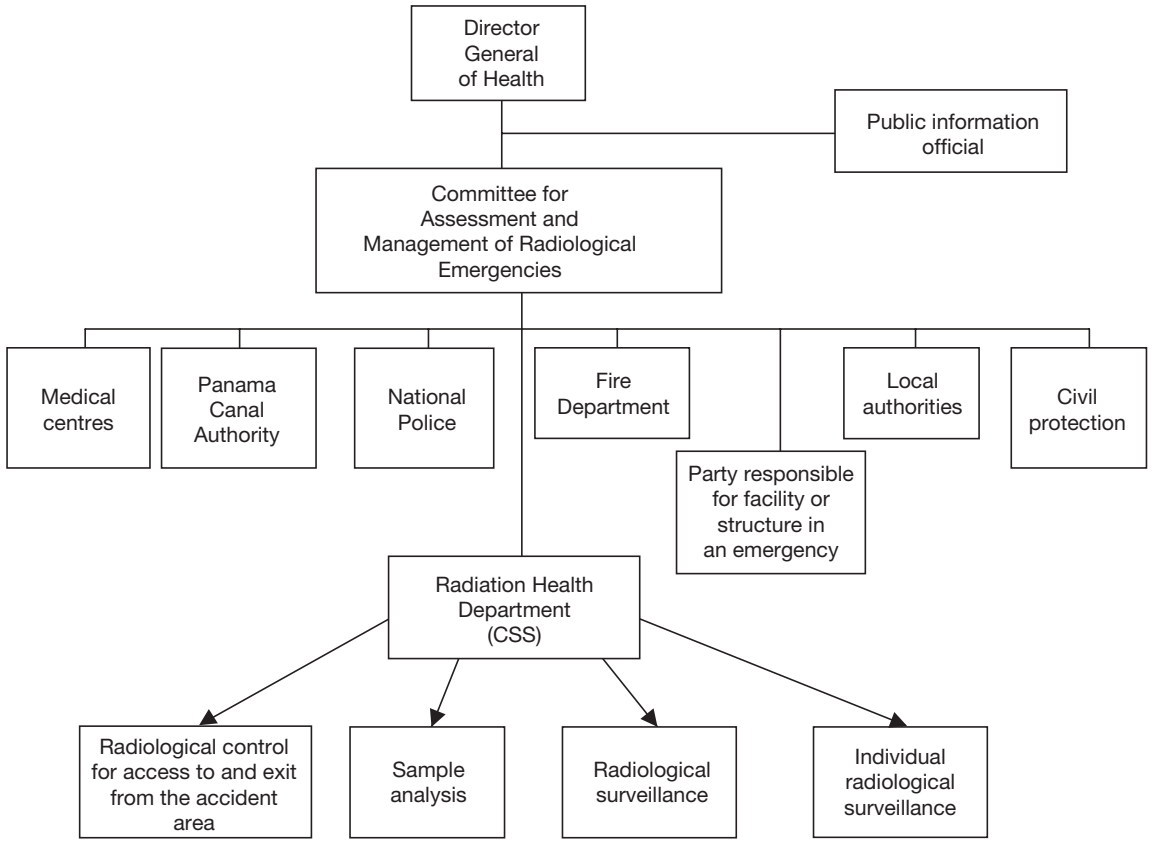

FIG. 2. Organizational scheme for radiological emergency planning.

4.110. Both the AAC and the AMP are participants in the national radiological emergency plan. The AAC has developed guidelines on emergency arrangements at airports, which were prepared by the Department of Dangerous Goods of the Direction of Air Safety on the basis of:

(a) Doc. 9284-AN/905 (2003);
(b) Doc. 9284-AN/928 (2003);
(c) The IATA provisions (2003);
(d) The RACP;
(e) The procedures for dangerous goods.

4.111. The AMP has a particular plan for contingencies in the maritime area, which does not specifically deal with radiological events. At present this plan is being updated. Additionally, each Panamanian port is required to have an emergency plan that considers accidents involving dangerous goods. For the Panamanian water corridor leading from international waters to the Panama Canal, the AMP has primary responsibility for emergency response. If an emergency occurs within this zone, the ACP would respond to assist the AMP upon request. In the special circumstances of shipments of radioactive material falling under the INF Code, the agreement between the ACP and MINSA would ensure that adequate information exists to allow planned responses at an early stage.

4.112. Basis: For emergency planning relating to radiation users within Panama, Executive Decree No. 1194 of 3 December 1992 effectively requires an authorization for, inter alia, the transport of radioactive material. Article 2 of Executive Decree No. 1194 requires that the authorization be issued by MINSA, through the DGS, based on technical criteria as assessed by the DSR. Clearly the legislative intent is that the DSR is to provide technical support to MINSA, the competent authority. Similarly, Section 8a of Resolution No. 69 of 23 July 1998 places responsibility for technical support during emergencies on the National Commission for Radiological Health of the CSS.

4.113. The main role of the DSR is to provide expert technical advice to those responsible for decision making, both during the acute phase of an emergency and in the follow-up phase in the aftermath of the emergency. As such, it is essential that specific channels of communication be established, and in particular that telephone and fax numbers and email addresses be collected for use in an emergency. It is highly desirable to have emergency procedures well documented and to ensure that any changes are made formally.

