Communications Issues for International Radioactive Materials Transport, post 9/11

A A Brown (1); M. Hartenstein (2); M Nawano (3)

(1) International Transport, BNFL, Risley, Warrington, Cheshire WA3 6AS, UK
(2) Transport External Affairs; Marketing, Sales and Projects Division;
Cogema Logistics, BP 302 Montigny le Bretonneux,
F 78054 - Saint Quentin en Yvelines Cedex, France
(3) Transport Headquarters, Overseas Reprocessing Committee,
11F Hibiya-Daibiru Building, 2-2, Uchisaiwai-Cho 1-Chome, Chiyoda-Ku,
Tokyo 100-0011, Japan

Introduction

The terrorist attacks of September 11th 2001 in New York and Washington (9/11) have increased government, public and media concern over terrorist attacks in general and attack on transport systems in particular. Anti-nuclear groups have increasingly made unsubstantiated claims about the terrorist threat to Radioactive Materials Transport and the consequences of such a threat being realised. At the same time, the international and national security regulations relating to Nuclear Materials Transport have been reviewed and tightened since 9/11. These changes have in some cases restricted the information that can be made publicly available.

It is against this background that the Industry must operate and seek to inform the public through its communications activities whilst remaining within the new security framework of security regulations. These activities must necessarily provide sufficient information to counter the incorrect claims made by opponents, allay fears of the public as far as possible and provide factual and scientifically rigorous data without compromising security.

Background

Nuclear materials have been safely and securely transported around the world for over 40 years. In 1961, the international community through the United Nations body the International Atomic Energy Agency (IAEA) established a set of standards which has lead to this impressive record of safety. These standards have been reviewed and revised over the intervening period to reflect advances in technology to ensure that the safety record is maintained. The most recent update in Regulations for the Safe Transport of Radioactive Material [1] took place in 2000 together with the introduction of a two-year review cycle.

The fundamental philosophy of the safety system is that the safety is ensured by the package. For the transport of significant quantities of radioactive materials, this has resulted in the development of extremely robust packages (type B) able to withstand severe accident scenarios. This robust package design also provides significant protection against terrorist attack. This approach is not without its public perception problems, however, as it contrasts with the experiences of the general public [2]. Protection of people and cargoes in planes, trains and ships is provided by the transport vehicle and all too often the failure of this approach is seen in the aftermath of accidents. The overwhelming success of the IAEA regulations in ensuring the safety of radioactive materials means that unlike oil tanker spills which are so graphically presented in TV news bulletins, there is, thankfully, no equivalent nuclear transport accident to use as a yardstick to measure comparative risk.

In a similar manner, the need to ensure the security of nuclear materials has also been recognised by the international community with the IAEA publishing its first “Recommendations for the Physical Protection of Nuclear Materials” in 1972. This has also been updated over the years with the last update taking place in 1998 including a title change to “The Physical Protection of Nuclear Materials and Nuclear Facilities” [3]. In addition, the Convention on the Physical Protection of Nuclear Material [4] was opened for signature by member states on 3 March 1980.

Against this background, over 4000 casks including those containing spent fuel, vitrified high level waste and MOX have been safely and securely transported between Japan and Europe by Pacific Nuclear Transport

Limited (PNTL), owned by BNFL, Cogema and the Japanese Utilities. It has an exemplary safety record, having covered over 5 million miles without a single incident resulting in the release of radioactivity. In addition, within Europe and Japan there are hundreds of transports of spent fuel every year which have all been carried out safely and securely in line with the IAEA regulations.

Safety and Security

Many of the measures taken to assure the safety of radioactive cargoes in type B packages also go a considerable way to providing security. Typical type B casks used to transport spent fuel, high level waste (HLW) and Mixed Oxide Fuel (MOX) are heavy (around 100Te) and would not be easy for a terrorist organisation to steal. In addition the robust design of the casks to meet the strict IAEA test criteria also give a degree of protection against direct attack.

From a safety point of view, there are multiple barriers protecting the environment from the radioactive materials. The materials themselves are in an insoluble form (ceramic fuel pellets or vitrified HLW). For example taking the incredible scenario where the HLW glass becomes directly exposed to the sea, the results of an environmental impact assessment performed for the Japanese Science and Technology Agency [5] show that the effect would be negligible. The exposure rate to the most affected person would be less than one thousandth of the naturally occurring radioactivity they receive annually.

