

THE RETURN OF VITRIFIED RESIDUES TO JAPAN: A JOINT EXPERIENCE

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This is the first time for more than ten years that PATRAM has accepted papers on the communications or public relations aspects of the transportation of nuclear materials. This is perhaps a recognition of just how important it is today not only to carry out the transportation safely, but to be perceived to be doing so. This paper considers how negative perceptions have arisen in many states about the transportation by sea of vitrified residues from Europe to Japan and how these perceptions have been challenged by the application of a communications strategy jointly undertaken by the Overseas Reprocessing Committee (ORC) of Japan, BNFL of the UK and Cogema of France.

A Successful International Safety Philosophy...

To begin, it is worth reminding ourselves that nuclear materials have been safely transported around a changing world for forty years. It was in 1961 that the international community, through its United Nations body, the International Atomic Energy Agency (IAEA), established a philosophy and a set of standards which would lead to such an impressive record of safety.

This philosophy was rational, but technically demanding, for it required safety to be ensured by the package holding the nuclear material whatever mode of transport was used. In contrast to the transport of other hazardous cargoes, the protection offered by the ship, plane, rail wagon or truck carrying the package would not be considered as a safety measure - as part of the 'safety case'. For some other hazardous cargoes the mode of transport is the only or primary safety measure.

In a world where accidents can happen the IAEA philosophy has worked extremely well, ensuring that all nuclear materials have been transported to extremely high safety standards, whether in Japan, Europe or elsewhere throughout the world. And as technology has advanced, so the standards have been reviewed and revised - six times - to ensure that this continues to be the case.

...Can Be Badly Perceived

The safety of nuclear materials transport under this philosophy has been less successful when measured against public perceptions. Whilst being entirely rational, it contrasts with the logical expectations of the general public based on their own experiences. People who in their everyday lives transport themselves by road, air and sea are protected only by the car, plane or ship in which they are traveling. They are not pre-packaged. They know that these structures do not provide ultimate protection in various accident situations and naturally apply this knowledge when evaluating other types of situation, such as industrial practices.

They also know from newspaper reports and TV news bulletins that oil tankers, for example, often seriously pollute the environment if they are involved in an accident. It is natural - although incorrect - for people to assume, therefore, that the same is true for other shipments, including nuclear cargoes. And since the IAEA standards have worked so well, there is no 'reality-check' they can use to judge the appropriateness of the standards - no experience of a nuclear *Torrey Canyon* which they can use as a yardstick.

Within this overall picture, over 4,000 casks of spent fuel have been safely transported between Japan and Europe since 1969 in over 150 shipments and many more shipments have taken place between other locations. Pacific Nuclear Transport Limited (PNTL), owned by BNFL, Cogema and the Japanese utilities, is the most experienced shipping company in the world for the sea transport of radioactive nuclear materials with a proven ability over more than 20 years. It has a safety record second to none, having covered more than 4.5 million miles without a single incident resulting in the release of radioactivity.

Against this unblemished background and the record of the international community's underlying safety philosophy, one might wonder why there should have been any protest about shipments of vitrified residues to Japan when they began in 1995.

Safety Measures for Shipments of Vitrified Residue

It is worth remembering what the safety measures amount to. The PNTL ships 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 from sinking even in extreme circumstances; dual navigation, communications, cargo monitoring and cooling systems; satellite navigation and tracking; twin engines and propellers; and additional fire fighting equipment, including a hold flooding system. Ships of a similar design safely transport the same type of material within Europe and between ports in Japan.

To look at this another way, these added safety features increase the cost per ship to some \$40 million each, whereas a standard cargo ship of the same size would cost about \$15-20 million and a second hand cargo ship twenty times as big could be purchased for as little as \$10 million. We have invested in safety, preceding the INF3 shipping code of the UN's International Maritime Organization (IMO) by fourteen years.

The ships currently in use were built in the 1980's and have regular maintenance inspections and equipment checks. They have a fully trained and experienced British crew and, whilst at sea, maintain a permanent communications link with a report center which is manned 24

hours a day. The ships meet the highest safety rating of the IMO, which means that they are amongst the safest ships on the seas. They also comply with all relevant national and international regulations. And PNTL recently became the first British shipper to gain approval from Lloyds Register Quality Assurance to the international environmental standard ISO 14001.