Suggestion: It is suggested that Section 8a of Resolution No. 69 of 23 July 1998 be revised to ensure that the reference to the National Commission for Radiological Health of the CSS not be confused with the Radiation Health Department of the CSS.

4.114. Basis: Section 8a of Resolution No. 69 of 23 July 1998 lists the responsibilities of the National Commission for Radiological Health of the CSS during emergencies. These responsibilities include:

(a) Drawing up a list of potential radiological emergencies (scenarios) for every practice that involves radioactive material;
(b) Assisting and supporting the users and authorities for the purposes of emergency planning;
(c) Radiological survey of areas and individuals;
(d) The assessment of doses received by workers and the public;
(e) The assessment of radioactive contamination of personnel, surfaces and the environment;
(f) Dispatching a team to the emergency area with the adequate equipment to respond to the emergency;
(g) Reporting to and advising the authorities that attend the emergency;
(h) Developing and maintaining a database on personnel qualified in radiological protection to request them for assistance;
(i) Developing and maintaining a database on radiation protection equipment in the country;
(j) Having available the necessary radiation protection means;
(k) Creating a 24 h assistance system that includes all members of CEDER.

Good practice: The responsibilities of the authority in charge of radiological emergencies (MINSA) and its technical adviser, the DSR, are stated in the legislation. This is considered good practice.

4.115. Basis: Part 3.5 of Ref. [3] recommends the extension of the national coordinating authority concept to the assignment of a coordination and control responsibility at the site of an accident. At the accident site an incident commander should be designated with the authority and responsibility to direct the on-site response. The National Police is the designated incident commander in the national radiological emergency plan, whereas the Fire Department is the designated incident commander for airport incidents involving radioactive material. The incident commander for maritime incidents in the Panama Canal operating area is the manager of the MRT.

4.116. The scenarios used in emergency planning are determined by the responsible person and are submitted for assessment by the DSR as to the possible causes of accidents during the transport of radioactive material, and as part of the MINSA authorization process.

4.117. Periodic emergency drills using realistic scenarios are an essential part of maintaining an effective emergency response capability. MINSA, via CEDER, has yet to exercise the national radiological emergency plan, either as tabletop drills or field exercises, but it does plan to undertake this task. At the local level, emergency plans at the various facilities are required as part of MINSA authorization to use radioactive material (Resolution No. 69 of 23 July 1998, Articles 104–108). There are plans to conduct emergency exercises at each facility that uses radioactive material under the supervision of the DSR. The AAC considers that exercising emergency response plans for radiological incidents is not warranted, owing to the low number of transports into Panama. The AAC considers that response to radioactive material is a subset of response to dangerous goods, and is included in the more general dangerous goods exercises. The AMP has not exercised the emergency response plans in the radiological area, owing to the small number of transports of radioactive material in transit through Panamanian ports.

Suggestion: It is suggested that a coordinated approach involving all jurisdictions and responsible agencies identified in the national radiological emergency plan be undertaken using tabletop drills and field exercises. Following the drill or exercise, it is suggested that a report be prepared and the report and its findings shared among all participating organizations.

Panama Canal Authority

4.118. The ACP has provided for the establishment of an emergency plan within the Panama Canal operating area in the emergency services regulation (Board of Directors Agreement No. 10, Article 1), which states, inter alia, that "*The Authority has the primary responsibility to respond to emergency situations that affect the safety and efficiency of the Canal and the transiting ships.*" Such response is supported with a comprehensive plan according to Article 8 of Agreement No. 10, which establishes that the Administrator has the authority for developing and implementing contingency plans to respond to emergencies, including hazardous materials spills or leaks from transiting vessels, in order to prevent and control situations that could jeopardize Canal operations or pose a danger to vessels that transit through Canal waters.

4.119. Article 3 of Agreement No. 10 broadens the area of responsibility: "*In the area of compatibility with Canal operations, the Authority will maintain coordination mechanisms with other entities responsible for the delivery of emergency services, so that these will not affect negatively the functioning of the Canal and the transit of ships. This coordination will be developed, as a minimum, in the areas of fire prevention and control.*" In the same agreement, Article 10 broadens the role of the ACP during events in areas compatible with Canal operations, which include the populated areas surrounding such operations, by stating that the ACP will be responsible for keeping communications, reporting to the appropriate authorities and coordinating the participation of public or private agencies during response operations.

4.120. At the national level, SINAPROC has developed a National Emergency Operations Centre. This centre includes representatives from all governmental institutions with responsibilities for emergency response or support to emergency services, including the ACP. The ACP will function as a technical adviser through a representative in order to assist in the implementation of coordinated efforts among the governmental institutions at the National Emergency Operations Centre to protect the population at risk.

4.121. At the international level, the ACP signed a memorandum of understanding with the National Response Team of the United States of America. This memorandum of understanding provides for the preparation of expert technical assistance for emergencies that are of a severity that exceeds the capacity and experience of the ACP, or for which not enough resources are available at the national level.