The materials are of course protected from this scenario by multiple barriers. Taking the example of MOX fuel, the ceramic fuel pellets are sealed in fuel pins designed to withstand the extremes of a reactor core. These in turn are held securely within a type B package, either a heavy sea transport cask or a lighter package contained within a security vehicle. The IAEA regulations are such that the package itself gives sufficient safety protection in the event of an accident, however for sea transport, the packages are loaded on vessels which comply with the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF code).

The PNTL vessels used for transport between Europe and Japan have a range of safety features far in excess of those found on conventional cargo vessels: double hulls to withstand collision damage; enhanced buoyancy to prevent the ship sinking even in extreme circumstances; dual navigation, communication and cargo cooling systems; and additional fire fighting equipment. Similar ships are operated to safely transport nuclear material within Europe and between ports in Japan.

Considering security, there are again multiple systems to protect the material. These consist of the physical protection offered by heavy casks and high security vehicles, the escort teams (who may be armed) depending on the category of nuclear material, and equally important, the protection offered by intelligence, information security and route selection.

For relatively short transport operations through northern Europe or around the coast of Japan, route considerations are perhaps less important than for the longer voyages between Europe and Japan. The principles remain similar however. Transport routes are chosen to avoid areas of known terrorist activity or piracy, areas of civil unrest and remain out of coastal waters as far as practicable. Route and timing decisions are also influenced by intelligence gathering activities.

Protest, Pressure Groups and their Tactics

For the first 20 years of spent fuel transport between Japan and Europe and across other regions, there was no incident or protest, despite the fact that the transports were a matter of public record. Since the 1960's however, there has been a growing trend of pressures groups covering almost every conceivable issue. At the beginning, their activities mainly targeted nuclear facilities. Then, in order to propagate their ideology further, a new horizon of business, far from the nuclear sites, became part of their strategy and they began to target the transportation of radioactive materials and the associated "en route" states.

Many of these groups are campaigning bodies which recruit members who support their goals and energetically lobby local and international political institutions. They could even be considered to be true multinationals operating both locally and internationally with annual budgets of hundreds of millions of Euros.

Pressure groups have a close dependency on the media. They provide stories and controversy while the media coverage provides exposure for the pressure group, enhancing their fund raising abilities. Activists are usually presented by the media as experts, even those who may not have appropriate academic or professional expertise. This is easy for them to do when there is no nuclear expert in local villages and countries en-route. Often they are seen as an essential part of the democratic process, holding business interests to account, however often there is little or no accountability to their memberships or supporters.

In the past, when we have visited coastal states to provide information about our shipments, we have encountered a series of common fears about the safety of the transport activities: that the material is in liquid form encased in glass containers; that the ships present the only barrier preventing a release to the environment and that the shipments present a far higher hazard to the environment than oil, gas and a wide range of other hazardous cargoes. Since 9/11, this list has been added to by fears over terrorist attack.

A typical tactic for opponents of our transports is to present what appears to be an independent academic paper which raises apparent technical doubts over the safety or legitimacy of a shipment. This was the case prior to the first two shipments of HLW to Japan when two purportedly authoritative papers were released to the media and political groups in en-route states [6], [7]. These were taken at face value despite not being peer reviewed and despite the fact that the author was neither a nuclear engineer nor an expert in risk. The approach of these papers is to promote worst case scenarios as a means of indicating the hazard of an activity. It is clearly unreasonable when evaluating the risks of any activity to assume that all safety measures simultaneously fail through a series of unconnected occurrences without taking into account how plausible or implausible this may be. These papers are still being cited by pressure groups today, including using them to highlight the risks from terrorist attack. Indeed the same author now presents himself as an expert on nuclear security. Since 9/11, the rationale for this approach has become that it could all happen in a terrorist attack. This is despite the paper having been reviewed by the IAEA from a safety perspective and found to be “fundamentally flawed and can be easily misleading” [8]. Furthermore, the IAEA has completed a co-ordinated research project on “Severity, probability and risk of accidents during maritime transport of radioactive material” [9] and concluded that “the risks of transporting RAM (radioactive material), for example irradiated fuel and VHLW (vitrified HLW), in type B packages are very small”. It should be noted that when this review paper was introduced into the International Maritime Organization’s meeting a Pacific Island country’s representative who was promoting the ‘concern’ of en-route countries said ‘I am not a nuclear expert, so I don’t know whether this review is correct or not.’

A similar tactic has been used to over state the risk from terrorist attack on land transports of Plutonium powder in high security vehicles [10].

