



MEETING THE CHALLENGES OF INTERNATIONAL PROJECTS

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ABSTRACT

Used fuel storage is a common issue in all countries with nuclear reactors. Notwithstanding considerable efforts to increase the efficient use of nuclear fuel and to optimize the storage capacity, delays in realizing geological repositories in most countries or in implementing recycling in some countries results in increased used fuel storage capacity needs in combination with longer storage durations. This trend combined with more sophisticated fuel design and higher enrichment requires providing innovative solutions tailored to each customer.

Facing these challenges, AREVA Logistics Business Unit, through its subsidiaries TN International in France, Transnuclear Inc. in the USA and Transnuclear Ltd. in Japan, has decided to launch an extensive innovation process to create a new generation of transport and storage systems and also to renew the management of projects. Thanks to its international subsidiaries, AREVA Logistics Business Unit was able to form multicultural project teams. Each team consisted of several experts from the three continents in order to propose to customers the most efficient teams in terms of knowledge and know-how. These multicultural expert teams could better understand the customer needs as well as the different regulatory requirements of each country.

The purpose of this paper is to present these experiences, and furthermore to underline our know-how and ability to provide highly efficient solutions to our customers.

INTRODUCTION

Worldwide the used fuel generation rate is about 11 500 t HM/year. As less than one third of the fuel inventory is reprocessed, about 8 000 t HM/year on average will need to be placed into interim storage facilities [1]. The total amount of used fuel that will be generated by 2020 is estimated to be 445 000 t HM. On this basis, additional storage capacity has to be installed in time, to avoid the shortage of used fuel storage capacity.

Moreover the storage duration is now much longer than earlier anticipated, due to the selection of the “wait-and-see” policy for the management of used fuel chosen by many nuclear power countries [2]. The trend towards more long term storage is complicated by trends towards higher initial



enrichment and higher fuel burnup, as well as other considerations including the use of new fuel designs and MOX (Mixed Oxide Fuel).

Facing the new challenges to extend the life of existing and new storage facilities and guarantee their safe performance for much longer periods of time, AREVA Logistics Business Unit (BU), through its subsidiaries TN International in France, Transnuclear Inc. in the USA and Transnuclear Ltd. in Japan, has launched an extensive innovation process to create a new generation of transport and storage systems and also to renew the management of projects [3].

Having accumulated more than 40 years of experience in the different fields of the design and manufacture of shipping and/or interim storage containers for radioactive materials and acting at all stages in the fuel cycle, it is the duty and commitment of AREVA Logistics BU to offer the innovative and improved systems to all its customers.

AREVA Logistics BU develops custom-made solutions that take into account the most stringent requirements in terms of safety and protection, the diversity and multiplicity of the relevant material, as well as the various configurations of the operations in several facilities and countries.

In order to conserve its technological advance and to optimize its industrial capability, the AREVA Logistics BU is developing a dynamic policy of innovation in its products and services supported by an efficient staff and organization.

INTERNATIONAL MANAGEMENT

AREVA Logistics BU benefits from an international network formed by its entities: TN International and Transnuclear Inc. have worked very efficiently together for 45 years, and Transnuclear Ltd. joined the network in 1984. These entities share experiences and resources to respond to the requirements of their customers and improve customer satisfaction. The companies have the same management team which is the Logistic BU management, so they have coordinated strategy, common development objectives, common R&D programs and common safety culture.

The top management and also the operational teams of the different entities are multicultural. Engineers from other entities and countries work currently in the different entities of the AREVA Logistics BU. Professional exchange programmes provide participants with opportunities to experience American, European or Japanese life through the lens of their professional interest to learn and engage with their professional colleagues. AREVA Logistics BU is able to transcend different cultures and demonstrates its good knowledge of international organizations and Safety Authorities as well as local and international stakeholders.

AREVA Logistics BU has a wide range of competences and experiences in the broad fields of design, licensing, manufacturing, transportation and storage of radioactive materials.