4.122. Basis: The ACP has developed an incident management system in its contingency plan. This system defines roles and responsibilities for the ACP's personnel in all types of incident, including those that involve radioactive material. The ACP incident management system is web based and extensive. It includes initial notification procedures, incident management system formation and responsibilities, contact information, emergency response and auxiliary resources of the different divisions of the ACP, central governmental agencies and some private companies, guidelines for developing an incident action plan, a geographic information system tailored to specific emergencies, and additional information.

Good practice: The web based incident management system developed by the ACP is extensive, powerful and flexible, and provides an ideal model for other

organizations wishing to implement emergency response plans for the transport of dangerous goods. This is considered good practice.

4.123. Basis: Paras 6.3 and 6.4 of Ref. [11] require that the Government ensure that competent authorities have the necessary resources and that they make preparations and arrangements to deal with any consequences of accidents in the public domain. These preparations shall include the actions to be taken both in and after an emergency, and the nature and extent of the emergency arrangements shall be commensurate with the potential magnitude and nature of the hazard associated with the facility or activity.

4.124. Reference [11], para. 6.5, states that "*The emergency arrangements shall include a clear allocation of responsibility for notification and decision making. They shall ensure an effective interface between the operator and the competent authorities and shall provide for effective means of communication. The arrangements of all parties shall be exercised on a periodic basis and shall, where appropriate, be witnessed by the regulatory body.*"

4.125. Although the ACP is not strictly a competent authority within the definitions contained in the Transport Regulations, the ACP has allocated resources to radiation incident planning and preparations, emergency response plant and equipment, emergency response arrangements, and training and exercising to a level equivalent to that of a competent authority.

4.126. As part of the planning for a radiation incident, the ACP has defined worst case scenarios of radioactive cargo spills and their consequences at the Panama Canal using the services of J. Poston, Head of the Department of Nuclear Engineering, Texas A&M University. Additionally, risk analysis and scenario resolution workshops are organized. These events are attended by a large number of participants from within the ACP and are also held jointly with local governmental authorities.

Good practice: The ACP's practice of defining theoretical source terms to be used in accident scenario planning, combined with practical workshops in which scenario resolution issues are agreed among people with field experience, is considered good practice.

4.127. Basis: As dictated in the ACP contingency plan, various exercise and incident preparedness activities are held each year. These are typically tabletop exercises, drills, and functional and full scale exercises (a combined minimum of two per year).

Good practice: The ACP's systematic approach of conducting exercises that cover a range of potential accidents, using a variety of methods and realistic scenarios in combination with a high frequency of testing, is considered good practice.

MARITIME OPERATIONS

Overview

4.128. The review of the maritime operations addressed specifically the operational rules and practices of the ACP concerning the transit of ships carrying radioactive material through the Panama Canal. As noted elsewhere, there is no traffic of vessels carrying radioactive material in the other marine areas of Panama that are administered by the AMP.

4.129. Vessel transit operations are carried out at the Panama Canal continuously and simultaneously at both the Atlantic and Pacific sides of the Panama Canal, 24 hours a day, 365 days a year. There are two shipping lanes at each set of locks. The locks are 304.8 m (1000 feet) long and 34.5 m (110 feet) wide. Over 208 000 m^3 of fresh water is spent during each vessel transit. There were a total of 11 853 ocean-going transits in fiscal year (FY[2]) 2002, of which 4376 vessels (36.9%) had IMO class dangerous cargo aboard. The percentage of vessels whose beams are over 30.48 m (100 feet) has been increasing. It was up to 41.1% of all ocean-going vessels in FY 2003, an 8% increase over FY 1999. The transit itself through the Panama Canal is completed in approximately 8 to 10 h under normal conditions and under the full operational control of the ACP. The total Canal waters time[3] is about 25 h.

4.130. During the ACP's FY 2002, only 36 of the 11 583 transiting ships (or 0.3% of the total) had radioactive material on board. Of these, 30 were container ships with minerals, uranium hexafluoride, uranium dioxide, reactor fuel rods, empty flasks or industrial and medical material; two were nuclear powered submarines of the United States Navy and four were INF Class 3 ships with spent fuel (two) or empty flasks (two). During FY 2003, up to the date of

[2] The ACP FY runs from 1 October until 30 September of the following year.

[3] The Canal waters time is the time elapsed from the time a vessel is declared ready for transit until the vessel departs the Canal after transit.

the TranSAS appraisal in June, 23 container ships and five submarines had transited the Canal.

4.131. A high level of safety has been achieved, despite the increasing number of larger vessels. The number of vessel accidents investigated by the Board of Local Inspectors is at its lowest level in 50 years. The safety record of 17 accidents investigated was repeated in both FY 2001 and FY 2002. There was neither loss of life, dangerous cargo release, nor vessel loss in any of these accidents. For FY 2003, up to the date of the TranSAS appraisal in June, eight accidents were investigated. One of the key elements for achieving the high level of safety is the strict application of the Canal regulations, which include the requirements of the IMDG Code and other international regulations for safe transport by sea.

