



WORLD NUCLEAR TRANSPORT INSTITUTE

Nuclear Transport – The Transport Dimension

presentation paper

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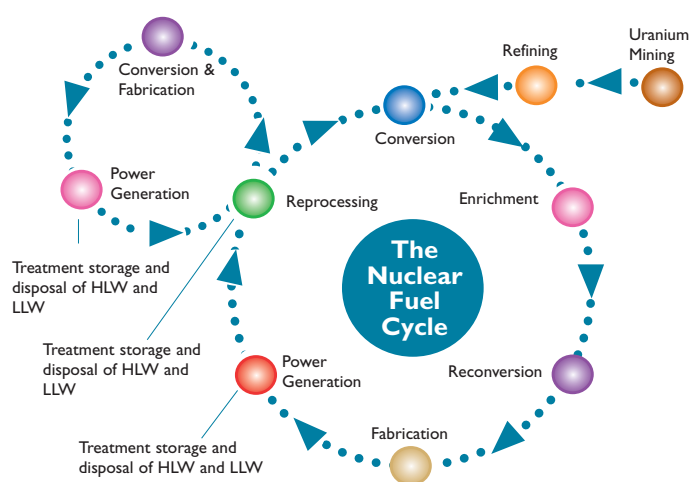


**Dedicated to the
safe, efficient
and reliable
transport of radioactive
materials**

Transport as part of the nuclear cycle

Most people are familiar with the graphics typically used to display the nuclear fuel cycle. You know the one; beginning with the uranium mine site, the arrows carry the eye around the circle from refinement, conversion, enrichment, reconversion and fabrication facilities to reactor site. And then, in the case of reprocessing, the cycle spins off on another round ultimately carrying spent fuel through the reprocessing cycle back once more to the reactor site. There are, of course, off-ramps to the cycle, carrying radioactive waste away for treatment, storage and disposal.

What is not so often depicted on these flow charts is what the arrows themselves actually represent. They represent, of course, the transport legs of the cycle. Transport is an intrinsic part of the cycle – knock the transport legs out from under the cycle, and the whole thing inevitably grinds to a halt. I recall, some years ago, an industrial action that threatened the movement of certain essential radioactive materials, for use outside the power generation sector, to the customer. The plant could produce the materials, but their transport to the customer had been put into question. It wasn't long before the consignees, the customers, were demanding interventions to ensure uninterrupted movement.



Is transport the weakest link?

There are some who would like for that very thing to happen in the nuclear power sector. Some people are opposed outright to the use of nuclear energy to produce electricity; there are others, perhaps in countries or regions that do themselves rely on nuclear power generation, who do not see themselves deriving direct benefit and so do not see why they should support the transport of fuel cycle materials past their shores or through their ports. Recently I heard of one case where a country supports an important radiopharmaceutical production facility within its borders but apparently the national airline will not transport its product. We've all seen the pictures from Germany last spring of protesters trying to impede the return by rail of German high-level waste from France.

The transport portions of the cycle are particularly vulnerable to such attention. Transport is a part of the business that takes place largely outside the perimeter fences of production facilities. Radioactive materials are carried out onto the highways, railways, waterways and airways of the world. No matter the outstanding safety record of such transports. It is at these points on the flow chart that the public at large, often uninformed and sometimes misinformed are made aware of the nuclear industry. And so, the transport legs of the cycle can be perceived by some as providing a particularly good focus for protest. The sad fact is that, sometimes, the transport protest may in fact be the Trojan Horse of opposition to the nuclear power industry.

