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COMMISSION STAFF WORKING DOCUMENT

Annex to the

COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

CONCERNING THE FIFTH REPORT OF THE STANDING WORKING GROUP ON SAFE TRANSPORT OF RADIOACTIVE MATERIALS IN THE EUROPEAN UNION

- 5th Report of the Standing Working Group on safe Transport of Radioactive Materials in the European Union -

{COM(2006) 102 final}

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Introduction

Radioactive materials are transported in most countries of the world primarily for medical use in hospitals. The continuing expansion of health care in recent decades has led to an increase in the number of such transport operations in many countries.

Manufacturing industry also has a need for radioactive materials in areas such as thickness gauging, industrial radiography and smoke detection. Additionally the nuclear industry transports radioactive materials to and from establishments such as nuclear power plants.

Packages used to transport radioactive materials for medical and general industrial use vary in size but most can be manually handled. Packages used by the nuclear industry are frequently large and heavy necessitating the use of remote handling, for example by crane.

The transport of radioactive materials has been regulated internationally for over 40 years and in some countries for even longer. The International Atomic Energy Agency (IAEA) published its first set of regulations for the safe transport of radioactive materials in 1961 [1]. These regulations applied to all modes of transport both nationally and internationally. In order to update the regulations and to take account of technical and scientific advances, periodic reviews of the regulations have been carried out and revisions published. Currently revisions are scheduled on a two- year cycle. The latest revision to the 1996 Edition of the regulations was published in 2000 [2].The revision process has been supported by scientific and technical studies on particular aspects of the regulations providing factual information for international discussion. The European Commission (EC) has funded a number of such studies and has provided valuable input to the development of the international regulations.

Radioactive materials are only one category of dangerous goods. Many other dangerous goods are transported including chemicals and explosives. There are separate regulations for such materials.

The safety record in the transport of radioactive materials is excellent but there is no room for complacency. The review and revision of the IAEA transport regulations will continue to require essential input from technical and scientific studies supported by the EC.

This report was prepared by the Standing Working Group on the Safe Transport of Radioactive Material set up by the Commission in 1982 in response to Parliament's request [O J C40/44 of 15 February 1982]. This, the 5th report of the Standing Working Group, updates the report presented to the Council and Parliament on 8 April 1998 [COM(1998)155 final].

1. BASIC INFORMATION

1.1. Data on transport of RAM in some Member States and other Countries

1.1.1. Normal transport conditions (incident free)

Shipment data and exposure data have been collected from Member States (including some new Member States) and some Applicant Countries (at the time of the study) as part of a study [3] funded by the EC. The data on package numbers are generally well known for nuclear fuel cycle operations but in most cases package numbers are only estimated for other transport operations. The data presented in Figure 1 are taken from the information supplied by countries as part of the study: some of the data are estimates. Most countries do not require shipment data to be available annually because the safety benefit is considered small compared to the effort involved. However Italy does require information on all shipments of radioactive materials within its borders. There are many reasons for the differences in package numbers between countries. Some countries have a large in-transit component, some have nuclear fuel cycle operations and some have major suppliers of radionuclides within their countries. In addition not all countries include Excepted packages (the most basic) in their shipment data.

Exposure data are not generally fully available for transport operations because such data are often incorporated into more general exposure data. Members of the public receive very low exposures from the transport of radioactive materials. There are many workers involved in transporting radioactive materials: most receive doses below 1 mSv/y but a few driver/handlers delivering radionuclides for medical use receive doses up to 17 mSv/y. The annual limit for worker exposure is 20mSv. Examples of maximum worker doses (late 1990s/2000), by category of material transported, are cited in Figure 2. In the UK doses from transport of consumer products have been calculated.

The small number of workers, about 10 in the UK, receiving the highest radiation exposures is comprised of drivers/ handlers delivering packages for medical use. These packages are manually handled and may be carried in close contact with the body. Improved procedures and training can help to limit such exposures.

1.1.2. Abnormal conditions

There are several millions of packages containing radioactive materials safely transported each year in Member States. Accidents and incidents do occur but almost all are minor involving no releases of radioactive material or excessive radiation exposure. Events involving nuclear fuel cycle materials are fully recorded but for other events, involving materials for medical and general industrial use, recording is less comprehensive. As an example some recent events, mainly recorded in France, are listed in Appendix 1.

Legislation requires the reporting of significant abnormal events during the transport of radioactive materials. Since 2003 transport operators are required to report such events to the appropriate authorities in accordance with the provisions in ADR [4] and RID [5]

Accident data covering the transport of radioactive materials are regularly published in some countries, mainly the UK [6] and France [7]. The numbers of such accidents are very low and the consequences, arising from the radioactive materials, are trivial apart from a few accidental over-exposures, usually arising from the transport of incompletely shielded industrial radiography sources. In France and in the UK events are reviewed each year: for example some 30 annually in the UK. Almost all such events have no health or environmental consequences.

In the event of an accident there are emergency procedures that are implemented to limit any possible consequences and to provide information to appropriate authorities. These emergency procedures depend upon the nature of the transport operations in each country and there is co-operation between countries. All emergency procedures are periodically tested and reviewed to improve the response.

The safety of transport of radioactive materials is based on the strict application of a large set of binding and non binding rules: organisational, operational and technical requirements of the applicable binding regulations together with the internal rules decided by companies under the control of authorities. Of particular importance is the permanent assessment of the adequacy of the whole set of requirements. This implies a systematic record and review of all abnormal events to draw all possible lessons with the aim of avoiding the recurrence of events.

A compilation and review of the emergency arrangements and the corresponding legislation in the Member States was completed in 1998 [8]. The conclusion of the study was that all 15 Member States of that time have well-developed emergency arrangements that are capable of providing responses to accidents involving the transport of radioactive material. (See section 4.2).

Figure 1: Estimated number of packages transported in EU Member States and applicant countries (1990s/early 2000) by category of material

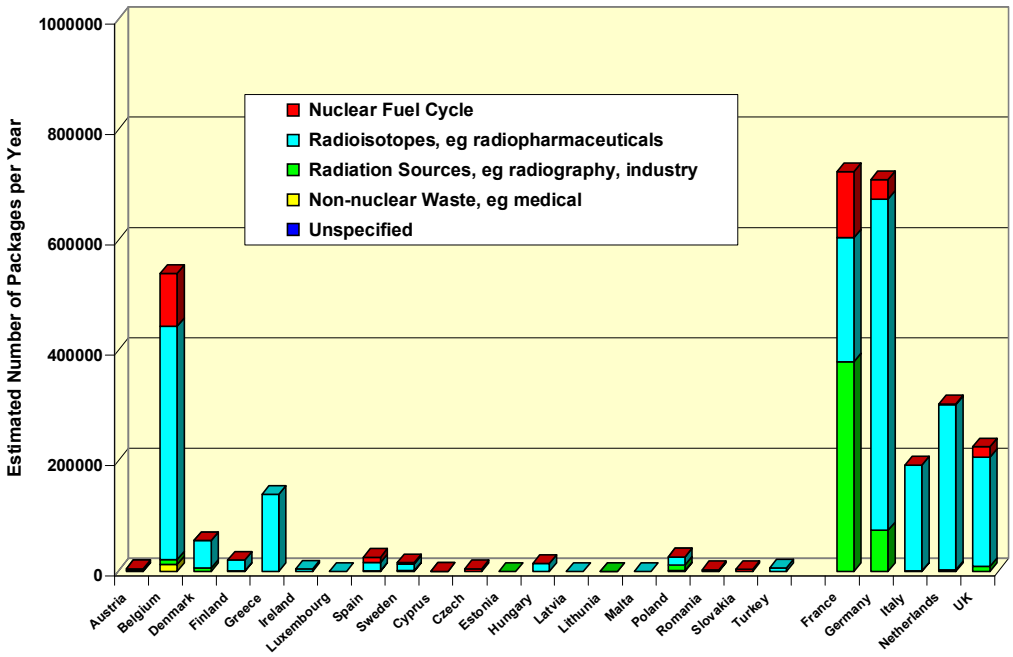
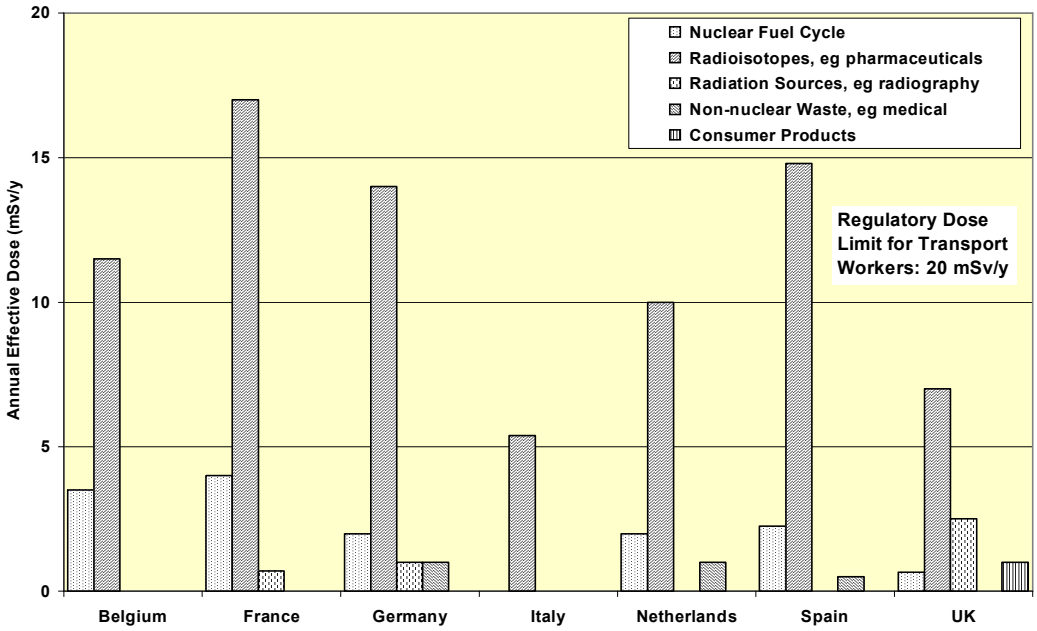


Figure 2: Reported maximum occupational radiation doses in EU Member States (1990s/early 2000) arising from the transport of radioactive material



1.2. Economic and social aspects

Radioactive materials are widely used in hospitals particularly for the purpose of diagnosis and treatment. Some of these materials are transported to hospitals and then dispensed and used on a regular basis, sometimes weekly to ensure a constant supply.

The safe transport of radioactive materials is vital to the use of such materials in medicine, general industry and in the nuclear fuel cycle. In the EU there are many hundreds of workers involved solely with transporting radioactive materials and many thousands of workers occasionally involved in such operations. There are millions of specially designed and manufactured containers and a large number of dedicated vehicles associated with the movement of radioactive materials.

Transport of radioactive materials is essential to the nuclear industry. There are two major parts to the movement of radioactive materials. Firstly, the production of the containers and vehicles to international specifications: secondly, the operational aspects covering the use of the containers and vehicles. Careful attention is given to all stages of the design, manufacture, testing, use and maintenance of all the equipment involved.

Radioactive materials are important to the economic and social well-being of the people. The safe transport of such materials is necessary for their continuing use.

1.3. The effect of enlargement by new Member States

Safety in the transport of radioactive material (RAM) is a primary concern of the European Union (EU) and its Member States. Safe transport is a necessary part of the aim to promote and facilitate the functioning of the single European market in an enlarged EU. Thus, allowing competition and the free movement of commercial goods, labour, services and other commodities within and between EU Member States. This policy objective is in practice realised in the EU through the development, implementation, application and maintenance of an effective system of pertinent regulatory controls and a set of coherent and harmonised safety standards and criteria concerning the safe transport of RAM.