Compliance with the IMDG Code

4.132. The ACP requires full compliance with the requirements of the IMDG Code, 2000 edition (covering 2001–2002), for all packaged dangerous goods, including radioactive material of Class 7, on board all ships in transit through the Panama Canal. The IMDG Code, 2000 edition, incorporates in full the 1996 requirements of the IAEA concerning the transport of radioactive material by sea [1]. Detailed provisions for the application of the IMDG Code are made in Chapter IX, Section 3, Articles 128 et seq., of the maritime regulations. Article 135 states, inter alia, that "*vessels shall comply with the same requirements set forth in the IMO codes and conventions, the cargo requirements set forth in article 128 of the annex, as well as the provisions contained in the IMDG Code.*" These regulations also reflect the related requirements in the SOLAS Convention, Chapter II-2, Regulation No. 19, on the construction and equipment of ships carrying dangerous goods subject to the IMDG Code, excluding Class 7, for which separate requirements are found in the INF Code. At the time of the appraisal, arrangements were being made to introduce the 2002 edition (covering 2003–2004) of the IMDG Code in time for its mandatory entry into force under the SOLAS Convention on 1 January 2004.

4.133. Basis: Section 1 of Chapter IX of the maritime regulations contains a number of general provisions relating to the classification and inspection of dangerous cargo. In particular, Article 113 states, inter alia, that "*On the subject of dangerous cargo, reference to codes, international agreements, or other regulations, shall also be deemed to refer to any amendments or additions thereto on or after the date such amendments or additions become effective.*"

Good practice: The ACP's use of a general updating provision in the context of international safety instruments such as the IMDG Code, which is substantially updated and revised every two years, is considered good practice.

4.134. Basis: Article 114 of the Regulation on Navigation in Panama Canal Waters specifically requires dangerous cargo to be classified in accordance with the IMO class and division, which is then repeated and listed in detail in an annex. However, the classification system has since been amended, so that this list is at present inaccurate and misleading in relation to flammable liquids of Class 3. If classification in accordance with the IMDG Code is mandatory, such a listing is contradictory and potentially confusing, and in future could be of concern in the case of Class 7. Such a breakdown into classes is unnecessary and could be deleted from this annex.

Recommendation: The ACP should as soon as practicable delete the explanatory list of IMDG classes of dangerous goods from Article 114 of the Regulation on Navigation in Panama Canal Waters, since this list is unnecessary and potentially confusing.

4.135. The ACP is International Organization for Standardization (ISO) certified. The Maritime Operations Department is certified to ISO 9000–2000. The Maritime Operations Department's quality assurance programme, in regard to Chapter 1.3 of the IMDG Code – Training, is confined to the transport of radioactive material. Quality assurance is achieved by means of verification of documentation submitted and by physical inspection of the packaged radioactive material cargo. For example:

(a) Documentation must comply with the requirements listed in, for example, IMDG Code Sections 5.1.5, 5.4.1, 6.4.22 and 6.4.23;
(b) Approval of shipments must comply with IMDG Code Section 5.1.5;
(c) Labelling must comply with IMDG Code Chapters 5.2 and 5.3;
(d) Stowage must comply with IMDG Code Section 7.1.14;
(e) Segregation must comply with IMDG Code Section 7.2.1.16.

Unless all these requirements are found to be satisfied, the ship is not permitted to transit the Panama Canal. These requirements are applicable to the transit of all radioactive material cargoes, including INF cargoes.

Good practice: The ACP undertakes essential verifications to ascertain that INF Code requirements for the transport of INF cargoes are met. This is done

within the context of a certified quality assurance programme. This is considered good practice.

Compliance with the INF Code

4.136. The ACP requires full compliance with the INF Code [21], which is mandatory under the SOLAS Convention, in accordance with Article 128(2) of the maritime regulations. The INF Code is published separately by the IMO and in the supplement to the IMDG Code. Under Section 1.1.2 of the INF Code, ships carrying quantities of radioactive material prescribed are divided into Class INF 1, INF 2 or INF 3. Detailed requirements cover damage stability, fire safety, temperature control, structural considerations, cargo securing, electrical power, radiological protection, management and training, and the carriage of a shipboard emergency plan and an international certificate of fitness. The Flag State's documentation, including blueprints, is requested in advance and provided to the ACP for such ships, and the ACP verifies that the Flag State has evaluated and approved the same for compliance with the requirements of the INF Code.

4.137. Radiological protection is verified by the ACP by measuring radiation levels at various places on the ship, especially on the bridge and at the workstations of the ACP employees during transit. The radiation protection and monitoring procedures and equipment in the instrument room and each cargo hold are checked. In addition, a briefing has been prepared on the INF Code, its background, purpose and requirements, for ACP managers, government officials and the public.

