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APPLICATION OF THE TRANSPORT SYSTEM CONCEPT TO THE TRANSPORT OF LSA WASTE

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The aim of this presentation is to illustrate using two examples how a particular special arrangement can be envisaged for the transport of a well defined category of waste according to the "Transport System Concept".

1) THE TRANSPORT SYSTEM CONCEPT

The current regulation on radioactive materials transport rests essentially on the packaging and does not take into account the contribution to safety which may be made by other features of the operation such as the conveyance or the overpack. The type of packaging required under the IAEA Transport Regulations is dependent on the nature and the quantity of the material to be transported.

The 1985 edition of the IAEA regulations [1] introduced new constraints for the transport of Low Specific Activity (LSA) material or Surface Contaminated Object (SCO) such as waste. Among these constraints the 100 A2 per conveyance limit for LSA combustible material affects numerous waste transports. The previous dose rate limits from the vehicle or from LSA unshielded material raises also some problems.

In order to comply with these limits the following alternatives can be considered :

- to reduce the quantity transported so as to comply with these constraints and to use the same packaging, or
- to use a type B package, or
- to obtain a special arrangement.

The first alternative is not always suitable for economical and safety reasons, the number of accidents being proportional to the number of journeys. The second one is often expensive and raises problems for the waste disposal facility which has sometimes to repackage the wastes. The last alternative has to be limited in time and is never totally satisfactory.

In some situations it would be beneficial to adopt none of these three alternatives but to envisage the possibility of using a package which does not meet all the Type B requirements, complemented by additional safety measures put in place to compensate for these shortfalls. The "Transport System" concept will take into account the contributions to the overall safety level from these additional measures. It will ensure that the proposed system is at least as safe as a reference operation which complies fully with the current Regulations. If this equivalent safety level can be properly demonstrated, the Transport System solution provides a kind of special arrangement for well defined shipments over a specific period.

2) TWO APPLICATION EXAMPLES

Within the framework of a joint IPSN/SRD/Transnubel study [2], sponsored by the European Communities (DG XVII) two major examples of the application of the Transport System concept have been provided. The first one concerns the transport of combustible alpha waste, the second one the transport of irradiated waste.

In order to solve the problem raised respectively by the 100A2 and the 0.1 mSv/h at two meters limit from the vehicle, an adequate protection of the container or the vehicle has been proposed. In the first case, a specific ISO container transporting 60 drums of 200 liters, thermally insulated, is envisaged for the transport of material having a total activity per conveyance up to 600 A2 (instead of 100 A2). The thermal protection is so designed that, in the event of a fire leading to engulfing 800°C flames for half an hour, the temperature reached at the hottest point of a drum will be less than the temperature leading to a radioactive release from the material inside the drum, or the opening of the drum. In the second case, the truck transporting 7 or 14 drums of 400 liters has been shielded so as to comply with the regulatory dose rate limits

A specific study [2], comparing the doses and risks associated with these two solutions to the doses and risks associated with two reference solutions complying fully with the current Regulation has shown that the two proposed Transport System solutions should be acceptable. The thermally insulated ISO container will therefore be envisaged in France and the Belgium Competent Authority has already accepted the shielded truck.

3) LIMITATION OF THE TRANSPORT SYSTEM CONCEPT

If the concept of the Transport System is judged relevant, the authors think that it should be limited to:

- material which broadly falls into the LSA or SCO categories, but which does not fully meet the current IAEA requirements,
- transport by land and sea,
- shipments which are regular and well defined (the consigning and receiving sites and routes should be defined, and the consignor or consignee should control all aspects of the carrier operations)
- "hardware" rather than operational compensatory measures are preferred and the compensatory measures should as far as practicable be "built-in" to the transport system.

In addition it is important to limit the number of variations from the regulatory requirements. Also the magnitude of the variations (ie the magnitude of the increase in allowed dose rates, quantity of combustible material, etc) should be limited so that the consequences of credible accident scenarios are controlled. A limit of one order of magnitude can be suggested for these variations. The Transport System analysis demonstrating that the proposed operation is at least as safe as the reference operation should be based on a quantified procedure, testing if possible.

Multilateral approval will be required for shipments through more than one country and the Transport System should ensure doses are kept ALARA and below dose limits.

Bearing in mind these limitations, the notion of the Transport System may be useful to solve some of the current problems of the transport of waste without having to change the current Regulations.

REFERENCES

- [1] IAEA "Regulations for the Safe Transport of Radioactive Material. 1985 Edition (As Amended 1990), Safety Series n°6, Vienna 1990
- [2] J. LOMBARD, F. RANCILLAC, H. LIBON, H. SANNEN, P. APPLETON "Safety Analysis of a Transport System". Final report to the CEC DG XVII, October 1992.