Transport as an essential link

Let's be quite clear. The nuclear transport industry is not engaged in some discretionary service for its own sake. We're dealing with an essential service. The nuclear transport industry plays an absolutely vital part in realizing a fundamental objective of the International Atomic Energy Agency (IAEA). The first sentence of Article II of the IAEA founding Statute states the objective of accelerating and enlarging the contribution of atomic energy to peace, health and prosperity throughout the world. That's not the industry talking; that's the world community of nations, members of the International Atomic Energy Agency. And the contributions of atomic energy to peoples' well-being cannot be assured if radioactive materials cannot be safely, reliably and yes, cost-effectively, transported to where they are needed. By the way, the next Article of the IAEA Statute, Article III, authorises the Agency, and I quote "To encourage and assist research on, and development and practical application of, atomic energy for peaceful uses throughout the world". And further, Article III goes on, the Agency is authorised "To make provision, in accordance with this Statute, for materials, services, equipment, and facilities to meet the needs of research on, and development and practical application of, atomic energy for peaceful purposes, including the production of electric power, with due consideration for the needs of the under-developed areas of the world".

And these articles were promulgated 45 years ago next month – long before the world took up the global challenge to reduce CO₂ emissions which threaten the entire planet, whether it be a developed or developing country. So all countries and peoples derive benefit from technologies, including nuclear power technology, that contribute to the reduction of CO₂ emissions. The beneficiaries of nuclear power do not only live in those countries that produce nuclear power. Once again, if nuclear power is to play its part in meeting the energy needs, and the clean air needs of people everywhere, it must be able to transport its materials to where they are needed.

Transport as a safe link

Alright, some say, we accept that nuclear transport has a vital role to play, but the balance of benefit must factor in safety for the consequences of failure in safety could outweigh the benefits. The exponents of this argument are handicapped somewhat however by the paucity of transport incidents to support the case; they tend to turn to dramatic historic safety failures in other sectors of the nuclear industry, notably reactor incidents, to support their case. Of course they are right to the extent that it is absolutely essential that radioactive materials are dangerous goods and must be handled and transported safely.

And they are. Transporters of radioactive materials have an outstanding safety record. Indeed, the transport of radioactive materials could be regarded as a model for the transport of other classes of dangerous goods. The industry has a long track record over several decades. It is noteworthy that where there have been transport incidents involving radioactive materials, and these have been few relative to the number of such transports, they have been without major radiological consequence for health and the environment. The incidents there have been, have largely been transport events involving radioactive materials, not radiological events involving transport. There is good evidence that packages conforming to the International Atomic Energy Agency standards offer sufficient protection under accident conditions. That is not the conclusion only of those in the industry; that is the conclusion of the international community of nations, members of the IAEA. The IAEA General Conference in 1998 recognised that, and I quote "Compliance with regulations which take account of the Agency's Transport Regulations is providing a high level of safety during the transport of radioactive materials" (Resolution GC (42)/RES/13).

There are two principal reasons for this outstanding safety record. It is due primarily to well-founded regulations developed by such key intergovernmental organisations as the International Atomic Energy Agency with the essential contributions of the Member States who participate actively in the regulation implementation and revision processes, and their reflection in the international transport safety regime of modal, regional and national regulations. It is due also to the professionalism of those in the industry. And there is a necessary synergy between the two, between the regulators whose task it is to make and to enforce the rules for safe, reliable and efficient transport, and those whose job it is to transport within the rules. Both, I suggest, the regulator and the transporter, can be more effective in achieving their purposes when they co-operate in the interest of mutual understanding.

The current context for transport

Practical, efficient, safe transport regulation should take account of its impact on those who do the transporting. The context today in which radioactive materials are transported is complex, it is challenging, and it takes place in a rapidly changing environment. Deregulation in the electric power industry is driving costs down while transport costs are being driven up. The demands to transport radioactive materials are increasing while consignors are having difficulties in some cases in securing carriers. We are witnessing consolidation among buyers and sellers, supplies opening up from non-traditional sources, and the decommissioning and clean-up of facilities. The buyers of radioactive materials more often are addressing transport requirements in detailed contractual terms; more clearly spelling out the respective responsibilities of buyer and seller with regard to packaging, physical transport and regulatory compliance. In many respects, transport now is being viewed as an integral market issue and not a subsidiary concern. The availability of carriers drives routing decisions, and changes in material flows necessitate new approaches to packaging and transportation scenarios. Non-dedicated carriers are concerned by the implications of regulations; for example, could the new regulatory requirements for radiation protection programmes be seen by some carriers as pushing up costs, and adding to operational and administrative procedures past the point of it continuing to be worthwhile to carry radioactive materials? And so, pressures on the transport sector are not without potential serious consequences. They can cause delays and in some cases cancellations of planned movements. Complex routings and the necessary use of chartered carriers can push up the costs and work against cost efficiency.