AREVA Logistics BU has established long-lasting contacts with international organizations and authorities in charge of transportation and storage in several countries. Its experts are involved in several committees and they contribute regularly to IAEA Safety Series ; they are members of IAEA TRANSCC (Transport Safety Standards Committee), and are representatives of France to ICAO, IMO and to Technical Committees and IAEA Consultant Services Meetings.



AREVA Logistics BU proposes close cooperation and relationships to its customers, something that has always proved to be a key for success. AREVA Logistics BU provides constant and long-lasting support, at each stage of the project. This includes, of course, the basic scope of work but also a wide range of competences across the spectrum of design, licensing, manufacturing, transportation and storage of radioactive materials.

INTERNATIONAL PROJECTS

AREVA Logistics BU has successfully completed projects internationally, putting together international project teams and collaborations. Transnuclear Inc., Transnuclear Ltd. and TN International have been working together on design and licensing projects (development of new storage systems, development of a methodology to implement the burn up credit in safety analysis, development of new shielding materials, development of new impact limiters,...) and transportation projects (UF6 from Europe to United States of America, used fuel and vitrified wastes from Europe or Japan).

AREVA Logistics BU can make available the best team members to its customers everywhere in Europe, in America and in Asia, thereby providing greater expertise and availability.

The following sections provide some examples of the international collaboration.

NUHOMS[®] systems - Republic of Armenia

Led by TN International, this project consists in the implementation of NUHOMS[®] dry storage systems in the Nuclear Power Plant of Medsamor, since 1996. TN International is supplying the dry storage solution for managing all the used fuel until the plant end of life.

The NUHOMS[®] system is the US industry leading used fuel storage solution and was specifically adapted and developed for this Plant: the system is compatible with the storage of VVER used fuel and compliant with Armenian regulations.



Figure 1: NUHOMS[®] systems, Republic of Armenia

This is a good example of cooperation between Transnuclear Inc., providing the technology, and TN International, in charge of the adaptation of the storage system and of all the project management.

TN[®]NOVA Project – Switzerland

In 2007 and 2008, TN International and Transnuclear Inc. designed and developed two innovative storage solutions in order to meet the needs of a Swiss Customer. This led to the development of the TN[®]NOVA and the TN[®]DUO [4], and the TN[®]NOVA was recently selected by our customer Axpo for the Leibstadt Nuclear Power Plant.

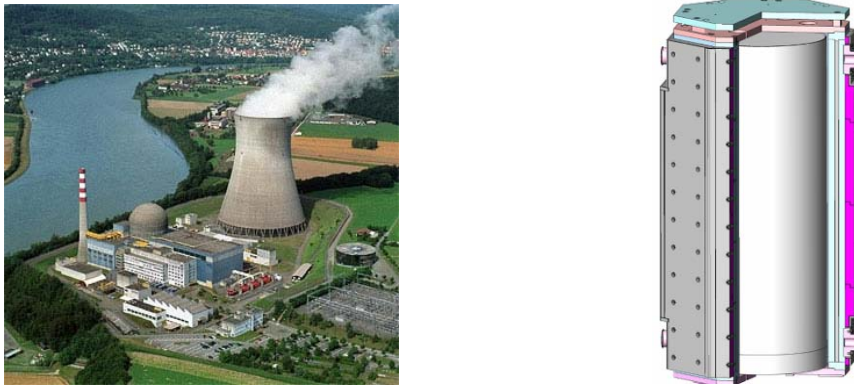


Figure 2: View of Leibstadt NPP, Switzerland & View of the TN[®]Nova storage overpack

Our customer Axpo is already benefiting of our cumulated expertise: a project team with shared resources in France and in the USA is working on the design, licensing and supply of the dry storage solution for managing all the used fuel of the Leibstadt Nuclear Power Plant until the plant end of life. Typically, Transnuclear Inc. offers its expertise on transportation licensing in the USA and TN International offers its expertise on the storage licensing in Europe and especially in Switzerland.