4.138. All vessels, including INF ships, have a shipping agent representative in Panama. Article 11 of the maritime regulations requires that the ACP be notified of any previous accident or incident involving the ship that may hinder safe navigation in Panama Canal waters. The shipboard emergency plan approved by the Flag State administration has to be provided to the ACP for review of its adequacy in the event of an emergency while in Canal waters. On 27 November 1997 the IMO Assembly approved Resolution A.854(20) with Guidelines for Developing Shipboard Emergency Plans for Ships Carrying Materials Subject to the INF Code, which is reproduced in the supplement published concurrently with the IMDG Code itself. After consideration of these guidelines and detailed discussions on the emergency plans submitted to them at their request, the applicable portions of these plans have been incorporated into the ACP's own contingency plan. Specifically, this comprises notification procedures to the ACP and to other officials and contacts in the event of

an incident; procedures to prevent, reduce or control (any) dangerous cargo release; priority actions; mitigation; security; international, national and local coordination; plans review; and exercises. Shipboard plans, including exercise logbooks and crew training and notification procedures to the Panamanian authorities, have been reviewed with shipping company management and masters. A current International Certificate of Fitness issued by the administration for an INF ship must be presented to the ACP on the occasion of each transit. A number of special restrictions are additionally imposed on the transit of the Panama Canal by INF ships, including clear passage through the narrowest stretch (the Gaillard Cut), assignment of senior pilots and security escorts, and limiting information on a need to know basis.

Good practice: In the application of the INF Code by the ACP, the detailed critique of shipboard emergency plans for INF ships and their comprehensive incorporation into the ACP's contingency plan, as well as the imposition of special conditions on ships in transit with INF cargo, represent good practice.

Convention for the Physical Protection of Nuclear Material

4.139. The Convention for the Physical Protection of Nuclear Material is applied through Law No. 103 of 30 December 1998. Information on INF ship transits is not reported to the public, but provided only to those previously identified to have a need to know. Patrol boat escorts are provided by the National Maritime Service and the ACP's Canal Protection Division. Additional security measures are provided by other national security institutions. Compliance with the convention is ensured by the participation of these security institutions during the transit of INF ships. Compliance by the shipper is through participation in the security effort with its contracted security group.

Good practice: Adaptation and inclusion of the obligations under the Convention for the Physical Protection of Nuclear Material by the ACP in the measures taken to ensure the smooth passage of INF ships in transit is considered good practice.

Solid Bulk Cargoes Code

4.140. The IMO's Solid Bulk Cargoes Code is applied through Chapter IX, Section 2, Articles 117 et seq., of the maritime regulations. Compliance with the Solid Bulk Cargoes Code in ACP waters is made mandatory by Article 120. Bulk carriage of radioactive material (LSA-1 and SCO-1) is permitted under this code. These cargoes comprise ores containing naturally occurring radionu-

clides and natural or depleted uranium and thorium concentrates of such ores (LSA-1), and solid objects of non-radioactive material having radioactive material distributed on their surface (SCO-1). The requirement is that there should be no leakage outside the cargo space in which such material is stowed.

4.141. Basis: Documentation must be provided to the ACP showing compliance with the Solid Bulk Cargoes Code. For LSA-1 and SCO-1 shipments in bulk, the master has to provide confirmation that there has been no spillage outside the cargo space. This confirmation is in addition to the requirements for packaged LSA and SCO shipments of the IMDG Code.

Good practice: Making the Solid Bulk Cargoes Code of the IMO mandatory in regulations issued by the ACP, and associating its requirements for the transport of radioactive material with those of the IMDG Code, is considered good practice.

Automatic Identification of Ships system

4.142. The IMO has approved carriage requirements for the Automatic Identification of Ships (AIS) system, which is to be given effect under the SOLAS Convention. The requirement to have on board a functional AIS system is scheduled to take effect from 2007, but in the case of ships other than passenger ships and tankers of 300 gross tonnes and upwards but less than 50 000 gross tonnes, will be not later than the first safety equipment survey after 1 July 2004, or by 31 December 2004, whichever occurs first.

4.143. As part of the Panama delegation, the ACP has been involved with the IMO from the beginning of the development of the AIS. Its own Canal Traffic and Navigation System (CTAN) has been in place since 1999. This system is a pilot carry-on unit with transponders and VHF radios that utilize Global Positioning System (GPS) and Differential GPS (DGPS) technology to assist navigation through the Panama Canal, as well as to aid traffic controllers in the deployment of resources and the scheduling of ships. Use of the system has been shown to improve yet further the safety record of the Panama Canal. All ACP vessels have CTAN units permanently installed. The carry-on units will be replaced by AIS-ready laptops carried on board ships in transit by the pilots. The pilot will be connected to the ship's AIS system through a pilot plug.

4.144. Basis: At the time of the appraisal, the ACP was implementing the requirement to have functional AIS systems with pilot plugs by 1 July 2003 (i.e. one year early). Prior to the SOLAS Convention deadline, a ship without a

functional AIS system installed will be provided with a rented portable one at a modest fee.

Good practice: Early introduction by the ACP of the IMO's AIS as a proven new safety aid in the transit of all ships, including those carrying radioactive material, is considered good practice.

International Safety Management Code

4.145. The IMO's International Management Code for the Safe Operation of Ships and for Pollution Prevention (the ISM Code) establishes a detailed regime for the safe management and maintenance of a ship's structure and operational equipment. Documentation and certification, verification and control are required. The ISM Code has been mandatory under Chapter IX of the SOLAS Convention since 1 July 1998. Recognizing the need for uniform implementation of the ISM Code, the IMO has adopted guidelines on its implementation. The code is applied by regulation from the ACP to all ships in transit.