In respect of the central role of safety issues including the safe transport of RAM in the enlargement process, the European Commission has, with the endorsement of the DG TREN Standing Working Group on the Safe Transport of Radioactive Materials, made efforts to assist the countries then applying for EU Membership. This has been achieved partly by the assessment and evaluation of their existing transport regulatory framework and the provisions needed in the Applicant Countries to achieve the same level of safety in the transport of RAM as in the EU. The principal regulatory instruments and related legislation considered in a multi-national effort involving several EU Member States and Applicant Countries, some of which are now Member States, in judging the level of regulatory control of RAM shipments included:

– the Modal Agreements (ADR [4], RID [5], ICAO Technical Instructions [9], ADN [10], IMDG-Code [11],) of the regional and international transport organisations which have fully incorporated the safety standards embodied in the IAEA Transport Regulations,

– the relevant EU Council Directives, Regulations and Recommendations [12], and

– the applicable international Conventions, Codes and Agreements [13].

Based on a comprehensive review and analysis of the relevant legislation in force in four Central European Countries (Czech Republic, Hungary, Romania, Slovak Republic) completed in 2000 [14] it was concluded that the latest IAEA safety standards have or will soon be adopted in the Countries concerned. Similarly, the Modal Regulations for the transport of RAM by road, rail and air were incorporated through national legislation in all four Countries. At the time of the study in 2000 varying degrees of compliance were found to exist in these countries in the implementation and application of the relevant EU Council Directives, Regulations and Recommendations.

Despite the variable level of compliance that existed in the Countries concerned, there was mutual agreement that the effort and burden of revising and amending the nationally existing regulatory framework for the transport of RAM has limited benefits. It is also believed that the benefits of having a harmonised system of safety and protection in place in an enlarged EU, outweighs changes to national regulatory frameworks. It is understood that assistance may be useful and needed by those Countries to ensure uniformity and consistency in the implementation and application of the relevant rules and regulations pertaining to the safe transport of RAM after the completion of the enlargement of the European Union.

New Member States will benefit from the harmonisation of transport procedures within the EU. They will also gain from working more closely on transport safety with existing Member States.

The further development and harmonisation of the safety standards and criteria embodied in the international regulatory framework for the transport of RAM and the monitoring and demonstration of its adequacy and effectiveness is a continuing challenge.

1.4. Assessment of issues identified in transport operations

Currently there are a number of transport matters that are receiving particular attention and these are described below.

1.4.1. The use of transport containers for interim storage

Interim storage capabilities have been developed allowing operators to keep open all back-end options. Some fuel has been subject to interim storage in multipurpose dry storage casks with the aim of final disposal or reprocessing of the spent fuel after several decades of interim storage. In some European countries the concept of at-reactor interim storage facilities was selected to reduce transport operations.

Several Member States have chosen to perform interim storage of spent fuel and vitrified waste packages. For spent fuel, the dual- purpose casks used for interim storage are more often stored on the site of loading of the spent fuel. Though designed for transport as well, they are initially not used for transport. It is generally not known how long they will be stored before the decision to transport them is taken; in principle it is intended to store the spent fuel until a final storage or reprocessing solution is implemented. These packages might only be transported some 30 to 50 years or more after having been loaded. “Ageing” issues will then have to be solved but the required performance may be less stringent due to the decay of the spent fuel activity. Another issue is the uncertainty as for the conformity of these packages to the future transport regulations that could, in the mean time, have been subject to changes. The same issue can be found with packages for low and intermediate level wastes in some countries, where packages containing conditioned waste will be stored at the reactor site for a long time before being moved for final disposal.

1.4.2. Denial of shipments

A major issue for users of radioactive materials is the denial of shipment by some carriers, sea ports and airports. There are problems with all modes of transport sometimes due to the perception of possible hazards rather than the reality. For example some maritime carriers and harbours have refused to transport and handle radioactive material, although the risk created by the material is very low: even Excepted packages have been refused. The classification as ‘radioactive’ gives rise to a negative prejudgement that often makes it impossible or difficult to transport this kind of dangerous goods. Similar perception is not apparently frequent in the case of the other classes of dangerous goods.

These situations, which are linked to perception and not to safety issues, may negatively affect future transports by sea. For example, these difficulties may seriously affect the

transport of very high activity sources of Co-60, generally used in industrial and medical irradiators, which at present cannot be transported by air as long as any Type C package is not designed and approved. According to the main suppliers of those sources, there are many practical and operational problems against the development of a Type C design for this use. If marine transport cannot be used for this kind of shipment then the practices where this radioactive material is used may be seriously affected.

Denial of sea transport can cause an increase in the number of transports by road. In fact, on many occasions the harbour nearest to the final user of the radioactive material cannot be used and it is then necessary to cross a country by road to reach those installations. This is likely to have a negative impact when there is a higher risk of accidents in the road mode. In order to allow a suitable and safe transport of radioactive material, it is necessary to investigate what actions should be adopted to avoid these problems (for example: increase the information and the training of the carriers and port personnel).

A similar "denial" situation is being observed for some transport by air: some airlines consider that the transport of radioactive material gives them more problems than benefits and they have decided not to carry out these activities. Negative public perception, labour problems and extra costs are some of the problems cited by carriers.

Information and training are essential if reality rather than perception is to be accepted. There are many publications and information sheets available on the safe transport of radioactive materials targeted at all levels of understanding. The IAEA and the EC have websites [15] that are helpful but more needs to be done to give factual information to the public and to all those involved with transport. (See also section 5.3)

The problem with denial of shipments has been discussed during the IAEA International Conference on the Safety of Transport of Radioactive Material, 7-11 July 2003 in Vienna. Based on the findings of this conference an IAEA Action Plan for the Safety of Transport of Radioactive Material (see section 5.4.1) has been developed and approved which contains also appropriate actions to solve this problem. In 2004 the IAEA sponsored meetings to address these issues and is working towards a satisfactory resolution. These actions should be supported by the EC.

1.4.3. Contamination issue

The surface contamination issue in transport is one that has received much attention in recent years and is now much improved. There are a number of publications demonstrating the improvements [16].

Surface contamination on some nuclear fuel cycle packages has received wide publicity and is perceived as a potential hazard. The real risk is much lower than the perceived one because the actual radiological consequences of such contamination are trivial. However, to allay concerns, improvements have been made to the decontamination operations and the number and magnitude of sizeable contamination events have decreased. More controls and improved preventive measures have been introduced. The development of the International Nuclear Event Scale to cover all transport movements has assisted public perception (see section 4.3).

Many Member States have investigated the causes of surface contamination on nuclear fuel cycle packages. The results of these studies have been made widely available [17]. Further, a consensus has been achieved on measures necessary to limit surface contamination and to reduce its impact [18].

Experience in Germany shows that since resumption of shipments in March 2001 non fixed surface contamination has been always clearly below the permissible limits by implementing appropriate measures and procedures for loading, handling, transport, transfer and unloading of spent fuel casks to prevent contamination and for improving decontamination methods, contamination detection and contamination measurements [19]. Improved training and operational procedures have been successfully implemented.

1.4.4. Uranium hexafluoride packages

From the 1st January 2002, packages designed for the transport of uranium hexafluoride have to withstand the thermal test specified in the regulations to simulate a severe fire. Subject to the approval of national Competent Authorities, the thermal inertia of large capacity packages is sometimes assumed to warrant their resistance to the thermal test. This change has no impact on the transport of enriched UF6 since packages of fissile material were already subject to this test; it only impacts either on the transport of UF6 in small size packages (metallic bottles) used to transport samples or on the transport of depleted or natural UF6 in large cylinders containing up to 12,500 kg of UF6.

For the sample package designs as for large cylinders, fire- protecting designs have been developed and applications for approval have been submitted to Competent Authorities. For the large cylinders, movements are performed in 2004 without additional protections but the new protections which have been granted approval in 2004 by the Competent Authority of a Member State, are under manufacture in 2004 for use in 2005.

2. SAFETY AND SECURITY

2.1. International Regulations on the Transport of RAM

The establishment, application and maintenance of a coherent and uniform approach to protection and safety in the transport of radioactive material (RAM), within and between countries, is a fundamental tenet to provide and ensure an acceptable level of control of the radiological and non-radiological hazards that may arise from the transport of RAM in the public domain. In recognition of this need the regulatory bodies concerned, including those of the European Union (EU), have developed a framework of controls and related legal instruments to address the safety and security concerns pertaining to the transport of RAM. The existing suite of legally binding and non-binding international regulatory instruments and regulations governing the safety and security of radioactive material shipments by all modes of transport comprises essentially:

(1) the IAEA Regulations for the Safe Transport of Radioactive Material,

(2) the Modal Regulations of the regional and international transport organisations,

(3) a range of EU Directives, Regulations and Recommendations, and

(4) a variety of international Conventions, Codes and Agreements.

The IAEA Transport Regulations establish standards of safety that provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of RAM and utilise the safety principles set forth in the International Basic Safety Standards [20] and Fundamentals [21]. These Transport Regulations [2] are supplemented by a hierarchy, of Safety Guides and Advisory Material [22a, 22b, 23a, 23b], developed and published by the IAEA. The Regulations provide a regulatory framework for all categories of radioactive materials and for all modes of transport (road, rail, air, inland waterways and sea). The Regulations are subject to a continuous review and revision process to keep the Regulations in line with the latest scientific and technological developments. The IAEA Transport Regulations are, however, not legally binding on IAEA Member States and other regional and international transport organisations but form the basis for legal controls given effect by such organisations.

The specialised regional and international organisations involved in regulating the regional and worldwide transport of hazardous material including radioactive substances have fully incorporated the recommended safety standards and provisions embodied in the IAEA Transport Regulations into their mode-specific regulations, that is ADR [4], RID [5], ICAO Technical Instructions [9], IMDG-Code [11] and ADN/ADNR [10].

The applicable transport-related legal instruments and related regulations of the European Union establish certain duties, obligations and technical and administrative requirements on Member States and transport operators relevant to safety and security in transport. For example: by the approval, notification and control of certain shipments, applications of certain procedures, appointment of safety advisors, and information to the public.

The international conventions, codes and agreements broaden significantly the international safety and security regime concerning the management of radioactive materials. They also promote the implementation and application of international safety standards in the field of civil nuclear liability, physical protection, early notification and mutual emergency assistance and safeguards control of nuclear material.

The most recent revisions in the IAEA requirements were put into force in the binding regulations of the EU Member States in 2001 with minor amendments made in 2003. The four most significant revisions concerned:

- updating the activity thresholds for the contents authorized in Type A packages,
- adding the need for packages of uranium hexafluoride (UF6) to withstand the severe fire conditions,
- introducing packages containing high activities and transported by air to withstand enhanced mechanical and thermal test conditions : impact at 90 m/s instead of 13 m/s and fire at 800°C for 1 hour instead of 30 minutes, for which a new package type has been defined, the Type C package and,

- a new requirement for radiation protection programmes.

The first modification (first bullet point) has not resulted in major changes to most package designs. The new requirement for radiation protection programmes was mainly aimed at keeping radiation exposures as low as reasonably achievable and at limiting high exposures.

The next edition of the IAEA regulations, (probably to be published as an amended version), will also include new requirements for worker training and declaration of abnormal events which affect radiation protection requirements.

