

Logistics of the Research Reactor Fuel Cycle : AREVA Solutions

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ABSTRACT

The AREVA Group Companies offer comprehensive solutions for the entire fuel cycle of Research Reactors comply with IAEA standards.

- CERCA and COGEMA LOGISTICS have developed a full partnership in the front end cycle. In the field of uranium CERCA and COGEMA LOGISTICS have the long term experience of the shipment from Russia, USA to the CERCA plant..

Since 1960, CERCA has manufactured over 300,000 fuel plates and 15,000 fuel elements of more than 70 designs. These fuel elements have been delivered to 40 research reactors in 20 countries.

- For the Back-End stage, COGEMA and COGEMA LOGISTICS propose customised solutions and services for international shipments.
- COGEMA LOGISTICS has developed a new generation of packaging to meet the various needs and requirements of the Laboratories and Research Reactors all over the world, and complex regulatory framework.

Comprehensive assistance dedicated, services, technical studies, packaging and transport systems are provided by AREVA for every step of research reactor fuel cycle.

PAPER

The fuel cycle for Research Reactors and Laboratories is an integral part of the fuel cycle of Power Reactors. Due to the type of material (uranium enriched up to 93%) the shipment must comply with:

- The international regulation for dangerous goods,
- IAEA standards,
- National and International laws for physical protection,

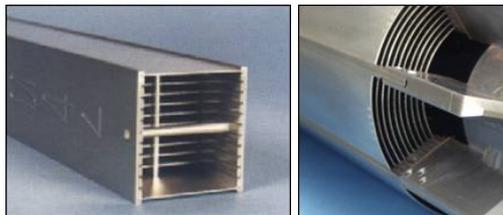
The AREVA Group Companies offer comprehensive solutions:

- CERCA and COGEMA LOGISTICS have developed a full partnership in the front end cycle :
- In the field of uranium (HEU and LEU) CERCA and COGEMA LOGISTICS have the long term experience of the shipment from Russia, USA to the CERCA plant. This cooperation includes providing the packages such as TN™-BGC, TN™UO2, technical assistance on sites and door-to-door transportation logistics.



TN™-BGC package

- Since 1960, CERCA has manufactured over 300,000 fuel plates and 15,000 fuel elements of more than 70 designs. These fuel elements have been delivered to 40 research reactors in 20 countries.



Examples of CERCA fuel elements

- Following the fuel fabrication, CERCA and COGEMA LOGISTICS provide transport services from CERCA plant to the reactor in Europe or abroad. Most of the fuel deliveries are performed with the CERCA 01 package. It has been developed in cooperation between both companies, complies with IAEA 96, and can be used for multimodal transportation.

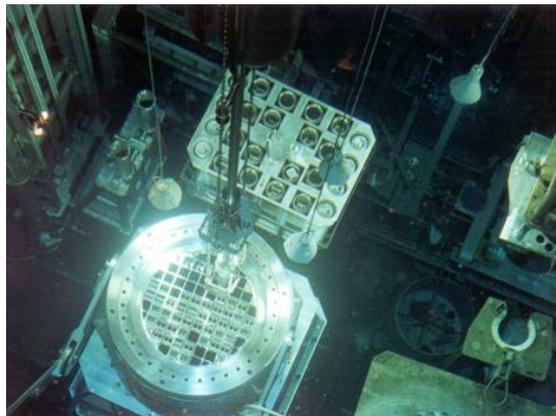


Examples will be provided, such as transports to Japan and within Europe, using CERCA package for fresh fuel, TNTMUO₂ or TNTMF-XI for powders and pellets, or TNTM-BGC for HEU.

- For the Back-End stage, COGEMA and COGEMA LOGISTICS propose customized solutions and services for international shipments, in a complex regulatory framework.

COGEMA LOGISTICS has developed a new generation of packaging to meet the various needs and requirements of the Laboratories and Research Reactors all over the world.

Four (4) TNTM-MTR casks, which can be equipped with 6 different types of basket allowing a capacity from 4 to 68 fuel elements, and 2 TNTM-106 casks with two different lengths of cavity (2200 mm and 2000 mm) are presently in use.



Unloading of TNTM-MTR cask at La Hague plant

A TNTM-MIL, allowing the transportation of 20 irradiated fuel rods will be in use in a very near future.

All these packagings meet AIEA 1996, T-S-R-1 regulations.

Examples will be provided, on current transport operations: shipments of spent fuel from Japan, Australia and Europe to US and France.

Conclusion

Comprehensive assistance dedicated, services, technical studies, packaging and transport systems are provided by AREVA for every step of research reactor fuel cycle.