

The IAEA's databases for safe transport of radioactive materials

An improved factual base covers package approvals, events, and shipments

by Maria Theresa Brittinger

The IAEA's safety standards for transport are embodied in Safety Series No. 6, the *Regulations for the safe transport of radioactive material*. They aim to make transport feasible by reducing risks to persons, property, and the environment to an acceptable level, taking into account the possibility of accidents. They are based on the Agency's radiation protection principles and are consistent with the principles of the United Nations' *Recommendations on the transport of dangerous goods*. They are applied widely in national and international regulations. According to a 1986 survey, they are implemented by 52 of the IAEA's Member States. Moreover, they are the basis of the provisions for radioactive material of the international regulatory organizations.*

Work on the standards began in 1959 and was marked by the publication in 1961 of the first edition of Safety Series No. 6. Since then, three main editions and two revisions have been issued, the latest in 1985. Guidance on the regulations and how they are to be interpreted, implemented, evaluated, and revised is given by the Agency's Standing Advisory Group on the Safe Transport of Radioactive Material (SAGSTRAM). SAGSTRAM also provides advice and assistance to the Director General in a continuing review of the Agency's programme in the safe transport of radioactive material. Member States are represented at SAGSTRAM's biennial meetings by senior managers, as well as technical and administrative experts, who serve in their individual capacities.

Ms Brittinger is a staff member in the IAEA's Division of Nuclear Safety.

* These include the Council for Mutual Economic Assistance (CMEA); the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), promulgated by the Inland Transport Committee of the Economic Commission of Europe (ECE); the International Air Transport Association (IATA); the International Civil Aviation Authority (ICAO); the International Maritime Organization (IMO); and the International Regulations Concerning the Carriage of Dangerous Goods by Rail (RID) promulgated by the Central Office for the International Transport by Rail (OCTI). The United Nations' recommendations are issued by the UN Committee of Experts on the Transport of Dangerous Goods (Rep. ST/SG/ACIO/Rev.4), New York (1986).

At successive meetings, SAGSTRAM has expressed support in principle for the Agency's activities in data collection and compilation of information relevant to transport of radioactive materials. These activities have been seen as being especially helpful in providing a valuable service to Member States for use in assessing the efficacy of their regulatory standards for transport, enhancing the implementation of the IAEA's transport regulations, providing factual data to help meet public concerns, and providing data for future regulatory revisions and risk assessment activities. Data is collected in connection with several aspects of the work in transport safety. Three databases, known as PACKTRAM, EVTRAM, and SHIPTRAM, are established or planned.

Large package for spent nuclear fuel in transport by ship. (Credit: BNFL)



PACKTRAM: Package and shipment approvals

A basic feature of the regulations is that radioactive material being transported should be adequately packaged to provide protection against the hazards of material under all conditions of transport, including foreseeable accidents. Before they can be used to actually transport radioactive material, packages should have been proven to meet precise requirements laid down in the regulations for their design, construction, testing, and use. Packages with contents that are fissile, or that exceed a specified level of activity, are subject to independent assessment and approval of compliance by the national competent authorities responsible for the transport of radioactive material. Approval certificates valid for a specific time period are issued for packages and shipments by the respective national competent authority. These are the bodies that are responsible for implementing the Agency's transport regulations in their respective countries. They are consulted by all those involved in the transport of radioactive material, be they consignors, carriers, or users.

In implementing the regulations over the years, it has been the experience that there is an almost constant need to refer to approval certificates for technical and administrative reasons. At one of its earlier meetings, SAGSTRAM, recognizing this need, recommended that the IAEA collect information worldwide on such valid certificates so as to be able to make the data readily available to the competent authorities of Member States, as well as to other users.

Work on this project began in mid-1980 by staff members in the Division of Nuclear Safety. Together with staff from the Agency's computer section, a main frame computer program was developed to store and retrieve the data, and prepare periodical reports for publishing and distribution. Many problems were encountered during this period as the certificates, although issued on the basis of the IAEA's regulations, were not uniform in appearance and content. Also, the mere act of collecting the information from the many sources and keeping it complete and up-to-date was time-consuming. It wasn't until a few years later that the first directory of package approval certificates and shipments was published in 1987 as a technical document that proved invaluable for determining the availability of approved package designs or the status of particular approval certificates, and as an aid to compliance assurance concerning the correct use of packages.*

Currently, the maintenance of the database is done on a personal computer to allow staff members directly involved with the work more control over all phases of the activity. Additionally, with the support of Member States, it allows the submission of material on floppy

disks formatted for direct entry into the system. A commercial database software program was selected to facilitate complete standardization.