It has been said that the future of nuclear power depends heavily on continued public confidence in its safe and peaceful use, and on its economic competitiveness in the energy market place. Safe, efficient and reliable transport are essential to both – to public confidence and to economic competitiveness. Economic competitiveness relies to an important extent on the optimal use of existing facilities, packagings, and efficient transport.

The international regulatory regime for transport

No form of transport is subject to a stricter regulatory regime to ensure safety and security. The international standards developed at the IAEA are reflected in the standards and regulations of the modal bodies such as the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO), regional regimes such as the ADR, RID and ADN for road, rail and inland waterways in Europe, and the regulatory regimes of IAEA Member States themselves. Taken together they form the rigorous international regulatory regime for the safe transport of radioactive materials.

Industry has co-operated in the full implementation of this regime. There is a clear determination on the part of industry and the key international organisations to dialogue. Organisations such as the International Atomic Energy Agency, and the International Maritime Organization make provision for non-governmental organisations which meet certain criteria to have a presence and, in some cases, to participate in their deliberations. This is an opportunity not normally available to any one company in this direct way.

WNTI as transport's eyes, ears and collective voice

A few years ago, some companies that attach importance to continued safe, efficient and reliable transport of radioactive materials, and whose operations are influenced significantly by national and international standards and regulations, began a discussion of how better to represent the collective interests of the industry. From those discussions grew the World Nuclear Transport Institute in 1998. Based in London, with regional offices in Washington and Tokyo, the Institute, or WNTI as it is known, has in a relatively short time grown to 35 members worldwide. The membership represents several sectors of the nuclear industry and utilities. Discussions with several other companies currently are underway. The Institute's ability to represent the collective interests of its members is enhanced by the global span of its membership and the diversity of transport concerns it represents. The World Nuclear Transport Institute offers a forum for members to share information, ideas and concerns, and it acts as a catalyst to stimulate development of consolidated industry positions on transport matters. In short, the World Nuclear Transport Institute provides the nuclear transport industry, and those who rely on it, with the collective eyes, ears and voice in the key intergovernmental organisations which are so important to it.

It is industry's preparedness to surmount competitive interests in the common interest of ensuring safe, efficient and reliable transport, and its capacity to collaborate in the development of consolidated positions so that it presents a united front on the issues that makes industry's voice more compelling. For the first time, industry has a dedicated channel through the WNTI in which to work together to develop consolidated, well-researched and professionally presented industry positions, and to have those positions represented in important bodies such as the International Atomic Energy Agency.

The World Nuclear Transport Institute has consultative status with the International Maritime Organization (IMO), and with the United Nations Committee of Experts on The Transport of Dangerous Goods. We are a liaison member of the relevant committee of the International Organization for Standardization (ISO). And the World Nuclear Transport Institute has observer status with the International Atomic Energy Agency (IAEA). Last year the IAEA Director General, Dr. ElBaradei invited WNTI to attend meetings of the Transport Safety Standards Committee (TRANSSC), the premier IAEA body charged with considering implementation and revision of the IAEA Transport Safety Regulations. Through the WNTI participation in this committee and the related cycle of IAEA meetings industry collectively now has the opportunity to register its views on implementation of the IAEA transport safety regulations, which as I noted earlier, forms a basis for international, regional and domestic regulation, to identify any problems arising from existing regulations, and to propose changes to them.

