

**IAEA/ANL
Interregional Training Course**



**Technical and Administrative Preparations
Required for Shipment of Research Reactor
Spent Fuel to Its Country of Origin**

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Lecture L.5.2

**Overview of
Local Arrangements in Japan**

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OVERVIEW OF LOCAL ARRANGEMENTS IN JAPAN

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SUMMARY

For the shipment of spent fuel, it is necessary to prepare transporting cask and to deal with many arrangements. In order to design and manufacture the casks, some legal approvals must be taken. In the experience of the design and manufacture taken the newest casks which would be used for the transport of spent fuel of research reactors at the Japan Atomic Energy Research Institute(JAERI), it took about three and half years from start of design until the cask approval was obtained. For every shipment, there are many arrangements such as application of permission and confirmation, notification, declaration etc. . In order to deal with these arrangements, it takes about a half year.

L.5.2 OVERVIEW OF LOCAL ARRANGEMENTS IN JAPAN

FOREWORD

For the shipment of spent fuel, it is necessary to prepare transporting cask and to deal with many arrangements. Spent fuel of research reactors in the Japan Atomic Energy Research Institute (JAERI) had been returned to the USA or transported to overseas reprocessing plants except some reactors. The shipments had been carried out since 1966 and have suspended since 1989. Total number of transported spent fuel elements reached 2,284, and total number of shipments were 37 times. The casks used for these shipments were: (1) bought used one from the USA, (2) manufactured by a company in the USA, (3) Leased from England, and (4) manufactured by a Japanese company. The details of these casks were described in "L.13.4 JAPANESE EXPERIENCE WITH SHIPMENT OF RESEARCH REACTOR SPENT FUEL " .

Until the early 1970's, these alternatives were easily taken because relevant regulations were not so strict. However, as the regulations became more strict, to take license became more difficult. For the future shipments of spent fuel of JAERI, casks described in above (4) will be only used.

There are many arrangements to be dealt with for the shipments. If arrangements to be taken for the shipments of spent fuel of Japan Materials Testing Reactor (JMTR) at JAERI are roughly classified, they are :(1) application for permission, confirmations etc. ; about 20 items, (2) notification, declaration etc. ; about 20 items, (3) competent authorities, local governments etc. needed explanation ; about 15 offices, (4) inspections by competent authorities ; 5 items, and (5) contracts ; 6 items. In order to deal with these arrangements, it will take about a half year for a regular shipment. However, for the shipment after long blank such as a shipment scheduled in 1997, which have almost 10 years blank, it will need to start much earlier.

1. LAWS FOR TRANSPORT OF SPENT FUEL IN JAPAN

There are two laws for control radioactive material in Japan. One is " The Law for Regulations on Nuclear Source Material, Nuclear Fuel Material and Reactors" (it is called " The Reactor Regulation etc. Law"), and the other is "The Low concerning Prevention from Radiation Hazards due to Radio-Isotopes etc. " (it is called " The Radiation Hazards Prevention Law "). Transport of nuclear fuel material and radio-isotopes are prescribed by the " The Reactor Regulation etc. Law" and " The Radiation Hazards Prevention Law " respectively. They are

based on the "IAEA Regulations for the Safe Transport of Radio Active Material" . The competent authorities for regulating nuclear fuel transport are shown in Figure-1.

2. EXPERIENCE OF DESIGN AND MANUFACTURE OF TRANSPORTING CASK

The newest type of spent fuel transporting cask in JAERI is the cask for the JMTR spent fuel. The cask name is JMS-87Y-18.5T. The experiences of design, fabrication and licensing are introduced in this section.

The entire cask is made of stainless steel attached shock absorbers to the top and bottom of the cask. These shock absorbers are made of plywood covered with stainless steel plates. The cask can accommodate 30 spent fuel elements, and its weight is 18.2tons. The conceptional drawing of the cask is shown in Figure-2, and the JMTR spent fuel elements to be contained in the cask are also shown in Figure-2. In order to reduce the size, the top section and bottom adapter are cut prior to loading into the cask.

It took 22 months for cask design, fabrication of a full scale model of the cask, tests conducted on the model cask and application for safety review on the cask design by the Japanese Safety Committee. And it took about 20 months for the safety review, obtaining approval for cask design, fabrication, inspections by competent authority and obtaining cask approval. Accordingly, almost three and a half years were spent from start of design until cask approval was taken. In addition to the design approval of Japan, approvals by six supposed countries through or into which cask would be to be transported were obtained. Design and fabrication procedures of the cask are shown in Figure-3, and the test flow conducted on the model cask is shown in Figure-4.