4.146. The ACP's inspections are mainly to verify that a ship meets all its requirements. As the first on board, the boarding officers review all areas essential for a successful transit. Deficiencies found are reported to the Canal Port captain to assign resources and sign a release. Some deficiencies must be corrected prior to transit. If a more detailed inspection is warranted, a Canal Port captain, transiting vessel inspector or naval architect is notified. This expert boards ship and records deficiencies in a log and in the ship's files for future reference. The agent is notified, as owners are expected to correct outstanding items. This activity is part of the Admeasurer's Inspection Programme for general transit requirements and the Transiting Vessel Inspection Programme to screen possible high risk ships prior to transit in order to detect deficiencies in equipment, engineering and the sanitary area. The ACP verifies the validity of a Safety Management Certificate for compliance with the ISM Code, as well as other relevant certificates, including a Certificate of Financial Responsibility for ships carrying radioactive material.

Port State Control

4.147. Under Regulation I/19 of the SOLAS Convention, Member States of the IMO are required to undertake given numbers of Port State Control (PSC) inspections of ships using ports in their countries. In Panama the AMP has the

legal responsibility to conduct PSC inspections within the territorial waters of the State.

4.148. The ACP boards every ship in transit through its waters and conducts inspections with a view to keeping the Panama Canal safe and secure, protecting its installations and other customers, with due regard to the State of Panama and to people beyond its boundaries. The major part of the inspection covers most of the aspects of PSC, and in some cases may exceed those requirements, but it is not conducted in the guise of a PSC inspection and the inspectors are not so identified. Ships carrying INF cargo and other material of IMDG Class 7 are subject to such inspections. (Such inspections are not relevant to the PSC duty of the AMP.)

Good practice: The inspection by the ACP of ships carrying radioactive material in the context of PSC type procedures is considered good practice.

International Ship and Port Facility Security Code

4.149. The ACP was committed to implementing as many as possible of the requirements upon it of the new International Ship and Port Facility Security (ISPS) Code before its entry into force on 1 July 2004. From that date the ISPS Code (Part A) has been mandatory under a new Chapter XI-2 of the SOLAS Convention. In particular, Article 30 of the Regulation on Navigation in Panama Canal Waters was amended to increase the pre-arrival notice requirement for all ships from 48 hours to 96 hours from 1 July 2003. Although not being identified as a port facility and notwithstanding the extensive similar procedures already in place in Panama, the ACP is arranging the appointment of a recognized security organization to assist in conducting its port facility security assessment and preparing its port facility security plan for the purposes of the ISPS Code. The Canal Protection Division is adapting existing security assessments and plans to comply with the new maritime security requirements. The ACP will have the responsibility of deciding when a Declaration of Security will be required. The ACP is considering possible bilateral agreements with port facilities located within its waters. Part B of the ISPS Code provides guidance regarding Chapter XI-2 of the SOLAS Convention and Part A of the ISPS Code, which contains the mandatory code itself. Whether Part B should also become mandatory in ACP waters is being considered.

Good practice: In so far as all the enhanced security measures to be required under the ISPS Code in the circumstances of today are being applied by the

ACP to ships carrying radioactive material, early introduction is considered good practice.

Training and human resources

4.150. The ACP has a thorough training programme. Employees are trained continuously in a variety of fields related to their positions at the ACP Training Centre, which includes the Maritime Training Division, in Panama City or abroad. Also, the United Nations Conference on Trade and Development has established in Panama a company, TRAINMAR, to provide specialized training in maritime affairs. One of its regular courses addresses the IMDG Code. General and function specific training of shore-side personnel is required under Chapter 1.3 of the IMDG Code. ACP chemists, Canal Port captains, lawyers and others have undertaken this course, based on the 2000 edition of the IMDG Code. Further courses on the 2002 edition are to be offered shortly after delivery of the copies that have been ordered. In addition, up to date briefings on the IMDG Code have been given by the Maritime Training Division to pilots and other transit personnel. Specifically, the ACP, together with MINSA and the IAEA, held a week long seminar in October 2001 on the 1996 edition of the Transport Regulations [1], which was attended by about 80 officials, including ACP marine inspectors, emergency responders and legal staff. MINSA sponsored in 1995 a similar course on the 1985 edition of the Transport Regulations [6]. Additional courses have been attended by ACP chemists at the Harvard University School of Public Health on the risk of radiation in the environment and on nuclear emergencies, including acts of terrorism.

4.151. Basis: Although training of shore-side personnel is included in the IMDG Code, few maritime administrations[4] have direct responsibilities for them. These provisions have always been seen as recommendatory and remain so from 1 January 2004, when the code for the most part became mandatory. The INF Code requires mandatory training for the crew of a ship carrying INF cargo to the satisfaction of the administration. This requirement is not applicable outside such administrations.

[4] The SOLAS Convention defines administration as the "Government of the State whose flag the ship is entitled to fly": the ACP is not an administration.