Casks similar to those used for residue shipments have been safely transported in the UK, France and Japan and many other countries throughout this time. The casks are specially designed for the particular radioactive material they carry, give protection to workers and the public against radiation and are designed to withstand the most serious accidents. They are massive steel structures made from 10-inch thick forged steel and weigh around 100 tonnes. Each one contains 20 or 28 stainless steel canisters which, in turn, contain the solid vitrified glass waste.

The casks are built to standards set down by the IAEA. The regulations which they have established have been agreed by international experts representing 127 member countries. Under these regulations the cask design has successfully met a series of rigorous fire, impact and immersion criteria.

Vitrification conditions the waste into a solid glass form and the highly radioactive nuclear materials, such as caesium, are incorporated in, and form part of, the matrix of solid glass. Independent nuclear experts around the world have stated that vitrification is a safe and secure method for treating, transporting and storing highly radioactive waste.

The solid glass is contained within stainless steel canisters which, in turn, are transported within the special casks and bolted securely to the hold of the ship. For the glass to become exposed, the ship's hold would need to rupture, exposing it to the flask, which in turn would also need to rupture, thereby exposing the canister which must also rupture, before the solid glass block itself would be exposed to the environment. A paper by the Sandia National Laboratories in 1997 (1) calculated that a scenario of this sort, as hypothesized by one of Washington DC's anti-nuclear lobby groups (2), was "so improbable that it is of very little or no concern."

Even in such an incredible scenario of the glass becoming directly exposed to the sea, the leach rate of this special material in water is extremely low. The results of an environmental impact assessment performed for the Japanese Science and Technology Agency (3) show that the effect of such a scenario would be negligible, an exposure rate to the most affected person of less than one thousandth of the naturally occurring radioactivity they receive annually.

The protection provided by the glass, the flask and the ship ensure that even in very severe accident scenarios the radioactive contents of the waste could not be released into the atmosphere.

Compare all of this for a moment with the hazards posed by shipping oil, liquid gas, explosives, etc. One expert wrote recently that "...the environmental damage done by any conceivable accident [of a ship carrying vitrified residue] would be thousands of times less than that done by a single oil spill." (4)

Protest, Pressure Groups and Nuclear Transportation

For some twenty years regular shipments of spent fuel took place between Japan and Europe, and across other regions, without incident or protest. These shipments have always been a matter of public record: papers describing them have been presented at international conferences for many years (see e.g. (5, 6, 7, 8)); it has always been easy to observe the shipments taking place; and even the most uninformed person could deduce the fact from simply glancing at one of our annual reports. So why is the recent history of protest such a new phenomenon?

The reason is likely to be found by considering how society has changed since the 1960's. The public's demand to be able to influence their lives has grown considerably with the rise of a myriad of pressure groups covering almost every conceivable issue, a trend which has spread from the developed to the less developed parts of the globe. These groups generally campaign on single or a limited number of closely related issues, which potentially could change the way we live in small or large ways. Many are campaigning bodies, recruiting members who support their goals, and energetically lobby national and international political institutions. They process information and 're-communicate' it in ways which they believe will further their aims.

Pressure groups and the media often have a symbiotic relationship. Pressure groups provide stories, controversy and angles of conflict. Activists are customarily presented as experts, even those who may not have appropriate academic or professional expertise. They challenge industrialists and politicians and are lauded by some as an essential part of the democratic process, even though there is sometimes little or no direct accountability to their memberships or supporters. And some have the advantage of being both international and local at the same time, boosting their credibility appeal, exposure and resources. In fact, these are true multinationals, with annual budgets in the hundreds of millions of dollars.