2.2. Other requirements

In addition to the regulation for the safe transport of dangerous goods there are also specific provisions for radiation protection that apply to the transport of radioactive material.

The aim of radiation protection standards is to protect members of the public and workers against the harmful effect of ionising radiation. The International Commission on Radiological Protection (ICRP) gives recommendations governing the primary rules and principles. These recommendations are revised periodically to take into account the scientific progress in the field. The current recommendations of ICRP were published in 1990 (ICRP 60) [24]. On that basis the European Commission revised their Basic Safety Standard Directive from 1980 and new recommendations were adopted and published as "Council Directive 96/29/EURATOM of 13 May 1996 [25], which lays down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation". This directive was required to be transposed into national law in each member state before 13 May 2000. The Directive shall apply to all practices which involve a risk from ionising radiation emanating from an artificial source or from a natural radiation source in cases where natural radionuclides are or have been processed in view of their radioactive, fissile or fertile properties. Such practices also include transport of radioactive substances. The ICRP has recently issued, for comment, draft 2005 recommendations containing new proposals on radiological protection.

Two shipment control procedures are in force in the European Community to supervise transfers of radioactive material:

- "Council Directive 92/3/EURATOM of 3 February 1992 [26] on the supervision and control of shipments of radioactive waste between Member States and into and out of the Community". Under this Directive Member States, including transit states of waste shipments, are made aware of and able to express their prior consent before movements of radioactive waste can take place. This Directive is currently under revision and is expected to be published in revised form in the near future.

- "Council Regulation (EURATOM) No 1493/93 of 8 June 1993 [27] on shipments of radioactive substances between Member States". A holder of sealed sources who intends to carry out a shipment of such sources, is required to obtain a prior written declaration by the consignee of the radioactive substances, to the effect that the consignee has complied with all applicable provisions of the Euratom Basic Safety Standards Directive. The competent authority of the Member State shall confirm that declaration. Furthermore a holder of both

sealed sources and other relevant sources who has carried out a shipment of such sources shall inform the competent authority of the Member State of destination within 21 days of the end of each calendar quarter.

A new Council Directive (2003/122/EURATOM on the control of high-activity sealed radioactive sources and orphan sources) was adopted on the 22 December 2003 with the purpose to prevent exposure of workers and the public to ionising radiation arising from inadequate control of high activity sealed radioactive sources or orphan sources. The Directive also has the aim to harmonise controls in place in the Member States by setting out specific requirements ensuring that each such source is kept under control The Directive shall be implemented by the Member States before the 31st of December 2005.

2.3. Security in transporting RAM

In December 2002, the United Nations Sub-Committee of Experts agreed to include, within its Model Regulations covering the transport of dangerous goods, measures for the security of all dangerous goods by all modes of transport. In the normal course of events, all these security measures would be transposed into the various mandatory modal provisions on the international transport of dangerous goods. Thereafter EC Directives 94/55 (road transport) and 96/49 (rail transport) will require Member States to apply these provisions in domestic law by no later than 1 July 2005. It is anticipated that the necessary revisions to the framework Directives will be completed by December 2004 through qualified majority voting adoption at the Technical Committee set up by Article 9 of the ADR Directive.

While several Member States are currently applying strict security rules for the protection of nuclear materials in transport, other Member States are developing a new regulatory system. As an example, in Spain, as a basis to the collaboration among the different Competent Authorities and operators, a plan of action is being developed to define an integral system on security for nuclear and radioactive activities. This plan has the following main work areas:

- Define an institutional framework, where the roles of the different authorities and private institutions are clearly established in this matter (like a memorandum of understanding between them).

- Revision of the current regulations on security, to be improved and adapted to the changes implemented in the international agreements, and to be consistent with the general regulatory framework on security.

- Improve the systems and procedures on security in three basic elements: internal security of the facilities, external support to that security and, preventative information.

- Increase the personnel training through systematic plans of training conducted by the institutions and companies that are responsible for the security in this area, focusing that training in specific aspects of nuclear safety and radiological protection.

- Rationalisation of the authorisation system.

As a further example the UK has taken significant strides to introduce the new security requirements. On the aviation front, the ICAO has agreed to adopt the measures, initially as a

recommendation, but at the next opportunity to make them mandatory. For maritime, the IMO has in effect already adopted most of the UN security measures with the introduction of the International Ship and Port Security (ISPS) code - agreed last year. These have been cross-referenced in the IMO Dangerous Goods Code (IMDG Code). Those UN measures that have not been covered by the ISPS Code have been adopted as non-mandatory provisions in the IMDG Code.

For road and rail, the UK introduced a Code of Practice for the security of dangerous goods by road that came into effect in February 2004 [28] and for rail in August 2004 [29] – well ahead of (and as precursors to) formal regulation by July 2005. The Codes, and supporting guidance, set out an agreed framework that aims to minimise the risk of theft or misuse of dangerous goods and thus reduce vulnerabilities by putting in place a set of proportionate and practical security measures to which industry should work. Prior to implementation of the new security measures in the UK, it will be determined as to whether any revision is required to the threshold levels for high consequence dangerous goods over and above the ADR/RID requirements in view of their relative sensitivity and potential threat that they may pose.

One Member State, in an ever-evolving environment, the UK welcomes the recognition by the European Commission of the importance of adequate security for goods in transit, including radioactive materials. The Commission's December 2003 consultation paper on the security of freight transport was an important starting point for generating debate on whether or not it is desirable and feasible to have EU-wide regulation and enforcement in this area.

The UK does not believe that a convincing case has yet been made for EU regulation in this area of freight transport security. The UK is of the opinion that the security objective can be sufficiently achieved by appropriate bilateral arrangements between individual Member States in a manner that they consider proportionate to the particular risk they face, while working under the umbrella of the UN Model security requirements.

The IAEA continues to draft further detailed guidelines for the security of RAM during transport and this work should be supported.

2.4. Inadvertent movements and illicit trafficking

2.4.1. Definition

The International Atomic Energy Agency (IAEA) in its TECDOC on the prevention of the inadvertent movement and illicit trafficking of radioactive materials [30] defines illicit trafficking as any intentional unauthorized movement or trade (particularly international) of radioactive materials (including nuclear materials) with criminal intent. The term should not be interpreted as covering all unauthorized events involving radioactive material, irrespective of type and cause, since most of these may only be administrative offences and matters for the national nuclear or radiological regulatory authority, rather that law enforcement agencies.

2.4.2. Background

Radioactive materials are used throughout the world for a wide variety of beneficial purposes in industry, medicine, research, defence and education. The radiological risks associated with

such uses need to be controlled. In Europe, while there is no specific regulation on the prevention of illicit trafficking, the provisions of Council Directive 96/29/Euratom, which lays down the Basic Safety Standards (BSS) for the protection of the health of workers and the general public against the dangers arising from ionising radiation, provides a basis for national regulations and operational safety [25].

As a result of this each Member State of the European Union will have established a system of notification, licensing, inspection and enforcement to take account of and control the use, storage, transport etc. of radioactive material. Within this system it is the responsibility of the operator (licensee) to account for all the material possessed in accordance with the requirement of the competent authority. National regulatory systems consistent with the BSS and IAEA guidance [20], [21], [22], and [23] would be expected to ensure that effective control of radioactive materials is maintained. Nevertheless, control can be lost for a variety of reasons such as failure to comply with regulations, deficiencies in the infrastructure, inadequate physical security or deliberate diversion of radioactive materials. In those cases, public and workers should be protected against radiological risks by the application of appropriate radiation safety standards.

2.4.3. Incidence of illicit trafficking

In March 1995 the IAEA started an Illicit Trafficking Database (ITDB) programme. For the purposes of the database a broad definition of illicit trafficking is used, namely "a situation which relates to the unauthorised acquisition, provision, possession, use, transfer or disposal of nuclear materials and other radioactive sources, whether intentional or unintentional and with or without crossing international borders, including unsuccessful or thwarted attempts." This database is known as the Illicit Trafficking Database, although many incidents that are included in it are more inadvertent movements rather than illicit trafficking. As of December 31, 2003, the database contained 540 confirmed trafficking incidents, which have been reported since 1993. The illicit trafficking database office issues a Quarterly Report of new incidents, which have been reported or confirmed to the IAEA by official points of contact and an Annual Report which analyses global trafficking trends and patterns. At the end of December 2003 there were 75 Member States of the IAEA participating in the ITDB with Malta and Mauritius in the process of becoming full members. All 25 EU Member States, except Luxembourg, are members of the IAEA ITDB programme. About 90% of the incidents recorded in the database involve radioactive sources, or low-enriched, natural and depleted uranium. It is of course likely that there are more incidents occurring worldwide than are detected or reported to the ITDB.

The IAEA has published a number of TECDOCs and papers in this field [31a,31b,31c].

3. HARMONISATION OF RAM TRANSPORT IN THE EU

3.1. Harmonisation of the application and enforcement of transport requirements in Member States

It is very important to look for the harmonisation of the requirements to be applied to the transport of radioactive material (harmonisation of the regulatory requirements). It is therefore necessary to harmonise the assessment procedures in the license and inspection processes.

There are already very similar national regulations through the implementation of ADR, RID, ICAO technical instructions and the IMDG Code: however, it is important to have a consistent application of the requirements established by those regulations. That goal may be reached if common assessment procedures are developed for all Competent Authorities.

For ADR, all existing EU States are signatories except Ireland and Malta. For RID, all existing states are signatories except Malta, Cyprus and Estonia. These Agreements ensure common packaging requirements and certification standards.

3.2. Emergency arrangements: co-operation between Member States

Despite the extensive application of stringent safety controls established in the current Regulations, transport accidents involving packages containing radioactive material have occurred and will occur. Whenever a transport accident involving radioactive material occurs, and although many will pose no radiation safety problem, emergency response actions are needed to ensure that radiation safety is maintained.

If a transport accident occurs that results in a significant release of radioactive material, loss of shielding or loss of criticality control, the consequences should be controlled or mitigated by proper emergency response actions. Responsibilities should be defined and preparedness actions should be taken to ensure that an adequate emergency response capability is available when transport accidents involving radioactive material do occur.

In line with the IAEA requirements, the Regulations on the transport of dangerous goods establish a framework for requiring an adequate emergency response capability for responding to transport accidents involving radioactive material. Then national arrangements for responding to transport accidents involving radioactive material should be developed. Intervention requirements are part of the Basic Safety Standards. There is an international reporting scheme set up for all incidents involving significant releases of radioactive material.

The approach of the national planning may be different. In some cases the planning will be particular for this practice, but in another may be integrated in more general emergency planning for responding to accidents involving dangerous goods.

Information on emergency response plans was provided in an EC funded study "Examination of existing transport emergency arrangements in Member States and discussion of the benefits which result" [8]. It was concluded that at that time all existing 15 Member States have well-developed emergency arrangements that are capable of providing responses to accidents and incidents involving the transport of radioactive materials. In most countries the primary responsibility is on the carrier and consignor to provide their own contingency plans for such emergencies and to inform the relevant authorities. The main area identified for development was in the provision of periodic exercises That are specific to the transport of radioactive materials. Consideration should also be given to the establishment of national databases for the purposes of learning lessons and identifying trends.

Communication and co-operation between Member States are essential. Mutual assistance is important since an emergency may affect several countries. Additionally some countries may

have special facilities that could benefit an emergency elsewhere. Co-operation will help establish similar approaches and integrated responses. There is a convention in place for radiological emergencies [32]. The IAEA has published a Safety Guide on Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material [33].

