QUALITY ASSURANCE APPLIED TO THE USE OF TYPE B FLASKS

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Abstract

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In the context of spent nuclear fuel shipments from European LWRs to the reprocessing plant, Cogéma and NTL (Nukleare Transportleistungen) have developed a quality assurance programme which covers transport and loading operations of Type B flasks. The paper describes on the one hand the present operating practice, and on the other hand principles to be used for setting up a quality assurance system applicable to the management of fuel consignments.

1. PRESENT OPERATING PRACTICE

In order to follow all operations during a complete transport cycle, from the departure of an empty flask until its return (loaded with irradiated fuel) to the reprocessing plant, a so-called transport dossier is built up step by step as the actions are carried out. This dossier represents the documented evidence that the transport is executed in accordance with the contractual and regulatory requirements. In order to explain the way in which it has been elaborated, we will analyse:

- the role and responsibilities of the various bodies involved (see Fig. 1);
- the arrangements made and the methods developed by the carrier, who co-ordinates the execution of the actions during the transport cycle.

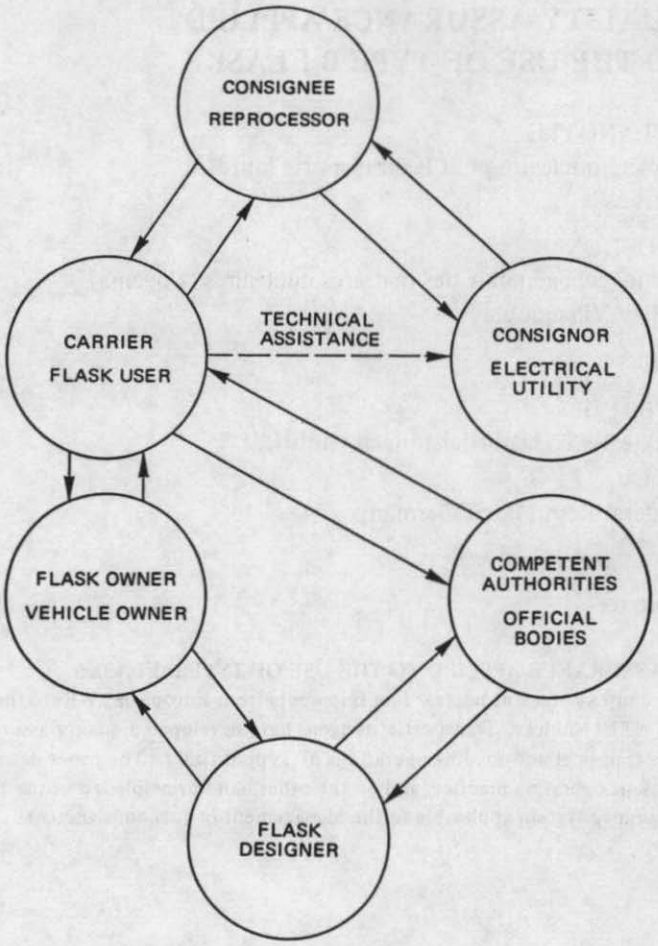

FIG. 1. Communication flow chart.

1.1. Role and responsibilities of the different intervening bodies

1.1.1. Carrier and its subcontractors

First of all, before starting the transport cycle, the carrier ensures that he is in possession of the documents listed below.

(a) Documents related to fuel qualification:
- Package approval certificate transmitted by the flask owner
- Document certifying compatibility between flask and fuel, produced by the carrier
- Document of fuel acceptance, transmitted by the reprocessor.

(b) Maintenance certificates for flask and vehicles
(c) Official authorizations
(d) Flask operating documents
(e) Consignor's and reprocessor's agreements on the transport programme.

Furthermore, the carrier is responsible for the supervision of operations from the preparation of the empty flask, including handling on its vehicle, up to the return to the reprocessor of the loaded flask.

1.1.2. Consignor

Basically, these are the electrical utilities, owners or users of the fuel to be evacuated. Their roles and responsibilities include:

- Establishing contracts with the reprocessor
- Giving to the reprocessor the fuel data for the evaluation and acceptance of the fuel
- When necessary, providing the fuel owner's agreement for reprocessing
- Being responsible for applying the flask operating documents transmitted by the flask owner through the reprocessor
- Transferring their consignor responsibilities to the reprocessor, who in turn delegates to the carrier signature of the declaration sheet in the 'transport document'.

1.1.3. Reprocessor

The reprocessor:

- Approves the list of fuel to be evacuated, as proposed by the consignor
- Subcontracts to the carrier the fuel evacuation.

1.1.4. Flask owner

The flask owner:

- Is responsible for establishing and distributing the flask operating documents
- In conjunction with the designer is in charge of obtaining the package approval certificate and the necessary validations from the competent authorities
- Is responsible for the maintenance status of the flasks and vehicles.

