TN International Transport Solution
Supporting Non Proliferation Initiative

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For more than forty years, TN International supports the research reactors community in safely performing national or international transport of radioactive materials (fresh and spent fuel).

TN International is bringing its experience to the various actors of the Global Threats Reduction Initiative Program (GTRI) in particular the Foreign Research Reactor Program (FRR) and the Russian Research Fuel Return Program (RRRFR).

TN International owns and operates a fleet of three TN™MTR casks. Each cask can transport up to 68 MTR fuel elements. Specific baskets have been developed for transport to the US as well as for Mayak acceptance for loading.

During the last decades, TN International has contributed to non-proliferation initiatives by loading and transporting casks in more than 10 countries. With the support of the AREVA network, TN International provides transportation services, including cask and technical assistance on site, to different Research Reactors under US Department of Energy and IAEA frameworks.

This presentation will summarize our experience and futures activities for the coming years in the framework of non-proliferation initiatives.

1. Introduction

Mandated by the U.S. Secretary of Energy, the National Nuclear Security Administration manages, consolidates and speeds up the return of high risk materials in the framework of the Global Threat Reduction Initiative (GTRI).
The office of the Global Threat Reduction NNSA manages several programmes including the Foreign Research Reactor Programme (FRR), the Russian Research Reactor Fuel Return Programme (RRRFR), the RERTR (Reduced Enrichment for Research and Test Reactors) and the Emerging Threats and GAP Material programme.

In the framework of the FRR and RRRFR programmes, a significant number of spent fuel shipments are to be organised from the countries eligible for the two programmes to the two countries where the uranium originated (the United States and Russia).
For the RERTR programme, several shipments of fresh fuel (LEU) to reactors which are to convert to LEU need to be organised.

TN International has for more than 40 years worked in the various phases of the research reactor cycle in organising and carrying out nuclear materials transportation all over the world. This paper will demonstrate TN International's capacity to support those involved in the GTRI programme.

2. FFR Programme

For many years TN International has worked in the transportation of spent fuel from research reactors, in particular in the framework of the FRR programme.
This programme has enabled and still enables scores of reactors in around forty countries to send their spent fuel, whose uranium came from the U.S., back to the U.S. in particular to the Savannah River site. In November 2004, the U.S. Secretary of Energy announced the extension of the FRR programme to May 2019 for fuel irradiated before May 2016.
When the programme started, three or four shipments were organised mobilising around six casks per shipment, but over the last years the number of shipments has been halved. In our view, this reduction in the number of transports is due to a combination of the reactors' efforts in the field of fuel management, the shutdown of certain reactors and the flexibility concerning the date of return of spent fuel to the U.S. caused in particular by the extension of the programme.

3. RRRFR Programme

The Russian Research Reactor Fuel Return Programme concerns around twenty countries which have research reactors which have used, and in some cases still use, Russian fuel. For these reactors the programme means their fuels can be sent back to Russia, in particular to the Mayak site.
The United States, Russia and the IAEA work together to make a success of the programme. The first objective has been the return of fresh fuel and over the last two years several shipments have been carried out (Czech Republic, Uzbekistan, etc.)

Now efforts will turn to spent fuel. The objective set is the return to Russia of around 15,000 fuel elements before 2010. It should be noted that most of these fuel elements to be returned are enriched in uranium 235 by more than 20%. The first spent fuel shipment organised in the framework of the RRRFR Programme concerns the Uzbekistan research reactor. This shipment will take two years to implement. This example shows how complex it is to organize a shipment which is to cross several countries.
There is one particular case, the Vincia research reactor in Serbia-Montenegro. It represents around 8000 small size fuel elements. The IAEA treats the return of these fuel elements to Russia separately from the other reactors eligible for the RRFR programme.

The existing Russian transport cask fleet (TUK 19) will not allow the objectives set to be reached on account of its low capacities (4 fuel elements) and even though, under the aegis of the IAEA, the manufacture of 10 casks of greater capacity has been launched, we feel it will be necessary to mobilize the existing world fleet of casks if we wantb to reach the return objective between now and 2010.

4. TN-MTR Cask and shipment

At the end of the 90s TN International developed a new cask, the TN™-MTR in accordance with the TSR-1 (IAEA 96) regulation, to replace the IU04 cask.
The IU04 cask fleet was managed by TN International (whose name at the time was TRANSNUCLEAIRE). It was often lent for the FRR programme and has been used in many countries, for example Denmark, Portugal, Italy, Venezuela, etc.
As IU04 no longer met the new international regulations, it was necessary to develop a new cask which did. With the TN™-MTR it is possible to transport up to 68 spent fuel elements. The TN™-MTR fleet numbers four.

The TN™-MTR is used to transport spent fuel to the La Hague plant in the framework of the reprocessing contracts of AREVA NC. The shipments are from French reactors (of the CEA, French Atomic Energy Commission, and ILL) as well as foreign ones (ANSTO and BR2).

In order to comply with the different needs and the different spent fuels geometries, TN International has designed several types of baskets allowing transporting up to 68 spent fuel elements: MTR68

(transport up to 68 spent fuel elements); MTR52 (transport up to 52 spent fuel elements); MTR-52S and MTR-44 (transport up to 44 spent fuel elements). A specific type of basket (called TN-MTR52S) has been developed to satisfy the requirements of the American authorities. This basket can transport up to 52 fuel elements and was used in 2001 in the framework of the last shipment from the Risoe reactor (Denmark) to the U.S. The TN™-MTR was accepted and used with no problem in the Savannah River installations.