For example, Plutonium dioxide road transports have been carried out in France for more than fifteen years, on a regular basis, by COGEMA LOGISTICS between the reprocessing and recycling plants. Opponents make profitable use of the confidentiality of the security measures (no details are given on features and dispositions to prevent hi-jacking, diversion or access to the material) to spread misinformation and allegations against the extremely robust systems put in place by the French Security Authorities. In this area, they only refer to the visible part of the security “iceberg”, and take care not to mention the “submerged and invisible but most significant part of this security iceberg”.

Industry Response

Although they may have been generated by false messages, the concerns of the media and politicians are genuine and need to be addressed by industry. They are however rational people who wish to be reassured, either by cessation of the activities which they perceive to be too dangerous to be allowed to continue or by being persuaded that the shipments are responsible, justified and of very low risk. It is only by challenging the misinformation and presenting the facts that we can influence the perceptions of the media and politicians and reduce their concerns.

Industry has addressed this through taking the time to visit en-route countries and inviting key politicians and media personnel to visit and see for themselves the safety and security precautions which are taken. From a safety point of view this is a relatively straight forward task. Presentations can be made, people can be shown round ships and nuclear facilities to see for themselves the size and strength of the casks or the distance between the inner and outer hull of the ship. When it comes to security matters however, this communication process is much more difficult.

Firstly it is not easy to second guess a terrorist intent. At some levels this can be done – their aims are to create panic, confusion and economic damage in addition to the immediate deaths and destruction of their attacks. For this to be effective, they also need media exposure. For example compare the likely impact of a cruise ship attacked in the Mediterranean Sea or an INF vessel carrying HLW attacked in the Pacific. In the former case, there would be immediate concern over the attack and loss of life coupled with an ongoing effect on the tourist trade and the economy. In the latter, although there would be immediate concern over the loss of life and worries over pollution, as time goes on and it is shown that there is little or no radioactive release, this concern could be expected to quickly fade. The publicity and consequences of an attack on a cruise ship would therefore be much greater than an attack on an INF vessel, making it a more likely target.

Secondly numerous attack scenarios can be postulated. These could range from hi-jacking a transport vehicle (lorry or ship) to try to obtain nuclear material, through trying to create a "dirty bomb" to just sinking the ship or even minor acts of piracy not specifically connected to the cargo. What can be said however is that the packages are robust and would not easily be ruptured by direct attack or by fire, the ships are designed to be strong and have extra buoyancy which would reduce the chance of sinking and in the case of category 1 material (Plutonium or MOX) which could conceivably be targeted for its nuclear material there are additional armed protections in place.

Thirdly the information which can be released is often constrained by security concerns. In the same way as a bank would not be expected to divulge the detailed security plans for its vaults but is expected to provide a secure place for money and valuables, so the security precautions and features applying to radioactive material transport can not be divulged in detail. This is not just a matter of common sense, but in many cases is demanded by legislation.

In the face of this, industry must continue to give reassurance, provide as much information as can be released and put the risk in perspective. Although the threat of a terrorist attack on a radioactive materials transport operation must be taken seriously, there are a large number of softer targets available. As transporters, we need to work with the security regulators and security services to protect the transports and also continue to publicly demonstrate as far as possible that security of transports is tight.

The Regulatory Framework

In the UK, there are two recent pieces of legislation which restrict the amount and detail of information which can be released on security grounds. Firstly there is the Anti Terrorism, Crime and Security Act 2001 section 79 (1) [11] which specifically creates an offence of disclosing information which might prejudice the security of any nuclear site or of any nuclear material … or being reckless as to whether that disclosure may prejudice that security. Secondly the Nuclear Industry Security Regulations 2003 [12] require all transporters to be approved, to have approved Transport Security Statements and approved security plans for transport operations.

The main restrictions placed on operators by these regulations are to prevent the divulging of information pertaining to: quantities of materials, detailed routes, detailed timings and physical protection measures taken to protect the material. As an example, the PNTL vessels Pacific Teal and Pacific Pintail which are used to transport MOX fuel between Europe and Japan are equipped with naval canon and other protective systems. As the canons can clearly be viewed, their existence can be acknowledged. Details of the operational procedures, other weapons, security systems and communication systems however are not in the public domain and can not be divulged. From a communications point of view this is restrictive, however general statements of reassurance that these systems exist can be made as well as reference to the fact that the vessels and transport systems are approved by the relevant Government security regulators in the consignee, consignor and transporter's flag state.