Design approval of cask must be revised every three years in Japan. In order to verify integrity of the casks, the casks must be inspected by the owner once a year. The inspection results must be submitted to the competent authority with application for getting the revised design approval. The inspection results are reviewed by inspectors of the competent authority, then the revised design approval is issued to the owner. It takes about three months from application to issue.

3. ARRANGEMENTS FOR TRANSPORT IN JAPAN

Major items of arrangements for transport of the JMTR spent fuel are listed in the following tables respectively.

Applications for permission, confirmations etc.	: in Table-1
Submission, notifications, declarations etc.	: in Table-2
Competent authorities, local governments etc. needed explanation	: in Table-3
Inspections by competent authorities	: in Table-4
Contracts	: in Table-5

Because there are so many arrangements as shown in these tables, it is impossible to deal with all duties by a few members of a fuel management group at JMTR. So, clerks in administrative divisions of the Oarai Research Establishment support them. Members to promote the arrangements are 3 or 4 of the fuel management group and almost same members of the administrative divisions.

4. THE SITUATION OF THE SPENT FUEL TRANSPORT IN JAPAN

The ground transport of the JMTR spent fuel has the longest distance in the research reactors at JAERI. The reason is described in "L.13.4 JAPANESE EXPERIENCE WITH SHIPMENT OF RESEARCH REACTOR SPENT FUEL". The actual state of ground transport of the JMTR spent fuel is introduced in this section.

A head office of the spent fuel transport is set up at the Oarai Research Establishment during ground transport. The transport is carried out at midnight because of avoiding traffic jam. In order to keep safety transport and to cope effectively with matter what happens, following JAERI members accompany, and employees of a transport company and a security company attend the transport.

- One person responsible of the transport
- One expert of radiation control
- One expert having national qualification of the supervisor of nuclear fuel
- More than ten staff members including professional radiation control members (most of them have national qualification of the supervisor of nuclear fuel and/or of the supervisor of radiation control)
- About 15 employees of the transport company
- About 15 guardsmen of the security company

Furthermore, several police cars escort and guard the transporting file.

Of course, these organizations, personnel organizations and an arrangement of the transport file are submitted to competent authorities and local governments. If any comments are given by them, JAERI conducts further examination. Finally, they are notified to the competent authorities and local governments.

Since the speed of the load vehicle was restricted to 30km/h, the file covered about 30km from JMTR to the port in almost two hours. The situation of the transport and the time passing check points are informed to the head office by radio of a car of the security company. If something happened, it is informed to the competent authorities and local governments from the head office at once. After the file arrived to the port, they wait until loading which begins at the sunrise.

AFTERWORD

The arrangements for the spent fuel transport are troublesome tasks. In order to avoid something trouble on the transport, the competent authorities and local governments impose conditions on the transport. The arrangements are being proceeded while solving such subjects. By our experience, it took about four or five months from shipment to return of the empty cask to JMTR. Accordingly, the maximum frequency of the shipment would be twice a year.

Table-1 Applications for Permission, Confirmation etc.

Confirmation of Nuclear Material Package to be transported	STA
Inspection prior to Shipment of Package	STA
Passage Permission of Special Load Vehicle	MOC
	One Prefecture
	One City
	One Village
Approval of Loading Method	MOT
Confirmation of Safe Transport Plan of Radioactive Material	MOT
Special Exception of Load Limit	MOT
Loading Inspection of Dangerous Cargo	MOT
Confirmation of Transport Agreement	STA
Permission of Load Service	MITI
Export Approval	MITI
Traffic Permission out of Designated Region	Custom
Permission of Storage at Place out of Designated Region	Custom
Permission of Load/Unload out of Duty Time	Custom

STA : the Science and Technology Agency

MOC: the Ministry of Construction

MOT: the Ministry of Transport

MITI :the Ministry of International Trade and Industry

Table-2 Submission, Notification, Declaration, etc.