1.1.5. Competent authorities

These are the official bodies delegated by the different governmental ministries of the countries through which the transport passes. Their responsibilities are to:

- Issue the package approval certificates and the necessary validations
- Issue the different transport authorizations required by the appropriate regulations and particular laws (security bodies, customs, insurances, etc.).

1.2. Skeleton of the procedures used by the carriers

Nukleare Transportleistungen (NTL) and Cogéma have set up the methods and associated documents which support the responsibilities of the carrier as described in paragraph 1.1.1. These are listed below.

1.2.1. Fuel homologation sheet

It is this document which demonstrates the compatibility of the flask with the fuel to be evacuated, on the basis of the parameters defined in the package approval.

1.2.2. Maintenance inspection certificates of flasks and vehicles

The carrier is in possession of the certificates of the last periodic maintenance performed on the equipment in the maintenance workshops selected by each owner. During each cycle it records the condition of the utilized equipment in the relevant 'transport document' sheets.

1.2.3. Administrative formalities

The carrier establishes a check-list which makes it possible to verify the presence of the necessary official authorizations.

1.2.4. Flask operating documents at the reactor site

Flask handling at the reactor site is supervised by the carrier, who gives technical advice to the reactor operator. The carrier certifies through check-lists for each type of flask that the nuclear power plants use the procedures approved by the owners.

If an incident arises during flask handling, the carrier applies the instructions for intervention in the event of an emergency, as defined by the flask owner and approved by the consignee.

An incident report describes the actions taken.

1.2.5. Establishment of fuel loading plans

From the administrative procedures transmitted by the electrical utilities, the carrier establishes the loading plans which allow verification of fuel identification and of the position of the fuel in the flask cavity. A procedure describes the method employed by the carrier in order to eliminate any source of mistakes.

1.2.6. Shipment supervision

Telephone or automatic computer connections from the carrier's base office make it possible to monitor the position of the shipment at any moment. In the event of an accident, the freight contractor informs the carrier, who ensures the link with the competent authorities.

The carrier, in co-operation with the flask owner, gives the necessary practical instructions to the local security bodies and to those of the consignee country.

2. PRINCIPLES FOR THE ESTABLISHMENT OF A QUALITY ASSURANCE SYSTEM

The proposed principles, based on the practice described above, originate from the recommendations usually adopted in quality assurance guides applicable to product manufacturing. In the present situation Cogéma and NTL will transpose these recommendations to their respective service company activities.

The following associated principles could be considered as parameters of a quality assurance system plan applicable to a carrier.

2.1. Scope of service activities

The interfaces and the associated document links with the other activities will be clearly defined and the contractual clauses between the nuclear material carrier and the consignee will be made clear.

2.2. Organization

The roles of the intervening bodies will be detailed with regard to the carrier's responsibilities.

Staffing and training must be implemented within the different bodies, careful attention being paid to the specialities of their personnel.

2.3. Document control

The procedural support between the intervening bodies will be defined in such a manner as to demonstrate that the information circuit during the whole transport cycle is under control, that documented evidence is shown and that distribution of applicable documents is made amongst the different contracting parties.

2.4. Fuel data analysis

The fuel user must give to the carrier and to the consignee all data necessary to allow demonstration of conformity with the package approval and with storage or reprocessing requirements.

2.5. Shipment control

Provision must be made to demonstrate that the flasks and vehicles are in proper condition prior to and during shipment and that the equipment's location at any moment is monitored during the complete transport cycle.

2.6. Special process control

All safety and security related processes utilized for transport and loading operations must be qualified according to recognized standards. Procedures will detail the associated process performances.

2.7. Test and inspection control

All data sheets related to special safety or regulatory measurements performed during shipment and loading operations must be recorded and signed by the responsible organizations. They will be part of the quality assurance dossier established for each transport cycle.

2.8. Non-conformance control and corrective actions

A deviation from the applied procedures will lead to a non-conformance treatment if a physical defect in the equipment or a procedural discrepancy are detected. In any case, remedial actions will be taken to prevent repetition and these will be clearly written in the associated non-conformance report. The consignee approves each step of the non-conformance treatment.

2.9. Storage of records

Lifetime and temporary storage have to be defined according to the different types of documents dealing with the execution of a complete transport cycle, and to the particular body concerned. Storage conditions have to be settled and must comply with normal document preservation criteria.

2.10. Audits

The different parties involved in the execution of the transport cycle have to be audited periodically by the respective contracting organization. Audit questionnaires will be based on the commitments written in the relevant applicable documents. The organization responsible for quality assurance will establish the audit questionnaire and designate internally the competent auditor.

The present communication circuit (Fig.1), as determined from the transport contracts which concern separately NTL and Cogéma, gives satisfactory results in the quality assurance management as described in this paper.

The carriers' constant aim is to improve the existing support documentation, especially from a security point of view.