The UK regulator, the Office of Nuclear Security (OCNS), publish an annual report on the state of security in the civil nuclear industry, including transport [13]. This confirmed that there were no security incidents related to transports to or within the UK in 2003 and that "security arrangements applied within the nuclear companies and bodies regulated by OCNS are comprehensive, well-managed and effective".

In France, in January 2004, the Senior Defense Official at the Ministry of Economy, Finances, and Industry issued an order/bylaw which aims to restrict or prohibit the disclosure of technical, operational and logistical details related to the transport of the following nuclear materials : Plutonium, Uranium, Thorium, Deuterium,

Tritium and Lithium 6. The order also applies to measures and information related to security, physical protection and control applied during transport operations, when their disclosure could compromise, prejudice, harm or damage the physical protection of these materials against agressive intents and proliferation.

In Japan, there are specific laws in each area such as the Hijack preventive law, but no comprehensive law on Anti Terrorism. However, implementation of those specific laws has been strengthened in the wake of 9/11. For example, in the area of the nuclear energy industry, the National Police Agency organizes special patrol teams in order to strengthen the protection of nuclear facilities. For the nuclear power plant etc. on the sea approaches, the JCG (Japan Coast Guard) have also strengthened their protection in cooperation with the Police Agency. As a legally strengthened measure for maritime transport, a new national law, called "the Law on Ensuring International Ships and Port Facility Security", based on the International Ships and Port Facilities Security Code (ISPS), which is mandatory under the Safety of Life at Sea (SOLAS) Convention, was issued on 14 April 2004, and brought into full force on 1 July 2004 (partly, on 23 April).

In addition, the International Maritime Dangerous Goods (IMDG) Code and INF Code became mandatory under the revised SOLAS convention although these codes have been implemented in Japan since a few decades ago. The relevant Japanese laws and regulations for Safety of Vessels were slightly revised to fit the international requirements such as certification and control in port. Indeed, it is emphasized that the INF code was originally developed with reference to the Japanese regulations.

The national safety regulations relating to the transport of radioactive material in each country are prepared in line with the international regulations. In addition, the IAEA provide a Transport Safety Appraisal Service (TranSAS), to evaluate the implementation of the safety regulations for the member countries. Up to now, TranSAS has been accepted by 6 countries, including the UK (two years ago) and France (this year). In addition, an official letter has been sent to the IAEA Director-General in from the Secretary-General of the Japanese Nuclear Safety Commission to request a TranSAS evaluation of the Japanese regulatory system. All modes of transport (land, sea and air) of radioactive material will be evaluated. It is fully expected that the TranSAS evaluation will confirm the very safe arrangements for transport of radioactive material in Japan as has already been the case for the UK and France.

Conclusions

The key driver for most pressure groups who oppose radioactive materials transport is to stop the nuclear industry by targeting a key aspect of the nuclear fuel cycle – Transport. In doing so, they are able to promote misleading information on both safety and security matters. After all they are not truly accountable for the claims they make whilst the industry needs to be able to justify and demonstrate its position. In addition the security regulations can sometimes make it difficult to answer the challenges on security matters.

It is frustrating that the genuine concerns on matters of safety and security felt in some areas are fuelled by misinformation in this way; nevertheless our core messages remain very simple:

- Transportation of nuclear materials is governed by international regulations which provide strict requirements for both safety and security and we comply with or exceed all of them

- These are routine shipments, and over more than 35 years and more than 5 million miles travelled by sea alone there has not been a single incident involving the release of radiation

- No one cares more about the safety and security of our business and the environment than we do – unless we ensure it, we have no business.

It is important for the industry to maintain an open dialogue with interested stakeholders to put the risks from our operations in their proper perspective. Properly founded scientific argument can be deployed to counter the claims on safety. While the regulations on security can constrain the messages, the very fact that those regulations exist and that transports are approved by security regulators is a positive reassurance on security. We must continue to present the facts on all these matters to those politicians, officials and journalists who are interested in the shipments. In addition we need to listen to the feedback from those people when engaging in dialogue and continue to address their concerns whether they are based on safety, security or public perception.

However, in certain Coastal States, domestic political interests extend beyond the Industry's remit for information provision. For example, seeking to prohibit the maritime transit of nuclear material through their territorial waters or even their Exclusive Economic Zone does not rely on any regulatory framework, or rational technical or environmental argument. Indeed it is based only on short-term political interest. In this context, our willingness to share information faces difficult challenges.

Nevertheless it is in industry's best interest to ensure there is an ongoing rational discussion about the shipments where scientific facts are considered and risk is put in perspective. Only in this way can the scare tactics of our opponents be countered.

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