3.3. Application of INES to transport

The International Nuclear Event Scale (INES) [34] is a means of communicating the safety significance of a radiological event to the media and general public. The responsible authority quickly communicates preliminary details of the event together with a rating to the IAEA for wide-spread distribution. A fuller report and confirmation of the provisional level of the rating of the event is available in due course. An event involving radioactive material during transport can be covered by this scheme.

Notification and rating transport events under this scheme are a good way to inform the public and media on what happens in the transport of radioactive materials. This is also a good tool to share experience with other countries.

An example of the useful application of INES is the following. At the beginning of 2002, the competent Swedish authority rated at level 3 an air transport incident concerning an abnormally high level of external radiation for an iridium-192 package sent from Sweden to the United States via France. This incident, which involved three countries, showed all the potential benefits of generalised international application of the INES scale to transport (further details of this event are given in Appendix 1).

In the same way as severity scales exist for natural phenomena such as earthquakes, wind or avalanches, France in 1987 set up a scale measuring the degree of seriousness of nuclear-related events. The Organisation for Economic Cooperation and Development (OECD) first of all, and then the IAEA made extensive use of this scale when putting together the INES.

The INES was internationally implemented in 1991. However in the early 1990s, INES was in reality applied only to nuclear facilities and not to all transport events. The main concerns at that time were for events occurring at fixed installations.

The late 1990s saw several significant transport-related events: excessive surface contamination on spent fuel casks made a deep impression internationally on public opinion and the media, forcing the authorities to react.

Application of the INES to transport in France was transmitted for information to the other safety authorities competent in the transport area and to the International Atomic Energy Agency. It was presented in turn to the participants at the IAEA's Radioactive Transport Study Group (RTSG) during the 29 September 1999 meeting in Antwerp (Belgium), on 30 March 2000 to the 32nd meeting of the European Commission's Standing Working Group (DG-TREN SWG), as well as to the IAEA's Transport Safety Standards Committee (TRANSSC) meeting of February 2001. These presentations led to large numbers of comments, demonstrating the need to continue to work on this subject.

Although the scale was not specifically designed for application to the transport of radioactive materials in general, information about rating events occurring during transport is given as of the 1993 edition of the INES User Manual. In 2001, the IAEA and the Nuclear Energy Agency of the OECD (NEA) published a revision of the INES User Manual [34], with more information about the rating of transport incidents.

In June 2001, the European Union organised a meeting for an exchange of views by the European authorities concerning application of the INES scale to radioactive material transport events. The European Commission consulted the Member States over the application protocol draft prepared during this meeting.

The document discussed at the European level was forwarded to the IAEA, which recognised the need for further development if the INES scale was to be fully applied to transport. The Agency therefore in December 2001 organised a consultants meeting (CSM) to propose additions to the scale. Experts from Belgium, France, the United Kingdom and the United States all contributed to this CSM. After approval by the Agency, the draft guide was proposed during the TRANSSC meeting in February 2002 for a trial period. Subsequently, this information could then be included in a future revision of the INES User Manual.

The SWG expressed concern that any dual system would not be appropriate. The existing incident/ accident notification system which is mandatory since 1 January 2003 by the Dangerous Goods Transport Regulations of ADR and RID in the European countries must be taken into account in any further development. The application of the INES system is supported on a voluntary basis for a trial period to gain practical experience with it in Member States.

4. PUBLIC, PARLIAMENTARY, MEDIA AND INTERNATIONAL CONCERNS

4.1. Radiological and environmental impact: real and perceived

Over the past 40 years a very good safety record has been achieved in the transport of radioactive material in the public domain in Europe and worldwide. No transport accidents have been reported to have resulted in severe health effects to members of the public due to the dispersal of radioactive material from the package contents or radiation emitted from a damaged package. The question arises whether this safety record over such a long time period is in conformity with statistical expectations or just a fortunate outcome.

The majority of radioactive material packages are shipped by road predominantly as Excepted packages due to their low activity content or as Type A packages with activity contents limited to either the radionuclide specific A1- or A2-value. In the frame of a safety assessment study for DG TREN entitled “Assessment of Radiological Risks of Road Transport Accidents involving Type A packages” [35] performed by five EU Member States with together 220 million inhabitants, estimates of frequencies of occurrence of road transport accidents which could lead to a significant atmospheric release of radioactive material were derived. A major finding of this safety assessment study was that about a total distance of 650 million km is covered annually by vehicles transporting Type A packages in these countries. On average a Type A package contains a radioactivity inventory of approximately 1 percent

of the package contents limit A1 or A2. Based on general traffic accident statistics in the 5 countries the accident rate involving fatalities of the driver or passenger of a transport vehicle was found to be about 1 in 100 million vehicle-km. Accidents of such a severity are judged to be associated in general with a severity which could challenge the integrity of such packages. Taking into account the design characteristics of typical Type A-packages including shielded receptacles containing the radioactive material itself one would not expect any significant atmospheric release of the radioactive contents in more than 1 percent of such road transport accidents. This corresponds to a conservatively estimated probability of occurrence of severe road transport accidents giving rise to an environmental release of not more than 1 in 10,000 million vehicle-km. In other words, for the volume of radioactive material shipments and traffic conditions concerned in five EU Member States with a total population of 220 million persons, the likelihood of such a severe road transport accident is on average 1 event in about every 15 years.

As regards the potential radiation exposure of individuals who may be incidentally close to the site of the accident the related probability of occurrence is further reduced. In conclusion, the numerical findings presented above are in line with the general observation that the safety record of shipments of radioactive material concerning a release of the radioactive package contents leading to significant exposures of individuals to radiation is very good. The design of the predominantly light weight packages, the prescribed radioactive contents limits of such packages, the safety requirements of the international transport regulations and the low frequency of occurrence of road transport accidents severe enough to cause a significant environmental radionuclide release result in a comparatively very low radiological transport risk.

This conclusion is, however, in contrast to the perceived risk of the public from the transport of radioactive materials in the public domain. Thus, there is an urgent need for intensified efforts to convey such information to the public and the media: additionally, to continue to assess and to consistently improve the operational safety of radioactive material shipments for all modes of transport.

The transport of radioactive materials is highly regulated and monitored. All stages of the process are covered from start to finish and the record for achievement is excellent. However, as with all human endeavour, accidents do happen and human error can occur. Quality assurance and compliance assurance can do much to reduce any errors.

Radioactive materials are often in the public domain during transport and accidents /incidents may affect individuals or their property. The radiological consequences are most likely to be trivial but the public concern is likely to be substantial.

4.2. Parliamentary concerns

The European Parliament and the Parliaments of Member States receive questions and comments on radioactive material transport. Reports and briefings are frequently prepared and inquiries are established. Factual information provided by the Commission and by Member States is important to ensure that all those involved are fully aware of the issues involved.

One of the key triggers for a request for information is a transport event, whether this is formally an accident or not. Indeed it is often the non-accidents that result in the greatest parliamentary interest. The reason for this may be that minor events often have an initial media report with no "follow up", leaving people with questions over what happened. Although there may have been no release of radioactive material (or indeed the packages may not even have been involved in the incident), this can give cause for concern if people do not know this. There is also a counter to this desire for open information - which is based on the possibility of legal proceedings where this is appropriate. This is one reason that some Member States have introduced the IAEA INES system, which helps to communicate the significance of an event, but at the same time involves limited release of information.

One trial system that seemed to work well was established by the UK. This involved including the European Commission on the distribution list for communications that would normally be limited to UK government only. This proved effective in two ways. Firstly, it was demonstrated that the confidentiality of the information was respected. Secondly, the information proved important to the European Parliament. Evidence of this system can be found in the answers to two questions detailed in Appendix 2 covering the following questions:

- The Official Report, House of Commons (6th Series) Vol. 1 (March 1981), HC Deb, 26 June 2002 Vol. 387 c 878W (a Question by Mr H Cohen on the recent accident involving a train carrying nuclear material).
- ORAL QUESTION TO THE COMMISSION H-0501/02
- Question no 78 by James (Jim) Fitzsimons (H-0501/02).

4.3. Improving communications particularly with the public

For more than a decade the Commission has funded studies on the transport of radioactive materials. The results of this work are available and recent studies are published on the website (europa.eu.int). Operators and national authorities have published relevant reports in journals and in conference proceedings. Other organisations, for example the IAEA, have prepared leaflets aimed specifically at informing members of the public. In some countries there have been public inquiries into particular transport operations. This report is one way of communicating information to the public and to the Parliament.

The benefits of openness and clarity are evident but a single major transport event could undo much of the gain. Prompt and accurate information are a necessity. The transport of radioactive materials is only a small percentage of all dangerous goods transported.

There is public concern over the transport of spent fuel and high level radioactive waste. For that reason in Germany the radiation levels in the vicinity of casks transported to the Gorleben or Ahaus interim storage facilities had been extensively documented to justify the negligible risk for the escort personal securing the spent fuel transport [36], [37]. But as a political reality it has to be concluded that those demonstrations of negligible radiation effect did not sufficiently convince the public, parliamentary majorities and the media to give up their concerns over spent fuel (SF) and high level waste (HLW) transports. To demonstrate the overall safety of SF and HLW transport casks even under very severe accident conditions,

investigations have been made with spectacular features, such as a train crash and exploding LPG tank crashes. All these demonstrations and tests have shown that the containers have sufficient safety margins. To promote the confidence of the public and media better communication methods have to be established. A good example can be found in the US Nuclear Regulatory Commission Package Performance Study where the development of a spent fuel transport risk study by SANDIA National Laboratory, with the subsequent test protocol of safety demonstration drop and fire tests with original-size casks, is covered by public hearings and comments gathered by the internet [38]. This Package Performance Study was sponsored by the US NRC to improve public acceptance of the countrywide radioactive waste transports to the repository site planed at Yucca Mountain. As a similar action an IAEA coordinated research project on the safety and performance of radioactive material transport packages under very severe accidental load conditions has been proposed. The European Commission has supported this action, for example by funding investigations based on previous work [39]. The output of these scientific investigations needs to be better communicated to the public. Media experts may help to explain the results of these technical and scientific investigations so that they are better understood by the public. The IAEA Co-ordinated Research Project on severity of accidents in air transport is ongoing.

Communication may appear to be a simple process. However, there are many groups and individuals with whom communication is required. Many of these groups and individuals then communicate with each other about the issues involved. It is also important to acknowledge that communication is bi-directional and so the communication is often different to each group. However, it is possible to establish common threads over several groups. For example, most groups are interested in reports on incidents involving the transport of radioactive material, albeit for slightly different reasons. Pressure groups look for information to support their views, either for or against the transport of radioactive material, regional bodies look for information to respond to the public they answer to, and other governments look for information on any problems that can affect them. The many ways in which a single communication can be used makes the production of such a single document difficult. However, with the multiple communication routes that exist, the benefit of having a single message addressed to several points has obvious advantages.

Further complications come from legal issues. Again considering communication related to incidents there are occasionally privacy/confidentiality considerations. Where commercial organisations make information available on a voluntary basis beyond that required by legislation this can often bring with it confidentiality agreements. Where there are questions of legal proceedings against individuals or organisations there can be restrictions on the release of information in order to prevent the prejudicing of court cases. Since transparency is something that much communication is intended to both demonstrate and achieve, this restriction often needs to be carefully explained. The guiding rule is that the requirement to ensure safety is more important than the desire for transparency.