Good practice: The comprehensive training given by the ACP to all its personnel involved in handling dangerous goods, including INF and other radioactive material, which goes beyond the recommendations in the IMDG Code, is considered good practice.

5. GENERAL CONCLUSIONS

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

5.2. The responsibilities for the implementation of the regulations for the transport of radioactive material in Panama and through the Panama Canal are clearly defined in the laws and regulations and are well understood by the authorities involved. Highly qualified personnel are available to carry out the activities required for the small number of radioactive material shipments in Panama. Highly qualified personnel and significant resources are used to ensure the safe transport of radioactive material through the Panama Canal.

5.3. With regard to radioactive material shipments in Panama, procedures and resources need to be developed to take care of the increasing regulatory requirements resulting from revisions to the Transport Regulations and an expected increase in the number of shipments of radioactive material in Panama.

5.4. A considerable number of good practices have been identified with regard to shipments through the Panama Canal, which are under the jurisdiction of the ACP. A very high level of safety is achieved owing to the rigorous requirements concerning compliance with all applicable regulations, the control of the shipments through the Panama Canal and highly developed emergency preparedness capabilities.

Appendix I

ABBREVIATIONS

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

AAC	Autoridad de Aeronáutica Civil (Civil Aeronautic Authority)
ACP	Autoridad del Canal de Panamá (Panama Canal Authority)
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AMP	Autoridad Marítima de Panamá (Panama Maritime Authority)
ATTT	Autoridad de Tránsito y Transporte Terrestre (Transit and Land Transport Authority)
CEDER	Comité de Evaluación y Dirección para Emergencias Radiológicas (Committee for Assessment and Management of Radiological Emergencies)
CSS	Caja de Seguro Social (Social Security Fund)
DGS	Dirección General de Salud (General Directorate for Health)
DSR	Departamento de Salud Radiológica (Radiation Health Department)
EU	European Union
IATA	International Air Traffic Association
ICAO	International Civil Aviation Organization
IMDG Code	International Maritime Dangerous Goods Code
INF Code	International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships
ISPS Code	International Ship and Port Facility Code
MINSA	Ministerio de Salud (Ministry of Health)

MRT	División de Tránsito Marítimo (Transit Operations Division)
RACP	Reglamento de Aeronáutica Civil de Panamá (civil aviation regulations of Panama)
SINAPROC	Sistema Nacional de Protección Civil (National Civil Protection System)
SOLAS Convention	International Convention for the Safety of Life at Sea
UNCLOS Convention	United Nations Convention on the Law of the Sea

Appendix II

THE PANAMA TRANSPORT SAFETY APPRAISAL SERVICE TEAM

P. COLGAN — Team member

P. Colgan is the Manager of the Facilities and Sources Group of the Australian Radiation Protection and Nuclear Safety Agency in Australia (ARPASA), where he is responsible for regulatory standard setting, assessment and compliance of non-nuclear radiation facilities and sources. He was previously Head of the Radiation Control Branch for the New South Wales Environment Protection Authority and the nominated competent authority for the safe transport of radioactive material (road and rail) in New South Wales. He was a member of Australia's Radiation Health Committee and has been involved in radiation protection policy development, covering a wide range of radiation protection topics, including the adoption of the Transport Regulations in

FIG. 3. The Panama TranSAS team at the entrance of the Maritime Trafffic Control Centre. From left to right: F.M. Zamora, I. Rahim, W. Huck, G.J. Dicke, E. Luraschi, R. Temps, P. Colgan, H. Tani, L. Grainger, J.R. López-Vietri, C.J. Pecover.

Australia. He has undertaken IAEA expert missions to Malaysia, Mongolia and Sri Lanka — the latter to aid in drafting their safe transport regulations for radioactive material. Since 1999 he has worked with the Commonwealth regulatory agency (ARPANSA) to license and assess for compliance the Australian users of radiation sources, including the Australian Nuclear Science and Technology Organisation (ANSTO), the Department of Defence and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). He is Australia's representative on the IAEA Transport Safety Standards Committee (TRANSSC) and chaired the Technical Programme Committee Meeting for the IAEA Conference on Safety of Transport of Radioactive Material held in Vienna in July 2003. He is also the chair of the Australian working group on the security of radioactive sources and has served as a consultant for the IAEA in this area.

G.J. DICKE — Team leader

G.J. Dicke is a Transport Safety Specialist in the IAEA Transport Safety Unit of the Division of Radiation, Transport and Waste Safety, Vienna, Austria. He is the Scientific Secretary for the annual IAEA meetings on the review and revision of the Transport Regulations. He represents the IAEA at meetings of the United Nations Committee of Experts on the Transport of Dangerous Goods and at 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, the United Nations and the IMO in support of the harmonized and integrated implementation of the Transport Regulations into the United Nations model regulations and the international modal transport regulations. G.J. Dicke had the lead role in the development of the working procedures and the questionnaire for the IAEA's TranSAS and has served as Team Leader or co-Team Leader for all TranSAS missions to date.

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

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.

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 Transportation and 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.

