

Validity of the IAEA test criteria for nuclear fuel cycle packages

The design and performance standards for packages used for the transport of nuclear fuel cycle materials are defined in the IAEA Regulations to ensure safety under both normal and accident conditions of transport. The underlying philosophy is that safety is vested principally in the package. The design and performance criteria are related to the potential hazard - the more hazardous the material the tougher the package.

For Type B Packages, which are used for the more hazardous materials such as spent fuel and high-level wastes, the regulations require a demonstration of the successful performance of the package in impact tests relevant to crashes, thermal tests which simulate fires and water immersion tests relevant to an accident at sea.

Any programme of testing must ensure that the tests are representative of real accidents. There is a large body of analytical and experimental evidence to support the fact that the current IAEA test requirements meet this criterion.

Spent fuel transport has received particular attention. An analysis¹ has been carried out recently of severe transport accidents which have occurred in the USA over the past 20 years involving various dangerous cargoes (but not nuclear materials) in high speed impacts, fires and explosions. This showed that if such severe accidents had involved nuclear materials, including spent fuel, the transport casks would not have been significantly damaged and would have retained their integrity.

The WNTI position which was advanced at the 2003 IAEA Safety of Transport of Radioactive Materials Conference is that the current test requirements are adequate and that extra-regulatory test programmes are not necessary on safety grounds. Proposals for more severe tests, which have little technical justification, should therefore be treated with caution. Such proposals could result in a loss of public confidence in the current regulations and the ratcheting up of design requirements which would not be warranted on quantitative safety grounds.

The IAEA tests are severe and cover all accident situations which realistically can be envisaged in the transport of fuel cycle materials. The IAEA regulatory regime has ensured safety under both normal and accident conditions of transport for many years.

¹ Comparison of Selected Highway and Railway Accidents to the 10 CFR71 Hypothetical Accident Sequence and the NRC Risk, US Department of Energy, 8 April 2003