While there are many individual messages and many strands to communication there are underlying key themes. One key theme in many messages is to convey background information on how radioactive material is transported and how safety in transport is ensured. A very large proportion of radioactive material packages transported contain medical products; another large proportion of packages contains industrial products. A small proportion of radioactive material packages contain material associated with the nuclear industry, however these packages tend to have a comparatively high profile. A large part of

the communication related to the transport of radioactive material involves emphasising these facts as a foundation for other communication and redressing the attention paid to nuclear shipments in many ways. Decisions and opinions, which are made on the wrong basis, often result in the wrong output. Messages that convey information on how the radioactive material transport industry is monitored by regulators convey a sense of how safety is ensured.

Another important approach is to ensure open dialogue on the acceptability of rules governing the transport of radioactive material. The ownership of the rules and regulations by all those with an interest in the transport of radioactive material is an effective means of demonstrating their suitability and encouraging full compliance. The degree to which this ownership is achieved can depend on the effectiveness of communication.

The first issue with public communication is that there are obviously too large a number to engage each person individually. In the UK one of the main methods for government to communicate with the public is indirectly through another body. The National Radiological Protection Board (NRPB) is a government body that is recognised as being independent from political direction. Because of their standing as a government organisation they can provide effective assurance of confidentiality. NRPB is given free access to government records in order to enable them to collate information to communicate to the public (amongst others). Some of the communication work they undertake is on their own behalf, other work is funded by the government. An example of their effective communication with the public is their "Understanding Radiation" (At a Glance) series on their web site [40], which includes a very good presentation on "Transport of Radioactive Material". The NRPB produces reports on a regular basis, funded by government, detailing recent incidents involving the transport of radioactive material of interest in the UK. These reports [41] are produced on an annual basis. Other reports produced by NRPB and funded by government look at specific modes of transport to examine their effect, taking into account current patterns of transport, revising each about once every ten years. The use of an independent body such as NRPB to be the focus for public information helps to demonstrate transparency and has proved to be an effective means of making information available.

Other means of communication with the public include communication through their elected representative at national level. In some cases these representatives will communicate their concerns through questions in parliament. These questions are normally answered by the government minister responsible for the Competent Authority. This communication is public in nature and records are openly available. On other occasions the representative may write to government ministers directly regarding issues raised by people they represent. This communication tends to be more detailed and less public than the questions in parliament. Finally there are occasions when the public will write directly to the Competent Authority to raise an issue that they have a personal interest in. In many cases these communications seek again to establish the basic facts regarding the transport of radioactive material, demonstrate transparency and effectiveness of rules.

In this process there would seem to be an issue with communication between the regulatory authorities and the European Parliament, or individual representatives. Although members of the European parliament are bringing forward similar concerns as their national counterparts there seems to be a lack in the means of formally obtaining information from national government (or the associated civil service) even where this is open information. The

informal arrangement between the UK and the European Commission demonstrated one effective way to make information available to the European Parliament on request. There is scope for further investigation of this topic, possibly developing other models for consideration, and eventually to devise a Europe wide system that ensured information is readily available to any elected representative of the public. However it is essential that the current gaps in communication between national authorities and members of the European Parliament be filled on an urgent basis (possibly with temporary agreements pending final proposals).

4.4. Current international developments

4.4.1. The IAEA Conference on the transport of radioactive material 2003

The IAEA held a conference on the transport of radioactive material in July 2003 [42]. This was attended by a large number of delegates from around the world. The suitability of the IAEA transport regulations was affirmed at the conference. However, there were some major issues that are important on a world- wide basis requiring input from EU Member States.

Liability during the transport of nuclear material was discussed. Several States disagreed over interpretations of Conventions (including some EU Member States). Although lawyers were available to offer opinions many were associated with one party or another. Some independent advice was available, but this seemed to be lost in the fog of discussion. It seems that there is scope for an independent legal authority to examine current liability arrangements and to prepare a clear layman's explanation. It is possible that this may be arranged through the IAEA, but the possibility of the European Commission using their legal services to listen to Member States and come up with a consensus view is worth examining.

Another issue that caused significant discussion at the conference was prior notification with respect to emergency arrangements. Again there was some disagreement worldwide that was also found in European Member States. Considerable advances were made in understanding each other's viewpoints, and informal discussions provided an effective way forward. The model of moderated discussions between small numbers of States is one that could be developed on a European basis to improve harmony and eventually lead to a common European policy on this issue.

The IAEA General Conference recognised these issues as being important and tasked the IAEA to establish an Action Plan to deal with them. The participation of Member States and the European Commission in this process is essential for greater harmony within Europe.

Subsequent to the IAEA July 2003 Conference the Director General of the IAEA set up an International Expert Group on Nuclear Liability (INLEX).The Group has prepared a questionnaire destined to IAEA Member States relating to their domestic civil liability regimes for nuclear damage.

4.4.2. IAEA Transport Safety Appraisal Service (TranSAS)

The IAEA has established what is essentially an audit system for radioactive material transport in individual countries. When states request an audit a TranSAS is carried out to

examine whether the State has effectively implemented the IAEA regulations governing the transport of radioactive materials. Support for TranSAS has been wide in Europe. Some Member States/new Member States/Applicant Countries have requested a TranSAS. To date Slovenia, Turkey, UK and France have been assessed.

Other Member States and countries have supported the IAEA TranSAS service by supplying experts and observers to assist in missions free of charge (UK, Belgium, Germany, Spain etc).

The outcome is a greater transparency concerning the workings of national authorities and an assurance that the transport of radioactive material is being effectively regulated. At present budget limitations mean the IAEA only holds around two TranSAS each year. The cost of funding a TranSAS is fairly low compared to the result. European funding of TranSAS to Applicant Countries and new Member States would complement the support of individual Member States. Indeed sponsorship of individual TranSAS missions and/or sponsorship of a specific IAEA staff post to support TranSAS in Europe (possibly seconded from the EC to IAEA) would probably be the most cost effective means of demonstrating transparency in Europe. It would also ensure the regulation of the transport of radioactive materials.

5. ACTIONS OF THE EUROPEAN COMMISSION

5.1. Legal Base and programme of action of the European Commission

The legal basis for the actions of the European Commission in the field of transport of radioactive materials has its origin in the EC Treaty, especially Title IV on the common transport policy and in the EURATOM Treaty where Chapter III provides the legal framework for setting the Basic Safety Standards on radiation protection.

While regulations on the transport of radioactive materials are drawn up by the International Atomic Energy Agency in Vienna and transposed into the national legislation of each country, the European Community must ensure that these provisions are in conformity with the Council Directives on radiation protection [43] (based on Articles 31 and 32 of the Euratom Treaty) and that they do not impede the functioning of the internal market. Title IV of the EC Treaty on the common transport policy also gives the Community certain responsibilities in the transport of dangerous goods. Council framework Directives 94/55/CE [44] and 96/49/CE [45] provide for the approximation of the laws of the Member States on the transport of all dangerous goods including class 7 dangerous goods.

In order to support these activities the Commission, in 1982, at the request of the European Parliament [46], set up a Standing Working Group (SWG) of national experts with specific competence in the field of safe transport of radioactive materials. The SWG organises the exchange of information on the application of the regulations on the international transport of radioactive materials between Member States and both within and outside the European Union. It makes proposals for Commission action in the field of radioactive material transport designed to furnish the basic knowledge required to develop the international regulations.

The Commission has also been asked to keep the European Parliament and the Council abreast of any new developments in the transport of radioactive materials and to inform them of the SWG's recommendations.

The last report by the SWG is annexed to a communication to the Council and the European Parliament adopted by the Commission on 8 April 1998 [47]. The EP adopted its report on the Communication from the Commission on 14th February 2001.

The report identified several areas for priority actions that formed the basis for the Commission‘s activities in the transport of radioactive materials for the last five years starting in 1998:

(1) Functioning of the single market and the need for harmonisation.

(2) Assessment of the implementations of the regulations

(3) Revision of transport regulations.

(4) Investigation of transport events.

(5) Transport emergency arrangements.

(6) Assistance to Candidates and NIS countries.

(7) Information and Communication with the public.

5.2. Implementation: programme SURE

The Council Decision of 14 December 1998 approved a multi-annual programme (1998-2002) – entitled SURE – of actions in the nuclear sector, relating to the safe transport of radioactive materials and industrial co-operation to promote certain aspects of the safety of nuclear installations in the countries currently participating in the TACIS programme and training activities to support safeguards in those countries. This programme enables the priority actions on the transport of radioactive material proposed by the SWG, to be implemented and financed on the general budget of the European Communities.

Two factors that condition the acceptability of the nuclear sector are the transparency and safety of its activities. In this context it is important to create databases recording the number and characteristics of shipments of radioactive materials and possible events (incidents/accidents) that could occur during transport of RAM.

These databases will provide information about the number, by different type of transport, of shipments of RAM in the EU. They will contribute to improve the safety of these shipments and facilitate the application of harmonised emergency arrangements in case of possible accidents/ incidents that could occur during these shipments.

Harmonisation of documents and of the data contained in the accompanying transport certificates is a prerequisite for the creation of these databases and is also an essential factor

for the full completion of the Internal Market, specially as shipments of radioactive isotopes used in medicine, industry and research represent a large part of the sector.

For safety, the main objective is to improve the practices that minimise the risks for workers and the population. In order to achieve this objective it is necessary to increase the knowledge in this field in order to improve the international legislation in force.

The European Commission carried out several actions aimed at harmonising documents and procedures essential for achieving the objectives identified in the last Communication from the Commission of April 1998. The main results are summarised below.

5.2.1. Results of SURE programme on safety of transport of radioactive material

The main achievements of the SURE programme were:

(1) The European scientific and technical community in this field have worked together to carry out these projects and, in fact, the SURE programme has served to establish a real network of excellence in the field of the transport of radioactive materials in the European Union and Candidate Countries.

(2) The SURE programme has contributed to improvements in the international legislation on the transport of radioactive material. The results of the SURE programme will continue to be used in the review and revision of the international transport regulations.

The Sure programme provided input for community legislation proposals as follows:

(3) harmonisation of procedures and documents to be used for notification and approval of shipments and for establishing a common methodology to approve the packages by the authorities of Member States. In this context, a Safety Report with a unique format and a similar structure for all types of packages would facilitate the approval of packages in the various Member States.

(4) a system of notification and rating of accidents/incidents which could occur during the transport of radioactive material.

The International Nuclear Event Scale has been further extended to cover more effectively for transport of radioactive material.

The developed INES covers areas, ranges of exposure and releases that are not fully covered by the current IAEA/NEA INES (i.e. releases in urban areas, releases in aquatic environments, the range of exposure and degradation of defence in depth criteria defined in the current IAEA/NEA INES are also reviewed). As a result of the work of the SWG, the IAEA has put out for a trial period the guidelines developed jointly between the Commission and IAEA.

An assessment was made of the Candidate Countries Legislation in relation with the European and International legislation as follows:

The current legislation concerning the safe transport of RAM in three Member States (United Kingdom, Germany and Italy) and four new Member States or candidate country (Romania, Hungary, Czech Republic and Slovak Republic) have been compiled and compared with the key international standards and codes (IAEA Safety Standards Series No. TS-R-1 (ST-1 Revised). It has been shown that there is a high level of consistency in the existing legislation between Member States and four new Member States or candidate country.

However, it is recognised by these new Member States that some differences exist in their domestic legislation but they relate to the individual countries transport arrangements and not to variations in standards.

Studies made recommendations on radiation protection measures in the transport of radioactive material:

- Best practices and recommendations for decontamination and monitoring of containers transporting irradiated fuel have been proposed including the method to be followed in operations of loading and unloading of containers in nuclear facilities.

- Procedures and equipment to be implemented for measured non-fixed contamination have been proposed.

The studies identified:

- The principal considerations and functional elements to be addressed in a radiation protection programme for transport.