J.R. LÓPEZ-VIETRI — Team member

J.R. López-Vietri is Head of the Transport of Radioactive Material Section of the Autoridad Regulatoria Nuclear, Gerencia de Seguridad Radiológica y Nuclear, Buenos Aires, Argentina. He has a degree in industrial engineering from Buenos Aires University and has been working professionally in the Argentine National Atomic Energy Commission and the Nuclear Regulatory Authority (the competent authority of Argentina) since 1978.

Since 1990, as a senior expert in the transport of radioactive material, he has taken part in several IAEA and IMO meetings. He is involved as Regional Coordinator in the IAEA Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) project Regulatory Harmonization and Quality Assurance Programmes for the Safe Transport of Radioactive Material. He has collaborated in developing both the English and Spanish language versions of the Transport Regulations and related documents. Since 1995 he has served as Argentina's representative on the IAEA Transport Safety Standards Committee (TRANSSC). He has served as an analyst in radiation and nuclear safety, specializing in the safe transport of radioactive material. He is involved in performing the analysis and assessment of compliance by users with national and international regulations for the safe transport of radioactive material in Argentina. He has been a lecturer in national and international training courses on the transport of radioactive material, inter alia, within the framework of ARCAL and in IAEA Model Projects in Bolivia, Brazil, Chile, Costa Rica, Guatemala, Panama and Peru, and in IAEA regional training courses in Latin America and the Caribbean. He assists in the preparation of training materials in Spanish. From 1979 to 1982 he worked in quality assurance audit teams in Argentine nuclear power plants, and since 1982 he has collaborated in developing national and international standards on the safe transport of radioactive material. He has authored some 50 technical papers that have been published in specialized journals or presented in national and international forums.

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 TranSAS appraisals.

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.

I. RAHIM — Team member

I. Rahim is a Senior Technical Officer in the Maritime Safety Division of the IMO. He entered the sea-going career more than 25 years ago as a cadet and moved up to the rank of captain. He holds a Master Mariner's certificate of competency and an honours degree in transport technology. He has lectured at the Branch Campus of the World Maritime University in Malaysia on ports, shipping and maritime related matters, and developed new shipping courses before moving on to join a major company that had its Asia and Pacific regional office in Kuala Lumpur, and was involved in ports and shipping projects. At this company, he undertook numerous studies involving port privatizations, port management, and efficiency and productivity enhancements. He was Project Director when he resigned from the company. Before joining the

IMO Secretariat in London, he undertook a number of consultancy assignments for the IMO and the Economic and Social Commission for Asia and the Pacific (ESCAP) relating to the facilitation of maritime traffic and multimodal transport. At the IMO, in addition to being the Senior Technical Officer responsible for matters relating to the IMDG Code, he is secretary to the Editorial and Technical Group and to the Sub-committee on Dangerous Goods, Solid Cargoes and Containers. He represented the IMO as a team member during the TranSAS appraisal of the UK.

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 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 the Japan Atomic Energy Research Institute (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.

R. TEMPS — Team member

R. Temps is a Safety Inspector in the US Nuclear Regulatory Commission's (NRC) Spent Fuel Project Office in Rockville, Maryland, USA. He is a 1980

Bachelor of Science graduate in chemical engineering of the Virginia Polytechnic Institute and State University. After graduation, he worked at the Norfolk Naval Ship Yard for six years as a nuclear test engineer involved with overhaul and systems testing of naval nuclear propulsion plants. In 1986 he joined the NRC's Region I office in King of Prussia, Pennsylvania, and for the next 13 years worked in various capacities, including as a licensed operator examiner, project engineer, a Resident Inspector at the Nine Mile Point nuclear power plant, and the Senior Resident Inspector at the Indian Point 2 nuclear power plant. Since July 1999 he has worked at the NRC's headquarters in Washington, DC, as a transportation and spent fuel storage safety inspector, where he is involved in the inspection and review of quality assurance programmes for the use and fabrication of radioactive material transportation packagings, review and follow-up of radioactive material transport incidents and inspection relating to the storage of spent nuclear fuel at independent spent fuel storage installations. He has also provided technical review and support for a complex NRC rule making that seeks to harmonize portions of the transport regulations of the NRC with the 1996 edition of the Transport Regulations.

F.M. ZAMORA — Team member

F.M. Zamora is Head of the Transport and Manufacturing of Nuclear Fuel Unit in the Consejo de Seguridad Nuclear in Spain, for which is he is the competent authority for nuclear safety and radiological protection. He has a degree in chemistry from the Universidad Complutense de Madrid. He initially worked for CIEMAT (Madrid) in research on the biological processes of vegetables using tracers with radioactive compounds.

He has been working for the Consejo de Seguridad Nuclear for the past 20 years in areas associated with the licensing, inspection, enforcement and regulation of industrial radiation facilities and suppliers of radioactive material and with the assessment of exemptions for radioactive material and radioactive consumer products. At present he is in charge of approvals, inspection and regulation in the area of the transport of radioactive material. He is also a member of the Spanish Commission for the Coordination of the Transport of Dangerous Goods and of the IAEA Transport Safety Standards Committee (TRANSSC).

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