The data fields per record were reduced to include only those which experience had proven to be most helpful to maintain. These include administrative details such as the certificate number, date of issue, period of validity, package identification information, validity for mode of transport (sea, air, rail, road); technical information such as package mass, description, outer dimensions, authorized contents (amount of radioactivity and type of source); operational information, such as stowage instructions (transport index); and other information gleaned from the certificates which might be helpful for the competent authorities to know.

Member States submit information on a form to the database either on floppy diskettes or paper. Copies of the certificates are also provided to document the database.

Streamlined report formats were also designed which enable quick and easy referencing. A system program that runs the database by menu was written by a consultant. The entire activity was implemented in early 1988.

The database currently contains about 1300 records (it is expected that there will be about 2000 records when the database is complete) and is continually updated. A report on the contents of the database in tabular format will be published annually starting in the fall of 1989, with a draft update to be distributed in the middle of the year.

PACKTRAM is by no means perfect. As experience with the use of the database grows, improvements and refinements suggested by Member States will be implemented taking into account the views of SAGSTRAM. Among other things, it is hoped that greater uniformity eventually could be achieved in the format of approval certificates.

EVTRAM: Events in the transport of radioactive material

A second area in which information is collected is that of events in the transport of radioactive material. A computerized reporting system has been established to be used by the Agency and Member States as a source of information to help judge the effectiveness of the regulations and to allow full use to be made of any lessons learned as a result of an accident or incident.

This project was launched in 1988 with the development of a form by which Member States are requested to submit information on accidents and incidents in the transport of radioactive material that occur in their territories and that they consider useful for other participating Member States. The data event form is patterned after a form used by the International Civil Aviation Authority (ICAO) for aircraft accident investigation; however, it is not quite as detailed. It has the benefit of comments from the members of SAGSTRAM, interna-

* *Directory of national competent authorities' approach certificates for packages, shipments, special arrangements and special form radioactive material*, IAEA-TECDOC-442 (1987).

tional organizations (especially ICAO), and members of an informal international group (the Radioactive Transport Study Group) that meets to exchange practical experience in the transport of radioactive material. The form is in its final stages of development to collect the first set of data.

Initially, it is proposed to collect the data for 1989 and then expand the database progressively to include information back to 1 January 1984.

EVTRAM will be maintained with the same software as that used for PACKTRAM. The structure of the fields for data entry has been defined. Unlike the PACKTRAM database, however, EVTRAM has not been developed to include a computer program to analyse the data. A group of consultants will meet in 1990 to study the information received, make a preliminary analysis, and submit recommendations to SAGSTRAM on the direction of future work in this area.

SHIPTRAM: Shipments of radioactive material

A third area in which it is intended to collect data relates to shipments of radioactive material. In previous years, some information was collected on the availability of related data in the respective Member States. A preliminary analysis of the data was effected in 1981. SAGSTRAM has recommended that a new data collection effort would be appropriate.

A form has been provided to SAGSTRAM members for consideration as to its suitability to collect information. Based on their comments, it will be distributed at the end of 1989 to all Member States and data for the year 1990 initially will be requested. Because of the difficulty involved in collecting this type of information, it is intended initially to collect the data for the nuclear fuel cycle only. Later, it is hoped to expand the scope to include non-fuel cycle consignments.



Light-weight package for gamma radiography sources. (Credit: Amersham International plc)

Factual base

Data collection and handling is essential to underpin the Agency's work in the maintenance and implementation of its *Regulations for the safe transport of radioactive material*. Besides providing an invaluable service to Member States in the application and administration of the regulatory provisions, it is vital to have a central up-to-date source of information on the performance and efficacy of the regulatory standards in practice. This can serve as an indispensable means of assessing the need for regulatory changes, and as a repository of facts for the various needs of governments, national authorities, the media, and the public.

The Agency's transport databases, in their newly developed status, are better adapted to meet these needs.

Further information on these databases may be obtained from either the IAEA's Division of Nuclear Safety or the national competent authority responsible for the transport of radioactive material in each respective country. The IAEA maintains an updated list of such authorities and can provide a copy on request.