Submission of Design Evaluation of Tie-down	MOT
Submission of Design Analysis of Tie-down	MOT
Submission of Reports on Transport of Nuclear Material	Public Safety Commission of one Prefecture
Submission of Reports on Transport of Radioactive Material	MSA
Request for Security Guard for Transport	MSA
Submission of Appendix-A and Appendix-B	US. DOE
Request for Use of Port	JAPCO
Request for Use of Equipment at Port	JAPCO
Submission of Results of Loading Inspection on Ship	JAPCO, Port Service Company
Submission of Reports on Plan of Receipt / Shipment of Nuclear Material	STA
Submission of Reports o Plan of Nuclear Material Export	STA
Export Declaration of Fuel	Custom
Export Declaration of Cask	Custom
Submission of Cargo Operation	Custom
Submission of Consignor's Certification of SF shipment	Captain

JAPCO :Japan Atomic Power Company
MSA :the Maritime Safety Agency

Table-3 Competent Authorities, local governments etc. needed to explain

STA	Nuclear Fuel Control Division Nuclear Reactor Control Division Policy Division Nuclear Fuel Division Research and Technology Division Atomic Office in the Prefecture
MOJ	Immigration Office
Local Government	One Prefecture Two Cities, one Town and one Village
Police	Prefecture Police Head Station Four Local Police Stations
Fire Station	Prefecture Fire Head Station Five Local Fire Stations
	Overseas Reprocessing Committee
	Prefecture Fishermen's Union

MOJ: the Ministry of Justice

Table-4 Inspections by Competent Authorities

Inspection prior to shipment	STA
Loading inspection on vehicle	MOT
Loading inspection on ship	MOT
Loading confirmation and Sealing of cask	IAEA, STA
Proof test of Lifting tools	Japan Maritime Association

Table-5 Contracts

Reprocessing	US. DOE
Marine Transport	BNFL
Ground Transport and Loading in Japan Transport Company (Includes Security Service for Ground Transport in Japan)	
Liability Insurance for Nuclear Damage	Japan Atomic Energy Insurance Pool
Indemnity Agreement for Compensation of Nuclear Damage	STA
Service Agreement	Trading Company