Of course, the nuclear industry is hardly in a unique position in being the focus of such groups. It has, however, endured concerted and well-coordinated campaigns against its activities over a considerable period of time. More recently there has been increased focus on transportation. That transportation should be targeted despite its impeccable safety history and standards is not a surprise: if it could be restricted by practical obstacles or made prohibitively expensive, then nuclear businesses would be severely handicapped and may be forced to close some of their operations. The campaign against the transportation of nuclear materials is the as yet unacknowledged short cut of the powerful anti-nuclear groups, who campaign to "achieve the final phase out of nuclear power." (9)

The anti-nuclear groups participate actively in a range of national and international institutions. They have consultative or observer status at bodies like the IMO and OSPAR, which allows them to monitor progress on their campaign issues, influence the policies of the institutions, and lobby the various governments through regular contact with their representatives. Their influence is also direct, through meetings with national officials, press conferences and public visits.

Pressure Tactics and the Art of Misrepresentation

When we have visited coastal states to provide information about our shipments we have encountered a series of common misperceptions: that the residue is in a liquid form; that the ships are poorly maintained; that the ships represent the only safety barrier preventing contamination of the environment; that these are the only nuclear materials being transported because these are the only ones that are reported in the media; and that the nuclear shipments present a greater hazard than shipments of liquid gas, oil, and a wide range of other hazardous cargoes. It is perhaps easy to understand how the public in various countries hold such views against an international background of generally poor ship maintenance and management, oil tanker disasters and the campaigning of international anti-nuclear pressure groups. As Greenpeace are quoted to have once said: "It doesn't matter what is true - all that matters is what people believe to be true." And we have found ourselves communicating the facts in a process where it has seemed that we have been presumed to be 'guilty' of recklessly putting the public and environment in serious danger until we have proven ourselves 'innocent' by explaining our well-conceived, legitimate and professional transport operations. It is worth noting some of the ways in which such misperceptions and misunderstandings can arise as a result of pressure group campaigns.

A classic technique is for opponents to present what appear to be technical doubts about the safety or legitimacy of an operation through what is deliberately promoted as an independent academic paper. This happened prior to the first two shipments of vitrified residue when a certain amount of media coverage and political interest resulted from what were purported to be authoritative technical reports (2, 10), although they were commissioned by anti-nuclear groups. This happened despite the fact that the author, a Ph.D. in string theory (a branch of physics) was neither a nuclear engineer nor an expert in risk; his papers were not peer reviewed by academic experts; and they contained a series of fundamental errors. These papers were distributed by the groups to politicians, officials and journalists worldwide, many of whom are not in a position to judge an author's credentials and the degree of his independence and naturally find it difficult to differentiate between the credible and the non-credible. The IAEA subsequently reviewed the second of these papers, reporting that it was "fundamentally flawed and can be easily misleading". (11) An analogy can be drawn by contrasting what happened here with a hypothetical situation where a newly qualified dentist publicly challenges the practices of heart surgeons. Even though the dentist could legitimately be described as a 'medical expert' we would expect some circumspection from the media and politicians about the authoritativeness of the accuser. And there might be added suspicions if the dentist also happened to belong to a pressure group which campaigned against heart surgery.

Allied to this is the technically flawed technique of promoting worst-case scenarios as a means of illustrating the hazards of a particular activity. In evaluating the risks of any activity, it is a self-evident fallacy to simply imagine scenarios where all the safety measures simultaneously fail through a series of unconnected occurrences, without taking into account how plausible or implausible this might be. If we followed 'worst-case' analysis in our daily lives, we would never get out of bed in the morning. As one expert wrote: "Worst-case analysis is commonplace among amateurs and the politically motivated." (12)

Another technique is to present an activity in isolation, without putting it into a proper perspective. For example, our detractors appeal to countries to oppose our shipments without qualifying that the 150 or so shipments of spent fuel are equivalent in terms of their energy

generating potential to some 5,000 shipments of large oil tankers. Other considerations or choices exist in the world, each with their own potential consequences. Moreover, the recycling of nuclear fuel could play an important role in reducing global warming, which is a concern to many littoral states with low-lying land. The most recent vitrified residue shipment alone 'saved' the release to the atmosphere of nearly 3.5 million tonnes of CO₂, if one compares the alternative of coal burning to generate electricity over nuclear.

Managing Perceptions

Of course, the media and politicians in these countries have genuine concerns, albeit inherited from our detractors. They have been presented with an open and shut case. But they are rational people who wish to be reassured - either by stopping the shipments they perceive as so threatening or by being persuaded that the shipments are performed in a responsible way. As the screen saver message declared on the computer of one Caribbean journalist: "Unfed worry soon dies of starvation." It is only by challenging the misinformation and presenting the facts that we can influence perceptions and make that worry less palatable.