- The provision of guidance concerning the assessment and evaluation of radiation protection programme by the Competent Authorities.

- Outlines examples of Radiation Protection Programmes for transport have been provided.

Statistical data has been published on:

- Collection of data and statistical analyses have been carried out for the transport of radioactive material in Member States and Applicant Countries by:

(1) Type of package.

(2) Type of transport.

(3) Radiation exposures to workers and members of the public.

(4) Use of the radioactive material.

- A list of the studies on the transport of radioactive material funded by the EC is given in Appendix 3.

5.3. Future Activities: Communication on TRAM and legislative proposals

The last report on the general safety of radioactive material transport established by the Working Group of the European Commission was communicated to the Council and the European Parliament in 1998 [48].

This year, a new communication will be addressed to these Institutions. This report will cover the following points

- A state of the art report on transport of radioactive material including statistics, an economic description of the sector, the new situation after the adhesion of candidates countries and the future evolution in the European Union of the transport of radioactive material.

- Safety and Security issues including the evolution and implementation of the international legislation on transport of radioactive material.

The security on transport of radioactive material after 11th September 2001.

The illicit trafficking and unauthorised movement of sources.

- Harmonisation on transport of radioactive Material in the European Union concerning the administration and procedures (certification, approval, etc.) to be harmonised on transport of radioactive material in order to achieve the internal market. In particular:

– Harmonisation of Safety Assessment.

– Harmonisation of approval and administrative requirements according to the IAEA regulations. “Regulations for the Safe Transport of Radioactive Material No. TS-R-1”.

– Proposal on common certification of packages.

– Emergency arrangements.

– Public Information.

– Necessity for a new programme on Safe Transport of Radioactive Material.

– Main orientations for this programme.

5.3.1. Legislative proposals

Currently legislation at European level covers almost all aspects of the transport of radioactive material. Because international legislation exists which governs the transport between most Member States the promotion of common legislation within Member States was seen as essential to harmonisation. It is worth noting that the legislation on the transport of radioactive material is intricately combined with legislation on the transport of other dangerous goods. There are many common features such as training requirements and vehicle marking requirements.

However, although comprehensive safety legislation has been introduced as part of this harmonisation aim, it is not set in stone. The legislation is reviewed on a regular basis (currently every two years) at international level and this is introduced into community legislation on a regular basis.

For the transport of radioactive material the "international level" is the International Atomic

Energy Agency. The influence of European Member States is high in this organisation, however the influence of the European Union is even greater. This has been achieved through targeted funding of research projects that have led to developments in legislation. This was formerly funded through the SURE programme (which continues to have significant effect on the development of international legislation), under the direction of the European Parliament. Continued funding of appropriate research work remains a very effective means for the European Union to affect legislation at international level.

Although there is an obvious need to strengthen communication to the European Parliament, it is not obvious which form of legislation could be used to achieve this at present, or indeed whether legislation is the appropriate tool for achieving this. However the need for improved communication overall would seem to suggest that legislation that reinforces the existing IAEA INES system would be an advantage to all at this point in time. The IAEA INES system is mainly concerned with fixed installation incidents, and transport is a relatively new addition. It is expected that the transport aspects will develop relatively rapidly, so any proposals for legislation must have the ability to be updated on a periodic basis.

Since 1 January 2003 a new requirement on notification of incidents and accidents during transport of dangerous goods has been introduced in the Dangerous Goods Transport Regulations for road and rail transport (ADR and RID). It contains specific criteria for the transport of radioactive material and a reporting system. This already existing legal requirement within the EU Member States must be taken into account in any further development of legislative proposals in this field.

5.4. Need for a new EC transport safety programme and main areas to be covered in such a programme

The safety in the transport of RAM in the EU and world-wide depends on the establishment of a uniform approach to safety and protection. This requires a set of stringent safety standards and procedures and the implementation and application of comprehensive quality assurance and compliance assurance programmes to ensure and enforce conformity with all relevant technical and administrative safety requirements and regulatory provisions concerning the transport of radioactive material.

– In a growing market of commercial goods and services being provided and moved within and between Member States, and world-wide, it is necessary to establish confidence that all reasonable practical steps have been taken to promote safety and security in transport. Also that the basic safety standards of the Council Directive 96/29/Euratom are satisfied. This is a continuing challenge for the parties with responsibilities for the safety in the transport of radioactive material, that is the national and international regulatory bodies including the EU with the statutory power to establish standards of safety. To address these

challenges and the transport safety concerns of decision makers, the public and the media, it is necessary to have a comprehensive European Community transport safety programme covering the following topics.

5.4.1. Standards, safety and security

The first aim is to support the international review and revision of the transport regulations and supporting safety guides: to ensure safety and security in the transport of RAM. The following work is of high priority:

– Support and assist in the continuous review and revision process of the IAEA Transport Regulations.

– To provide input and support to the relevant IAEA transport safety committees. Specific work is as follows:

- Adoption of a new contamination model for packages and conveyances,
- Assessment of the impact of the implementation and application of new surface contamination model on transport activities,
- Reassessment and evaluation of the adequacy of, and further development of, the criteria of the transport event severity scale (INES).
- Development of security guidelines and operational measures to be employed in the transport of RAM in the framework of the ADR and the RID.
- UF6 transport.
- Interim storage casks used for transport.
- Accident safety of packages.

– Arrange for regular assessments and evaluations of the type and magnitude of radioactive material shipments, the radiation exposures of workers and the public arising from these transports and abnormal occurrences with relevance to safety encountered during the transport of RAM in EU Member States and countries applying for EU membership. Data collection and analysis are important.

– Develop guidance material to promote and facilitate the establishment and application of best practices and operational procedures in the transport of RAM in EU Member States and world-wide.

– Support for IAEA TranSAS and for the IAEA EVTRAM database. Also other issues from the IAEA Action Plan.

5.4.2. Collaboration and harmonisation

A second aim is to promote and strengthen, in collaboration with its Member States, the system of safety and security in transport abreast with the latest scientific and technological

developments and to take due account of the current and projected radioactive material transport practices and procedures. The following work is proposed:

– Promote the input of expertise, and facilitate international co-operation in vital areas of transport safety research performed under the auspices of IAEA Co-ordinated Research Programmes (CRP), for example related to: Low Dispersible Material transported by air, LSA/SCO packages, and material behaviour under severe mechanical and thermal load conditions.

– Perform a review, comparison and evaluation of the different radiation protection programmes prepared by the transit operators in airports.

– Harmonisation of procedures for communication during incidents/accidents between carriers /consignors /authorities.

– Harmonisation of the guidelines to be followed in the elaboration of the emergency arrangements to be applied for incidents/accidents in transport of radioactive materials.

– To establish structures and provisions for a methodology related to safety assessment allowing joint agreement/certification of packages for the transport of radioactive material.

– Harmonisation of Safety Assessment:

– Harmonisation of approval and administrative requirements according to the IAEA regulations. “Regulations for the Safe Transport of Radioactive Material No. TS-R-1”.

– Harmonisation of formats of application primarily on multilateral approval by the competent authorities of Member States and for approval certificates issued by the competent authorities of Member States for:

– the designs of packages,

– shipments,

– shipments under special arrangements.

5.4.3. Emergencies and illicit trafficking

A third aim is to further the development of emergency preparedness and response; and to protect against illicit trafficking. These objectives will be assisted by the following work:

– Develop guidance material to strengthen the system of controls for ensuring safety and security of radioactive sources and nuclear materials against the risk of loss of regulatory control (orphan sources), theft, sabotage and illicit trafficking during transport. Also methods and instruments to prevent, detect and respond to such events, including where appropriate the safe and economical return of such materials to their origin.

– Assess and evaluate the adequacy of the emergency preparedness and response arrangements in the light of the specific hazards associated with the misuse and illegal activities including sabotage of sources and materials.

– Promote and assist in the development of national emergency preparedness and response arrangements by organizing regional transport emergency exercises.

– Perform a review, comparison and evaluation of the regulatory instruments and provisions in EU Member States to ensure safety and security of radioactive sources and materials to protect against the unauthorised acquisition of, loss, theft and malevolent use during transport.

– Harmonisation of the criteria to determine which events should be reported to Competent Authorities of each Member State and which should be notified to the Commission. Support for the INES.

– A common European format to report these incidents/accidents.

– To establish a methodology to assess the gravity of incidents/accidents which could occur during the transport of radioactive material. This assessment should enable authorities to rate the incident/accident in a scale of gravity.

– Co-operation between the emergency arrangements of the different Member States. Such co-operation is mainly necessary to improve the collaboration between Member States in incidents/accidents of transports of radioactive material close to borders.

– Co-ordination of procedures for communication during incidents/accidents between carriers /consignors /authorities.

– Harmonisation of the guidelines to be followed for the emergency arrangements to be applied for incidents/accidents in transport of radioactive materials.

– Support IAEA work on emergency response and illicit trafficking.

5.4.4. Enlargement

A fourth aim is to assist and guide applicant countries and potential new EU Member States in the development and implementation of their national regulatory infrastructure to ensure uniformity and consistency in the interpretation and application of the Communities comprehensive safety standards, provisions, good practices and operational procedures at all levels of transport. To support this aim the following work is proposed:

– Promote and assist in the development of a regulatory infrastructure and the application of best practices and operational procedures concerning the transport of RAM in New Member States to achieve the same level of safety and protection as in other Member States.

– Promote intensified co-operation of European research and expert institutions to further develop and combine the transport safety assessment tools and the technical basis for the evaluation and improvement of the transport safety.

– Perform a review, comparison and evaluation of the different regulations in force in the EU Member States and accessing countries applicable to the transport of radioactive materials in transit by road or rail in tunnels, and assist in the development of harmonized requirements.

5.4.5. Communication

A fifth aim is to promote transparency in the provision of information to, and communication with, the public and the media in order to improve the public perception of transport safety.

It is understood that the long-term policy objectives underlying the proposed European Community programme are most effectively achieved by adoption of a multi-annual strategic transport safety programme rather than by tactical regulatory considerations and by taking due account of the regulatory developments at the international level. The following work is a first step:

– To provide factual information on the transport of radioactive materials in a widely available and understandable manner.

– To assist in training for all persons associated with the transport of radioactive materials.

– To define a common system of notification for incidents/ accidents to be used in transport of radioactive material:

– Harmonisation of the criteria to determine which events should be reported to Member Authorities of each Member State and which should be notified to the Commission.

– A common European format to report these incidents/accidents.

5.4.6. Denial of shipments and barriers to trade

A sixth aim is to reduce any denials of shipments and to remove barriers to competition. This is an important objective for future transport operations. Work is required as follows:

– To detail the reasons for denial of shipments.

– To improve training and information particularly for carriers.

– Support for the IAEA work in this area.

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GLOSSARY

A1 is the maximum activity value of special form radioactive material that can be carried in a Type A package.

A2 is the maximum activity value of radioactive material, other than special form radioactive material, that can be carried in a Type A package.

Absorbed dose is the quantity of energy imparted by ionising radiation to unit mass of matter, such as tissue. The unit is the Gray (Gy), which is 1 Joule per Kg.

Activity is an attribute of an amount of a radionulide. It describes the rate at which nuclear transformations (or decays) occur in the material. The unit is the Becquerel (Bq), which is 1 transformation per second.

Approval

Multilateral approval means approval by the relevant competent authority of the country of origin of the design or shipment also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country.

Unilateral approval means an approval of a design that is required to be given only by the competent authority of the country of origin of the design.

Carrier means any person, organization or government undertaking the carriage of radioactive material by any means of transport.