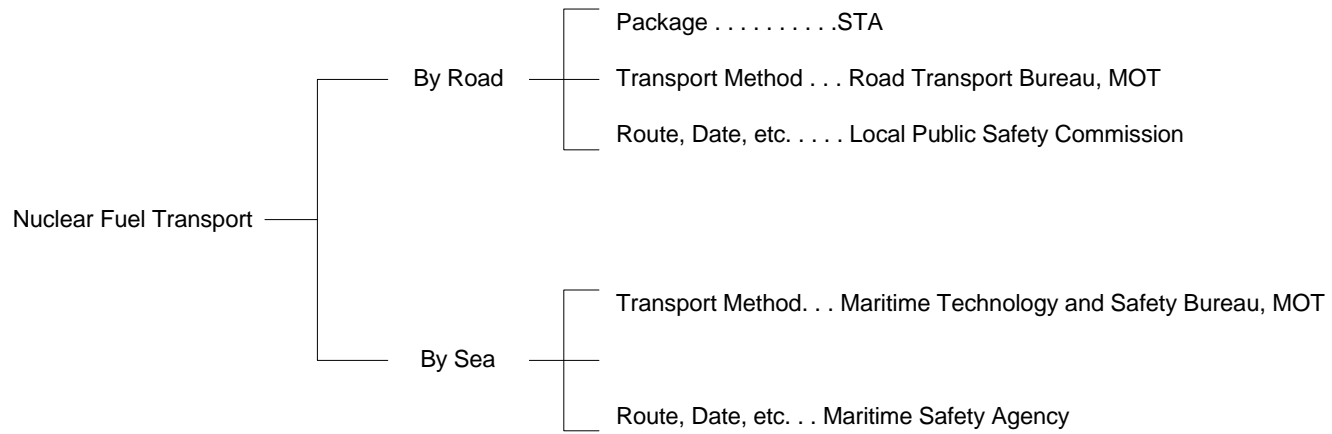


Figure-1 Competent Authorities for Regulating Nuclear Fuel Transport

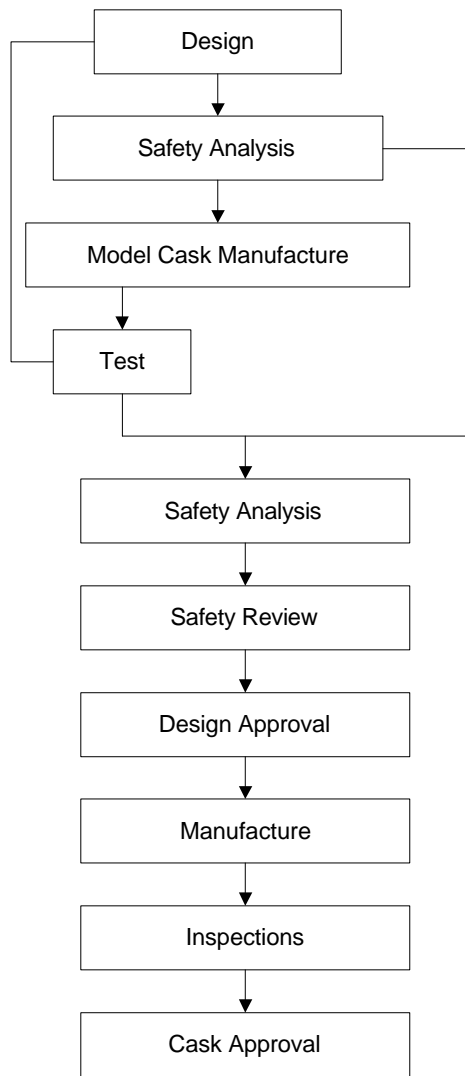


Fig.-3 Design and Manufacture Procedure

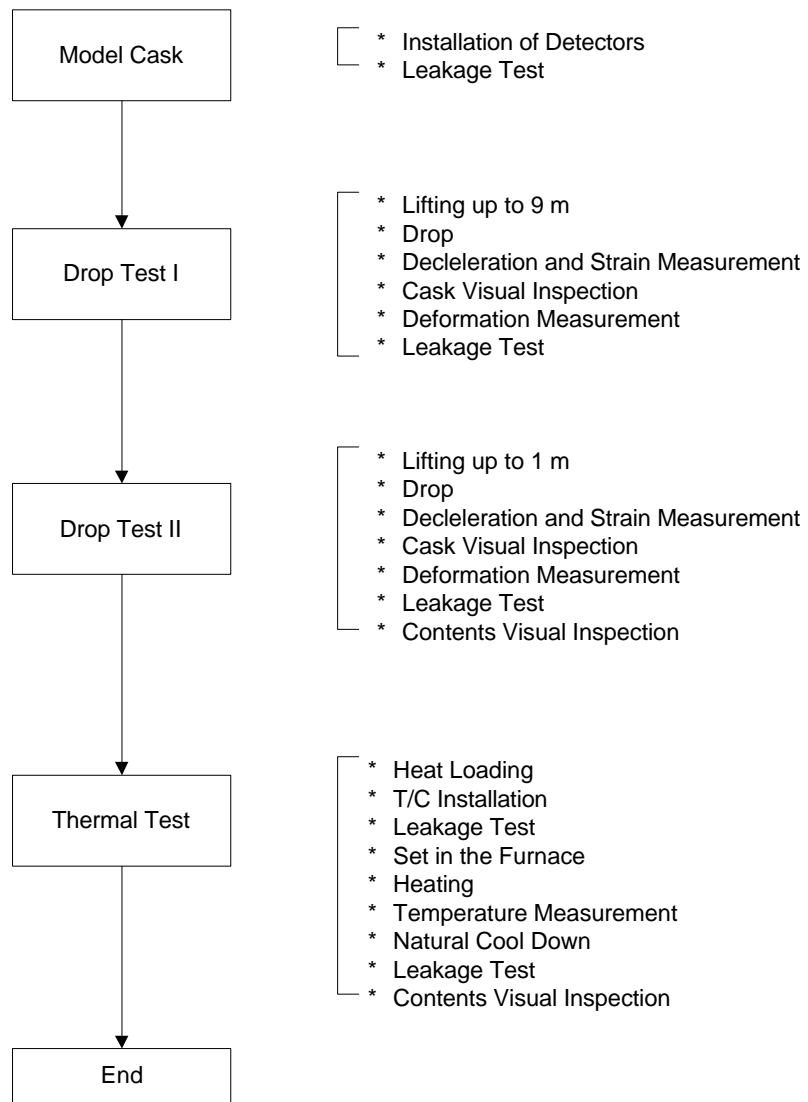


Fig.-4 Test Flow