The transport safety rules of the road

The IAEA Transport Safety Regulations are based on the philosophy that radioactive materials being transported should be packaged adequately to provide protection against the hazards of the material under all conditions of transport, including foreseeable accidents. Therefore, it is considered, as far as possible, that:

- safety is vested in the design of the package. This, combined with simple operational controls, ensures safety;
- the consignor bears most responsibility for ensuring the safety of the transport, because it is he who prepares the package for transport;
- packages of radioactive materials should be dealt with in the same way as other dangerous goods.

The current version of the IAEA Transport Safety Regulations – known as TS-R-1, or ST-1 for short – being implemented this year, introduces several significant changes to which industry is having to accommodate itself. For example, ST-1 imposes new requirements for the transport of uranium hexafluoride. It introduces a new Type C package specification for the transport of high-activity radioactive material by air. It requires carriers to have a radiation protection programme in place, the nature and extent of which to be related to the magnitude and likelihood of radiation exposure.

Regulatory changes can and do have an important impact on packaging, on operations and on the commercial climate. Industry is committed to meeting the requirements of the international regulatory regime, but compliance is made more complicated when some of the rules under which industry must operate need further explanation, or when regulatory agencies interpret the regulations differently.

The bottom line of regulation is safety and security. But as much by the provisions of the regulations themselves, safety and security are assured also to the extent that there is clarity within the regulations, to the extent that there is consistency and uniformity in their interpretation and application around the world, and to the extent that they provide for efficient operation. This is not always the case. For example, different time schedules for introduction of changes to modal and national regulations, and different transition periods from one set of regulations to another, can cause confusion, introduce further complexity, and delay transports. For example, ST-1 was in force effective January 1, 2001 as far as the IAEA is concerned. For the International Maritime Organization, ST-1 is incorporated in its latest amended International Maritime Dangerous Goods Code, but IMO Member States can choose between the old and new version of the Code until January 1, 2002. The International Civil Aviation Organization has given its members until July 1 of this year to implement relevant ST-1 provisions. The European regimes for road, rail and inland waterway transport have allowed a 12 month transitional period until January 1, 2002. Not all countries will have adjusted their national regulations to implement ST-1 provisions by then however. So today, in Europe for example, one can move materials to an airport under pre-ST-1 provisions, but once they are moved by air, ST-1 provisions apply. If they are flown to a country which has not yet implemented ST-1 provisions in national regulations, then the pre-existing rules apply. So what labels are attached, for example; the ones that satisfy the old provisions, or the new ones? Is this lack of uniformity conducive to clarity, or to simplicity?

The importance of harmonised rules of the road

The international organisations recognised that unharmonised implementation of new regulations was not conducive to the intent of the regulations, and so they worked hard to bring their implementation dates into line. The co-operative efforts they took to rectify the situation were welcomed by the transport industry. And indeed, industry would like to see these efforts extended still further, to take us further toward uniform implementation, and yes, uniform interpretation also, between countries and regions worldwide, so that we have a truly international, and harmonised, transport safety regulatory regime that best serves safety, efficiency and reliability.

It took ten years to produce the ST-1 set of regulations. The IAEA has allowed two years to produce a revision of ST-1. The move from a ten-year to a two-year revision cycle has potentially significant consequences for the safe, efficient and reliable transport of radioactive materials. It is not at all clear that national regulations worldwide will be able to keep up with this pace of change. Nobody benefits from a smorgasbord of regulations of varying vintage. Does change every two years allow sufficient time to agree interpretations of the new regulations, nationally and internationally? Does it allow sufficient time for public consultations and for the necessary legislative or other regulatory procedures before incorporation into national regulation? Does two years allow adequate time for industry to make necessary modifications where required by new regulation, to train its staff in new requirements, and, where necessary, to modify operational procedures?