Competent Authority means any national or international regulatory body or authority designated or otherwise recognized as responsible for the transport regulations.

Compliance assurance means a systematic programme of measures applied by a competent authority that is aimed at ensuring that the provisions of the transport regulations are met in practice.

Consignee means any person, organization or government that receives a consignment.

Consignment means any package or packages, or load of radioactive material, presented by a consignor for transport.

Consignor shall mean any person, organization or government that prepares a consignment for transport.

Contamination means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm2 for all other alpha emitters.

Non-fixed contamination means contamination that can be removed from a surface during routine conditions of transport.

Fixed contamination means contamination other than non-fixed contamination.

Conveyance means a vehicle in the case of road and rail transport, a vessel in sea transport and an aircraft in air transport.

Criticality safety index (CSI) assigned to a package containing fissile material is a number which is used to provide control over the accumulation of packages in the same location.

Design means the description of special form radioactive material, low dispersible radioactive material, package or packaging that enables such an item to be fully identified.

Effective dose is the quantity obtained by mutiplying the equivalent dose to various tissues and organs, by a weighting factor appropriate to each, and summing the product. The unit is the Sievert (Sv).

Equivalent dose is the quantity obtained by multiplying the absorbed dose by a factor to allow for the different effectiveness of the various ionising radiations in causing harm to tisue. The unit is the Sievert (Sv).

Exclusive Use means the sole use, by a single consignor, of a conveyance or in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee.

Fissile Material means uranium-233, uranium-235, plutonium-239, plutonium-241, or any combination of these radionuclides, but does not include unirradiated natural or depleted uranium.

Low Dispersible Radioactive Material (LDM) means either a solid radioactive material or a solid radioactive material in a sealed capsule that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material means radioactive material that by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply.

Low toxicity alpha emitters are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in

ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Overpack means an enclosure such as a box or bag that is used by a single consignor to carry one or more packages for convenience of handling.

Package means the packaging with its radioactive contents as presented for transport.

The types of packages are:

(a) **Excepted package**; for low activity sources and materials, and able to meet the minimum standards of the regulations.

(b) **Industrial package**; for ores and wastes, and able to meet certain basic standards of packaging.

(e) **Type A package**; for medium activity materials for industrial and medical uses, and able to withstand normal transport and handling conditions.

(f) **Type B package**; for high activity materials, and able to withstand severe accident conditions.

(h) **Type C package**; for high activity materials carried by air, and able to withstand very severe accident conditions.

Packaging is the assembly of components necessary to enclose the radioactive contents.

Radiation level means the dose rate expressed in millisieverts per hour.

RAM means radioactive material

Special form radioactive material means either an in dispersible solid radioactive material or a sealed capsule containing radioactive material.

Specific activity of a radionuclide is the activity per unit mass of that nuclide. The specific activity of a material is the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

Surface contaminated object (SCO) means a solid object that is not itself radioactive but which has radioactive material distributed on its surfaces.

Transport index (TI) of a package, overpack or freight containeris a number which is used to provide control over radiation exposure. It is the maximum dose rate at 1 m from the surface in mSv h-1, multiplied by 100.

Uranium

Natural uranium is uranium containing naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium is uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium is uranium containing a greater mass percentage of uranium-235 than 0.72%.

Appendix 1
Examples of transport events involving radioactive materials.

A1.1 Event involving Ir-192.

Shipment: Studsvik (SE) - Paris (F) – New Orleans (US).

Date: 27 Dec 2001 – 2 Jan 2002.

A type B(U) package containing 366 TBq Ir-192 was despatched from a radioisotope manufacturer at Studsvik, Sweden on 27 December 2001. The package was transported by road to the Stockholm-Arlanda airport (200 km), flown to the Roissy airport, Paris, where it was transferred to another aircraft to Memphis, USA, then by road from Memphis to New Orleans, USA (a journey of approximately five hours). The package was stored in a cargo centre at the New Orleans airport during the New Year and finally picked up by the staff of the consignee and brought a short distance (2-3 km) in a small lorry to their facility.

Unusually high levels of external radiation were observed at the cargo centre at New Orleans airport. The pick-up crew, however, believed that the dose rate meter was malfunctioning, and only upon arrival at the premises of the consignee the high radiation levels were confirmed. Dose-rates up to 3-4 mSv/h at 20-25 m from the lid of the package and 10 mSv/h at 5 m from the side were reported.

Based on information received from the US on dose rate measurements, the Swedish authorities provisionally assigned the event an INES Level 3 rating because of the potential exposure of individuals where acute health effects could not be ruled out.

The basic features of the package are:

Iridium pellets (more than 1000) with a diameter of 2.7 mm and 0.15 mm thickness are enclosed in screw-topped capsules. Three capsules are placed in the cavity of the shielded inner container. The lid of the inner container is used to keep the shielding plug in place, and also defines the containment system. The inner container is placed in an outer “keg” with a screw-bolted external lid.

Later examination of the package showed that

- For two, of a total of three capsules, the lid was detached. Essentially all the contents of the two capsules were released into the inner cavity of the packaging.
- A number of the pellets had moved into the narrow gap between the shielding plug and the body of the shielding.
- The containment system was not broken.

At the time for the event the approval certificate required that “The pellets shall be contained in either screw-topped capsules or sealed capsules so that they can only be opened by destroying the capsule.” This requirement was interpreted by the consignor in a way that “opening by destroying” did not apply to screwed-top capsules. Therefore a design of the capsules was chosen, which made them easy to handle and open at the facility of the consignee. That design, however, did not make it impossible for the lid to unscrew due to shocks and vibrations during transport.

The package design approval also includes a requirement that “the primary containers carrying the radioactive material shall be packed using suitable packing material, so as to prevent gross movement or impacting upon another during both normal and accident conditions of transport”. This requirement does not seem to have been fulfilled in a satisfactory manner. Therefore enough space was available in the inner cavity for the lid of the capsules to become removed.

A change has now been introduced in the certificate by the Competent Authority to clarify the requirement that the contents must not escape from the capsule during transport. The requirement now reads “The radioactive contents shall be contained in either sealed metal capsules constructed so that they can only be opened by destroying the capsule, or in screw-topped metal containers which have been lock welded or otherwise positively fastened to ensure that the closure cannot become loose or detached under routine, normal or accident conditions of transport”. If these conditioning principles are correctly implemented it should be nearly impossible for an inner capsule to be opened during transport.

Exposure investigations were subsequently carried out in Sweden, including blood tests and chromosome analysis of the individuals identified as the ones having been closest to the package during the handling process. No evidence of abnormal exposure was found; this supported early estimates and findings.

Similar analyses were performed in France with blood samples taken from the possibly most exposed personnel of the carrier who handled the package in the Roissy airport. Results showed that two workers had excessive doses of about 15 mSv and 100 mSv respectively. Further inspection revealed that the company had not implemented the radiation protection programme that had been required by the new regulation since the 1st July 2001. In addition though some workers were likely to have annual doses in excess of 6 mSv/y, no dosimetric survey was in place.

Following this event and other handling incidents on the same site of the Paris airport, the Competent Authorities took actions to increase the awareness of operators about the applicable regulations including radiation protection and the precautions to be taken during handling; they also enhanced their inspection plan in this domain.

A.1.2 Miscarriage of a plutonium package

Geel, Belgique

Date: October 1999

A package containing a small quantity of plutonium, was shipped declared as empty by human error, from Belgium to the maintenance facility in England via Luxembourg, France and the Channel tunnel. This incident could have had consequences if an accident had occurred during movement. Human error should be removed as far as possible through efficient operational procedures and strict application of quality assurance systems.

A.1.3 Complete burning of a cargo truck

Langres, France

Date: October 1999

On October 9, 1999, a truck carrying 900 smoke detectors caught fire on the A31 highway, in the Langres area (Haute-Marne county, France). Each smoke detector contains a sealed source of americium 241, with a 4.4 kBq activity. The smoke detectors had been packaged as 300 in 3 packages. The overall activity of the cargo was 3.96 MBq, i.e. 0.02 A2. The carrier was not aware of the radioactive nature of the cargo.

The fire started in the trucks brakes. The truck was also carrying combustible liquids (paint, oil alcohol). The fire was extremely violent (lasting for 2 to 3 hours) and the trailer was destroyed. The firemen and the Langres Highway Gendarmes Unit intervened without being informed that the cargo was radioactive. The violence of the fire obliged the firemen to wear breathing masks. The trailer was then transported to a scrap merchant. The fire wastes were transported to a "conventional" trash dump.

The consignee of the shipment was informed 3 days after the accident. The following day, the consignee informed the various Competent Authorities of the radioactive nature of the accident and also contacted the scrap merchant in order to isolate the trailer. An operational team of the Radiation Protection Authority was sent six days after the accident to collect urine samples from the firemen, also to perform measurements and sampling on the trailer and at the site of the accident.

The firemen did not receive any significant radiation exposure. At the fire location, alpha contamination equal to 10 times the background level was recorded over a 1 m2 area. The result of the soil sampling showed a 3,700 Bq/kg activity. A lower activity was also detected down the highway, due to the spillage of water used by the firemen. The burnt chassis of the truck trailer (stored by a scrap merchant) showed spot contamination, and burnt debris were found with an activity of 12,000 Bq/kg.

After this accident, it was recommended that consideration be given to stricter rules to guarantee that the driver is informed of the radioactive nature of the cargo, even when including excepted packages only, in view of informing the emergency response teams in case of accident.

A.1.4 A Crushed Package in Paris-CDG Airport

Date: August 2002

Five gendarmes of the airport Gendarmes Unit found, on a service road of a terminal of the CDG airport of Paris, a crushed package bearing radioactive labels. When removing the package and the debris from the road, some of them had their hands slightly contaminated.

Five MBq of iodine 131 was being carried in a capsule intended for medical use (radiotherapy), this package had been dropped from the conveying trolley, then probably crushed by another vehicle, leading to rupture of the capsule and its containment and dispersal of the radioactive powder by wind and rain. Two small areas on the road were contaminated, with a radiation level less than 0.2 mGy/h at contact (i. e. 4 000 times above the ambient level of 50 nGy/h). The movements of vehicles had to be restricted on this road, which caused many flights to be delayed.

The main hazard for iodine 131 is related to inhalation. Examinations on the gendarmes revealed only very low contaminations in the thyroid. It is not known whether other drivers could have been affected by this event on the frequently used service road. The half life of iodine 131 is about 8 days which guarantees normalization of the radiation levels within 10 weeks.

Appendix 2
A selection of parliamentary questions and replies on the transport of radioactive materials.

A2.1 UK Parliamentary questions and responses

The Official Report, House of Commons (6th Series) Vol 1 (March 1981) - , HC Deb, 26 June 2002 vol 387 c 878W (a Question by Mr H Cohen on the recent accident involving a train carrying nuclear material).

Nuclear Material (Rail Accidents)

Harry Cohen: To ask the Secretary of State for Transport if he will make a statement about the recent accident involving a train carrying nuclear material; and if he will make a statement on the performance of the emergency services in response. [62150]

Mr. Jamieson: The recent incident at Brookland crossing in Kent on 11 June involved a train carrying an empty nuclear fuel flask destined for Dungeness nuclear power station. The collision is estimated to have occurred at less than 5 mph. There was no damage to the flask, and minor damage to the front of the locomotive and the heavy goods vehicle, which it struck. Emergency services and specialist support from the nearby nuclear power station attended and information suggests that the response was adequate to deal with this incident.