An executive steering committee has been assigned, ensuring that any obstacle during the project will be removed. This steering committee is always available to deal with any request from the customer. Frequent project progress meetings with the Steering Committee and the project team ensure that the project organization is in line with Axpo challenges.

TN[®]843 transport cask - Japan

TN International with the support Transnuclear Ltd. designs the TN[®]843 cask for the transportation of compacted waste from France to Japan. This radioactive waste is conditioned at the La Hague recycling plant in France.

This project consists in the design, the licensing of the transport cask in France and in Japan and the supply of the transport casks.

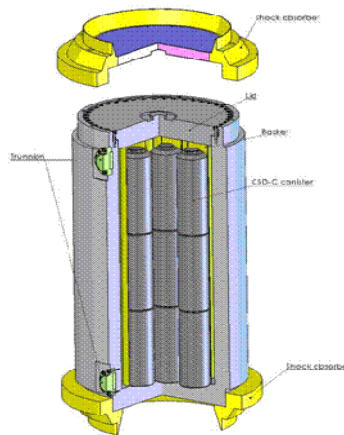


Figure 3: View of the TN[®]843 transport cask

Our customer is benefiting from our cumulated expertise: a project team with shared resources in France and Japan is working on the design, licensing and supply of transport cask. TN International and Transnuclear Ltd. applied for and obtained numerous transportation licenses for transporting used fuel and high level radioactive waste in several countries. Moreover the customer is benefiting from the long-standing contacts with competent authorities for the transport application in France and Japan especially. Finally, for several years AREVA Logistics BU has organized multi-modal transports from Japan to Europe and from Europe to Japan.

This is another example of close cooperation between TN International, in charge of the main design of the transport cask and of all the project management, and Transnuclear Ltd., providing the licensing and transportation support for all the activities related to Japan.

Underwater Fuel Storage Racks

In 2009, AREVA Logistics BU developed innovative designs for Underwater Fuel Storage Racks which includes the use of Metal Matrix Composite (MMC) material as a neutron absorbing material.

The designs of the Underwater Fuel Storage Racks have taken advantage of the expertise in the field of the design, licensing and fabrication of the dual-purpose cask high capacity baskets. Thus TN International and Transnuclear Inc. developed and designed different Underwater Fuel Storage Racks:

- racks using MMC or BSS (Boronated Stainless Steel) as poison material in accordance with the European and Chinese requirements,
- racks using MMC as poison material (NUSTOR™) in accordance with the US requirements of 10CFR Part 50 and 52.

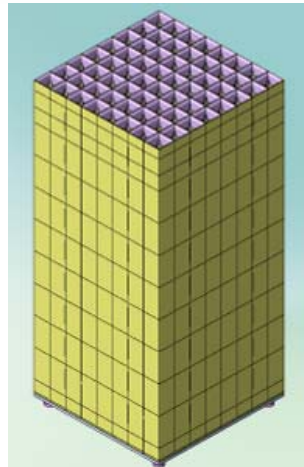


Figure 4: View of the Fuel Storage Rack

This is another example of cooperation between Transnuclear Inc. and TN International who work together in order to design innovative solutions which are adapted to their specific markets and customers requirements and specific regulatory frameworks.

CONCLUSION

While integrating different cultures and different regulatory frameworks, AREVA Logistics BU is able to propose innovative products and services to its customers.

It provides significant advantages:

- AREVA Logistics BU has a wide range of competencies and experience in the areas of design, licensing, manufacturing, transportation and storage of radioactive materials.
- AREVA Logistics BU can offer expert knowledge and know-how, and experience of dealing with international organizations and authorities as well as local and international stakeholders.
- The multicultural expert teams within AREVA Logistics BU are able to better understand customer needs as well as the different regulatory requirements of each country.

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