Let's take one practical example. The transport of radioactive materials relies on the accessibility of approved packages, and the IAEA Member States have recognised the need to authorise existing package designs over a reasonable period of time. In practice, however, differing approval processes and differing interpretations of regulatory provisions can impact on the availability of suitable packagings for multi-national shipments. The development of a viable system in which packagings that are properly maintained, and continue to meet their original design intent may safely continue in use to the end of their useful design lives is essential to the continued flow of radioactive materials in an increasingly international marketplace. Consistent with development of transitional arrangements that are practical in a two-year revision cycle, evaluation of existing design reviews and validation processes by industry and by national competent authorities may be helpful to determine how increased efficiencies can be introduced into the current system.

And so the process of regulation revision carries on. The current two-year revision cycle now is well advanced, and already, even as it unfolds, the IAEA and the industry are gearing up for the next round, even before the current round will have worked its way fully through the system. At least the engagement by industry in the implementation and revision processes, through the World Nuclear Transport Institute, provides a major opportunity for industry to advance its positions, and to have its interests and concerns taken into account. And the impact of the industry case is made stronger to the extent that it is expressed as a consolidated industry position, developed and advanced collectively by industry. In our experience those responsible for developing regulations welcome the fact that industry clearly is collaborating, through the WNTI, to develop consolidated positions. And the fact that industry can and is doing so, makes the industry view clearer and more compelling. The collective industry approach also sends a powerful message that industry together takes its responsibilities for safe transport seriously.

Communicating nuclear transport safety

The nuclear transport industry, and those charged with regulating transport, inevitably operate within a wider political context in which public attitudes are so important. It is not sufficient that the nuclear transport industry is conducted safely, and that it knows that it is so conducted – it is necessary that that message be conveyed to far wider, often very diffuse audiences. We will have little difficulty agreeing among ourselves on the fundamentals within this room. It is not always so easy, but certainly more important, outside these walls. I was stopped on the street in London one day by a young woman carrying a clipboard. She asked if she could put a few questions to me. First, she asked, “Was I in favour of clean air?” “Yes”, I answered, “unreservedly”. Next she asked if I was, “For sustainable resources?”. Again, “Yes”, I replied. Third question, “Was I against nuclear?”, I was taken up short. “You’ve introduced a negative,” I said, “can you tell me more about this anti-nuclear thing?” “Well,” she replied, “I’ll tell you the truth, I don’t really know much about nuclear, but I can assure you that the group I represent is anti-nuclear, and that for one pound a week, or four pounds a month you too could be a member”.

I applaud that young woman for her activism. I applaud her for her idealism. I applaud her for her obvious concern for the environment. I do take exception however at her advocacy of positions about which, by her own acknowledgement, she really is uninformed. But that is me talking. I could not expect to sway her by a blizzard of facts. Public attitudes are made up of much more than facts, they are a complicated mix of beliefs and feelings as well as facts. And attitudes can be

highly resistant to change, even when confronted by compelling new or different evidence. The smallest event involving the transport of nuclear materials, no matter the lack of any real or potential radiological consequences, has the potential to play to latent anxieties. And so the industry’s messages must respond not so much to its own way of processing information, as to the means of information processing by those outside the industry.

Summary

In summary, there is a widespread recognition today that maintaining transport options requires open and sustained dialogue between regulator and licensee, and close collaboration among all parties in the industry. This type of industry co-operation and collaboration, that now is possible through participation in the World Nuclear Transport Institute, transcends the competitive pressures between individual companies in their common interest.

Our members recognise that they must educate themselves and their partners in the industry. At the same time, industry must take the opportunities afforded to it to inform the regulators, and others, of the context in which industry operates and, to be engaged in the regulation implementation and revision process. The voice of industry, we believe, is made stronger through the elaboration and presentation of collective positions, made possible through participation in the work of the World Nuclear Transport Institute.

The logo for the World Nuclear Transport Institute (WNTI) consists of the letters "WNTI" in a white, serif font, centered within a dark blue rectangular box. A thin white curved line is positioned below the text, suggesting a horizon or a stylized wave.

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