The UK is currently undergoing an audit, at our request, by the International Atomic Energy Agency under the auspices of its Transport Safety Appraisal Service (TranSAS). The audit team is formed from expert participants and observers from several countries and international bodies. The audit is intended to examine the regulatory and enforcement infrastructure in the United Kingdom related to the transport of radioactive material. This incident occurred while the TranSAS audit team were examining emergency response arrangements. The team visited Dungeness nuclear power station on 18 June and investigated the effectiveness of the response to the incident. The final report of the TranSAS mission is due later this year and copies will be placed in the Libraries of the House.

A2.2 Debates of the European Parliament

SITTING OF THURSDAY, 4 JULY 2002

ORAL QUESTION TO THE COMMISSION H-0501/02

Question no 78 by James (Jim) Fitzsimons (H-0501/02)

Subject: Collision of nuclear fuel train in Kent

Will the Commission make a statement on the collision which took place at a level crossing near Ashford, Kent, on 11 June 2002 between a heavy goods vehicle and a train on its way to collect used nuclear fuel from Dungeness since, although on this occasion, the nuclear flasks were empty, the accident could have resulted in a major emergency and radioactive fallout?

Answer

The Commission is aware of the event referred to by the Honourable Member. Commission's services were informed immediately, on a voluntary basis, by the British authorities of the essential facts concerning the event:

The collision between a heavy goods vehicle and the locomotive of a train carrying an empty nuclear fuel flask took place at a level crossing close to Dungeness nuclear power station. The collision was slow speed and there was no damage to the fuel flask, no leakage of radioactive materials and no risk to the public. Nevertheless, as a precautionary measure, the emergency arrangements were activated.

The event is rated at level 0 according to the International Nuclear Event Scale (INES) which means that the event is considered without safety significance from a radiological point of view and is rated below scale as 'deviation' on a scale ranging from level 1 to level 7.

Transport of irradiated nuclear fuel has been carried out for the last 35 years, by rail, road and sea by several countries that use nuclear power. As far as the Commission is aware, in that period there has never been an accident that has caused death or serious injury to persons, nor significant harm to the environment from radiological cause when the transport has taken place in accordance with the regulations established by the International Atomic Energy Agency (IAEA).

The Department for Transport is responsible in the United Kingdom for certifying that flask designs and associated transport arrangements comply with the requirements of the statutory regulations that are based on the IAEA regulations. This requires a detailed evaluation of the safety case which organisations that consign irradiated fuel for transport are required to submit as evidence that their flask designs and proposed safety arrangements meet the standards.

The flasks used for the transport of irradiated nuclear fuel are designed to withstand severe accidents without releasing their contents. For example, they are designed to withstand a major train accident at high speed.

Applicable Community legislation to such events is as follows:

under Title IX of Directive 96/29/Euratom of 13 May 1996 , emergency plans must be drawn up and regularly exercised by the companies involved in nuclear fuel flask transport;

under Directive 89/618/Euratom of 27 November 1989, the implementation of emergency exercises requires that the population likely to be affected be involved in order to be prepared would such a radiological accident occur;

should the consequences of an accident necessitate large-scale actions to protect the general public, the Member State concerned must urgently notify the Commission according to Council Decision 87/600/Euratom .

WRITTEN QUESTION P-1904/02

by Avril Doyle (PPE-DE) to the Commission

Subject: MOX shipment from Japan to UK

Is the Commission satisfied that adequate security measures are in place for the returned MOX shipment from Japan to the UK port of Barrow-in-Furness due in August/September 2002?

Would the Commission detail what the security measures are and whether all necessary safeguards are in place to protect European territory and European waters?

ORAL QUESTION H-0059/00

for Question Time at the part-session in February 2000 (check date)

pursuant to Rule 43 of the Rules of Procedure by Nuala Ahern to the Commission

Subject: Transport of MOX and other nuclear fuels

What assessment has the Commission made of the dangers posed to European Union states and transit countries respectively of nuclear materials, including plutonium-based MOX fuels and spent irradiated nuclear fuels exported to and imported from Japan by nuclear processing plants in Belgium, France and the United Kingdom?

Answer:

The Office of Civil Nuclear Security (OCNS) in the UK is responsible for the regulation by civil nuclear operators for the secure transport of “sensitive categories” of nuclear material. In this context, the Office is the UK’s designated national authority under the Convention on the Physical Protection of Nuclear Material, for shipments to and from overseas destinations.

Specifically concerning the return shipment of the MOX fuel from Japan, this falls directly under the regulatory control of the OCNS. The Office reviewed all the security arrangement, in particular in the context of the terrorist attack last September in the United States. These

security arrangements were also reviewed by the United States and Japanese regulatory authorities. All the security authorities are satisfied that the security arrangements are "amply robust to deal with any potential threat".

In view of the above and although the Commission has neither the responsibility nor the legal powers to evaluate the security arrangements adopted, the services of the Commission are satisfied that adequate security measures are in place for the return shipment of the MOX fuel to the UK.

Concerning the security measures that are in place, the services of the Commission have been informed about a number of these that include: two vessels sailing together for mutual support and protection; the deployment of a wide range of protection systems; an escort of specially trained and armed officers; measures to impede the removal of the MOX fuel at sea; contingency plans and constant monitoring of location of the vessels. These are in addition to the normal "safety in depth" systems applied to such transport and formally approved by both the Japanese and UK nuclear safety regulatory bodies. However, full details of all security measures are unlikely to be made available, as there might be a risk that terrorists groups could exploit such information. In this context, the attention of the Honourable Member is drawn to the Convention on Physical Protection of Nuclear Material and, in particular, the paragraph concerning confidentiality of information concerning security measures.

OQ H-0136/01 from Manuel Medina Ortega

Passage of ships carrying radioactive materials through waters close to Member States.

ORAL QUESTION

pursuant to Rule 43 of the Rules of Procedure by Manuel Medina Ortega to the Commission

Subject: Passage of ships carrying radioactive materials through waters close to Member States

The ship Pacific Pintail recently left the French port of Cherbourg bound for Japan carrying a cargo of plutonium and uranium oxide. Does the Commission know what exact route this ship will be taking when passing through waters close to Member States? What measures are being taken to prevent pollution of Community waters in the event of an accident?

ORAL QUESTION H-0398/01

for Question Time at the part-session in May 2001

pursuant to Rule 43 of the Rules of Procedure by James Fitzsimons to the Commission

Subject: Ban on shipping German nuclear waste through the Irish Sea

he German Government has stated that it is opposed to the reprocessing of nuclear waste. Despite this it has been suggested that for the first time since 1998, spent nuclear fuel is now to be shipped through the Irish Sea from Germany to Sellafield. Is the Commission aware of the objections of the Irish people to such shipments and will it outline how it intends to defend their interests against this and all future shipments, taking into account that before July 2005 about 200 casks are due to be delivered to Sellafield from Germany?

General Answer

The IAEA regulations for the safe transport of radioactive materials, which have been implemented into Members States regulations, govern the package design in order to ensure the safety of people and the environment in extreme accident conditions, regardless of the mode of transport.

As the safety of all transportation operations lies primarily in the package the Uranium and Plutonium oxide (MOX fuel assemblies) are transported in a specific cask, licensed by British, French and Japanese Authorities. Each cask is designed to ensure the safety of the transport.

The casks and the sea transport vessels used, as well as the organisation of the transport should meet the latest requirements of the applicable international and national regulations (national regulation has been established in France, UK, and Japan), which derives from IMO conventions. including those related to safety (International Atomic Energy Agency recommendations)

It is up to the National Authorities to insure the conformity of the packages and the vessels and the compliance to the above mentioned regulations.

In addition, Council directive 93/75 EEC concerning minimum requirements for vessels bound for or leaving a port in a Member State and carrying dangerous goods constrains the operator of such vessel to notify before departure the competent authority of that Member State about the destination, the intended route and the nature of the dangerous goods transported.

The commission has no mean to monitor the sea route of the vessels.

QUESTION ÉCRITE E-3170/02

posée par Marie Isler Béguin (Verts/ALE)

à la Commission

Objet: Maîtrise et vigilance de l'UE concernant les transports nucléaires dans l'espace communautaire

Du fait que différents États membres de l'Union européenne maintiennent la production nucléaire à l'aide d'un certain nombre de centrales et d'usines de retraitement, des transports d'uranium et de déchets radioactifs se poursuivent sur le territoire de l'Union, au sein de bien des États membres. Des contrats industriels conclus avec des pays tiers comme le Japon ou la Russie entraînent le même effet.

La dangerosité extrême de ces produits a toujours laissé planer une menace permanente et terrifiante en cas d'accidents de la circulation ou de déficiences des équipements, et ce à l'intérieur d'un vaste périmètre entourant les trajets empruntés par les convois. La mobilisation responsable de riverains et de militants antinucléaires sur certains de ces passages engendre des répressions et des expulsions par les forces de l'ordre, seule réponse des autorités de certains États membres à cette vigilance citoyenne.

La menace d'une autre dimension d'"hyperterrorisme", inauguré le 11 septembre 2001 aux États-Unis, laisse désormais redouter, aux dires d'experts en matière de sécurité et de spécialistes du nucléaire, que ce type de sorties régulières de matières nucléaires hors de leurs lieux surveillés de production, de transformation ou de stockage, ne devienne la cible d'attentats ou de détournements par des organisations extrémistes.

Est-ce que la Commission détient et maîtrise, de manière exhaustive et immédiate, les calendriers et cartes de ces transports extrêmement sensibles et périlleux?

Est-ce que les informations concernées sont communiquées à la Commission en toute transparence et fidélité par les États membres d'où proviennent ou qui sont traversés par les convois?

Quelles est la marge d'appréciation et d'intervention de la Commission européenne quant à ces calendriers et trajets de convois nucléaires, lesquels sont générés par des industries dont la gestion relève certes d'une prérogative nationale, mais dont le potentiel de dangerosité recouvre tout l'espace communautaire et au-delà?

Est-ce que la Commission peut répondre de la sécurité des convois en question contre toutes les formes d'attaques ou d'accidents, ainsi que garantir l'ensemble des dispositions, dispositifs et interventions à la fois médicales et financières en cas de catastrophe à redouter dans l'espace communautaire élargi?

Réponse:

Points 1,2 et 3: Les États membres et les industriels ne sont pas tenus de communiquer à la Commission le calendrier et les trajets des transports de matières du cycle nucléaire (Pour l'instant la Commission ne voit pas d’avantages à proposer une telle législation)

Point 4: Aucune personne ou organisation ne peut garantir la sécurité absolue des transports ou autres formes d'activités contre des attaques visant à les perturber. Par contre, la Commission, en collaboration avec les États membres et dans le cadre de discussions

internationales, développe et améliore la législation nécessaire pour réduire l'impact des conséquences d'éventuels accidents qui pourraient survenir dans les transports.

La protection des personnes et de l'environnement passe bien entendu par le respect des normes internationales pour les colis. L'expérience montre que ces normes sont suffisantes et que les accidents encourus dans le cadre de transport n'ont pas conduit à un impact important sur l'environnement. Il est néanmoins probable que la conception des colis ne permet pas que ceux-ci résistent au-delà d'un degré de sévérité qui ne prévoit pas des attaques par des armes de guerre.

En ce qui concerne la sécurité contre des détournements, il existe des dispositions internationales qui prévoient des escortes de polices. Il appartient donc aux autorités nationales de juger dans quelle mesure elles doivent aller au-delà de ce qui est demandé par les règlements internationaux dans ce domaine.

Appendix 3
List of EC recent funded studies on the transport of RAM

http://europa.eu.int/comm/energy/en/pfs_sure_en.html#radio