DEVELOPMENT OF AIR TRANSPORTABLE PACKAGE FOR PLUTONIUM IN PNC*

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PNC has had experience in the development and use of transport containers for mixed oxide fuel (PuO_2–UO_2), plutonium dioxide, plutonium nitrate liquid material, etc., for about twenty years in Japan.

Our knowledge of transport techniques has been obtained through experience and joint studies with foreign laboratories.

Future transport of plutonium from Europe to Japan is expected to be by air in view of the need for physical protection during the shipment of special nuclear materials. National regulations for air transport are now being discussed in Japan.

The Power Reactor and Nuclear Fuel Development Corporation (PNC) started a development programme for an air transportable package for plutonium in August 1984.

Preliminary designs for this package have been developed to determine a fundamental structure on the basis of the results for the PAT-1 and PAT-2 type packages for plutonium in the USA. Design requirements for the packages are that they should withstand severe air accidents, especially high speed impact, extreme crushing, puncturing, ripping/tearing, hydrocarbon fueled fires and deep underwater immersion: these are the characteristics being discussed in the Japanese national regulations for an air transport package for special nuclear materials. The main experimental programme for the air transportable package foresaw preliminary tests in Japanese fiscal year (JFY) 1984 and demonstration tests in 1985.

The preliminary test is designed:

(1) To assure the integrity of the fundamental structure of the air transportable package;
(2) To evaluate the mechanical strength of the structure (metal-wood) against high speed impact;

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* Only a summary is published here.

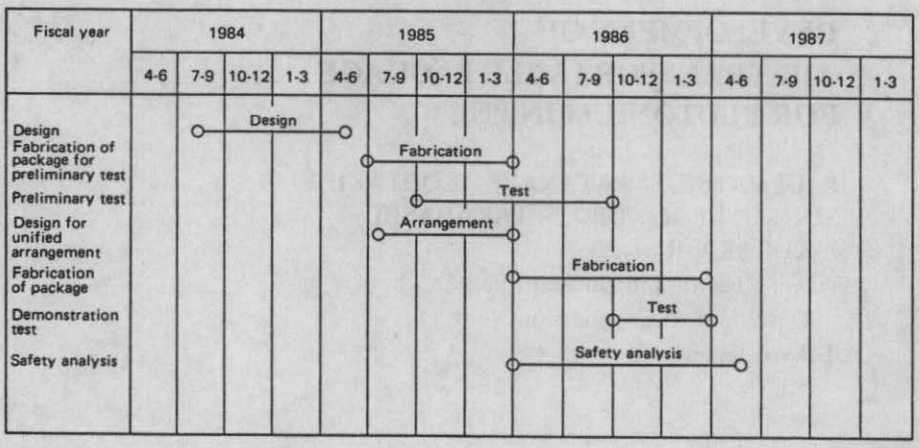

FIG. 1. Air transportable package development.

(3) To collect enough data for the purposes of the forthcoming Japanese national regulations for an air transport package for special nuclear materials.

The demonstration test is designed:

(a) To demonstrate the safety of the package under the severe accident conditions of the Japanese national regulations in order to obtain the certificate of package design from the competent authority;

(b) The full-scale prototype package for the demonstration test should be co-ordinated among the various facilities involved in the handling of the package.

So far, two high speed impact tests have been performed as preliminary tests. One was carried out in the vertical arrangement in March 1986. The other was performed in April 1986 with a horizontal positioning. The experiment schedules are shown in Fig. 1.

The results of the tests are now being studied. Much valuable data has been obtained. The performance of the air transportable package will be improved and information exchanged amongst the countries concerned.