For the American part of the transport we can rely on another company in the AREVA group, TRANSNUCLEAR Inc., and the close links between our companies ensure satisfactory cooperation in the shipments to the U.S.

The TN™-MTR is suitable for all types of loading/unloading under water (in the pool) or dry. For the CEA, TN International has developed a system by which the TN-MTR can be vertically connected to a hot cell.

The TN™-MTR is accredited for a large number of MTR and TRIGA fuels. Fuels of Russian origin (IRT, EK-36, EK-10, etc.) have been analysed and can easily be integrated into the TN™-MTR accreditation. The TN™-MTR accreditation was obtained in April 2002 for a period of 5 years. The extension for this accreditation will be submitted in mid 2006 to obtain a new five year accreditation.

We would like to point out that, working from information supplied by the IAEA and the Russian authorities, and with the collaboration of AREVA Moscow, unloading operations at Mayak have been studied. We may modify the MTR68 baskets to be ready, if necessary, to unload the loaded basket directly in the cell.

TN International makes available to small research reactors which cannot receive the TN-MTR, a transfer system for loading spent fuels. The system is composed of a radiological protection 2 metres high which is placed on the cask filled with water, and a transfer system allowing the fuel elements to be transferred in complete safety.
This transfer system has already been used with the IU04 (e.g. in Italy, Venezuela and France) and also with the TN-MTR (in France). It will be used a new time in France 2007.

TN International has several decades of experience in the international transport of spent fuels by road, rail and sea and can rely on the collaboration of companies in the AREVA group such as AREVA Moscow and TRANSNUCLEAR Inc. Consequently TN International can offer efficient, reliable and safe solutions for the FRR and RRRFR programmes.

5. The RERTR programme and fresh fuel shipment

Following the initiative of the NNSA, several reactors throughout the world are converting to LEU fuel in the framework of the RERTR Programme.

Via CERCA, a subsidiary of AREVA, which is world leader in the supply of fuel to research reactors, TN International participates in supplying some of the reactors converting to LEU.

TN International regularly (5 to 10 times a year) performs international shipments of fresh MTR and TRIGA fuel, leaving the CERCA plant, using all means of road, rail and sea transport, and taking account of French and foreign Physical Protection Requirements.

TN International's latest work projects performed in 2006 are as follows:

- Supplying of TRIGA fuel elements to the Pitesti Reactor of Romania;
- Supplying of RTR fuel elements to the Safari Reactor in South Africa;
- Supplying of TRIGA fuel elements to the TAMU Reactor in USA.

For most of these shipments, the cask used was the TNBGC-1, designed by TN International. It is known worldwide and has accreditation in France validated in the U.S., in Russia, and in different countries in Europe and the rest of the world.
Due to its small size and its not excessive weight, the TNBGC-1 is easy to handle and requires no special means. The TNBGC-1's accreditation covers a large number of MTR and TRIGA fuels and usually enables them to be transported by air.

6. Emerging Threats and Gap Material Programme

The objective of the Emerging Threats and Gap Material Programme is to address vulnerable, high-risk, nuclear and radiological materials that could be of terrorist concern throughout the world that are not currently being addressed under existing programmes.By creating an initiative that comprehensively addresses these materials, the Office of Global Threat Reduction will be able to quickly and more effectively respond to evolving threats requiring rapid removal of nuclear or radioactive materials worldwide.

Through AREVA's collaboration within NNSA, TN International can undertake the transport of different types of materials: uranium (HEU & LEU) and plutonium. It should also be noted that this programme could also concern spent fuels which are not covered by the FRR and RRRFR programmes.

TN International can also propose several types of casks which all satisfy TSR-1 IAEA 96:

- The TNBGC-1: this cask enables uranium (HEU & LEU) in all its forms to be transported by all means of road, rail, sea and air transport. The transport of powdered or metal plutonium is also authorized (except by air).
- The FS47: this cask allows the transport of plutonium.
- The TNUO2: this cask is accredited for the transport of metallic uranium (LEU & HEU).

TN International has long experience of the international road, sea and air transport of uranium and plutonium in conformity with the international safety and physical protection regulations.

7. Conclusion:

In the framework of the various GTRI programmes, we therefore expect an increase in the number of shipments, in particular with the start-up of RRRFR and the continuing FFR programme.

TN international can mobilize a fleet of efficient casks for the different phases of the fuel cycle of research reactors, which can be used in the transportation of different types of nuclear materials (uranium, plutonium, fresh and spent fuels).
We intend to maintain close links with the various parties involved (reactors, NNSA, IAEA, etc.), in order to assess the demand and analyse the capacity of our casks to satisfy it. In this endeavour TN International can rely on the collaboration of the different entities of the AREVA group and in particular AREVA Moscow, AREVA NC Inc; and TRANSNUCLEAR Inc.

TN International has long experience of international transport in all the various modes (road, rail, sea and air) and of all types of materials all over the world. TN International permanently updates its competences by reviewing regulatory and technological developments, by training its teams and developing its casks.