The anti-nuclear groups have been trying to persuade countries to take actions which are not legal and even to use force if necessary to support these actions (13) - such as banning shipments from Exclusive Economic Zones, which would be inconsistent with the United Nations Convention on the Law of the Sea (UNCLOS). A legal expert has concluded that these attempts, again promoted through the distribution of supposedly independent academic papers, "must be understood more as advocacy than as a disinterested appraisal of the current state of international law" (14) and hoped that such a position "will be viewed for what it is and disregarded." (15). The implication is clear in a Greenpeace fund-raising letter in New Zealand in February 1997 which stated (inaccurately) that Argentina and Chile had "banned" the first vitrified residue shipment from their Exclusive Economic Zone "because of information from Greenpeace." (16) It is to be expected that there is often limited expert knowledge about nuclear matters in non-nuclear countries, which impedes objective evaluations being made of the conflicting information they receive. And if the media do report doomsday allegations, thereby raising local fears, local politicians can be placed in an invidious position when asked for comment or lobbied to take action.

'Provincialism' or NIMBYism (Not In My Back Yard) remains one of the most effective standpoints encouraged by pressure groups because it can be used in every part of the world to orchestrate opposition to just about any interest that is not global. It is used to great effect in regions of the world where local politicians can argue that their region is 'special' so, in our case, the argument is that the shipments should simply be routed 'elsewhere'. Countries in many regions, some with no or little interest in nuclear energy, have been targeted by the anti-nuclear pressure groups. Ultimately this type of approach, together with the questioning of the rights of innocent passage and freedom of navigation, could have detrimental implications for international trade in general.

Communications - Reasons to be Cheerful

When we began working together to communicate proactively about the vitrified residue shipments the public in many countries had simply not had the facts. Historically, we had perhaps been too ready to take the view that since the shipments were safe and complied with

agreed international regulations, people in countries unaffected by the shipments neither had any reason, nor a locus standi, to protest. We had therefore missed opportunities to communicate that our shipments are carried out in an extremely professional manner, with state of the art equipment, properly trained crews and a multi-barrier approach to safety, whilst our opponents had been busy communicating their own messages.

The global focus of our communications is a relatively new theater for the companies involved in the shipments. It has created some fundamental logistical difficulties for all the companies involved because they have traditionally been geared to dealing almost exclusively with domestic issues. Cooperation between the companies has been vital, which means, from a practical point of view, sharing the responsibility and recognizing the need to communicate. Inevitably, agreeing on communication plans, briefing material, etc. is time consuming and requires a good deal of commitment.

The countries who have raised concerns about nuclear shipments can be found in diverse corners of the world, reflecting the long distance of the shipping routes. This makes monitoring what is said and written, together with any dialogue, extremely difficult. This is particularly so with the speed of global communications when pressure groups can transmit messages and images to news organizations anywhere in the world almost instantly. So a global capability is required to reach all the various audiences, which means having dedicated personnel overseas and a system of local support in these areas, provided by an international public relations company. Inevitably it also means a lot of travel to many countries to put our case face-to-face.

Each overseas audience is unique because, within the similarities of their concerns, lie particular local considerations and issues. This could be their dependence on fishing or tourism for a large part of their economic activity, for example. Similarly, some global issues are more relevant to overseas audiences than they are to domestic audiences. An official in an island state may find the news that recycling nuclear fuel helps Japan's policy of maximizing its fuel independence relatively unconvincing. He will be reassured to hear, however, that this policy avoids the burning of greenhouse gases which many experts believe causes global warming and could lead to rises in the sea level, threatening low lying land. Messages must therefore be tailored to local audiences and local concerns if we are to optimize our case.

Nevertheless, our core messages are very straightforward:

- Transportation of nuclear materials is strictly governed by rigorous international regulations and we comply with - or exceed - all of them;
- These are routine shipments, and over thirty years more than 4.5 million miles have been traveled without a single incident involving the release of radiation;
- No-one cares more about safety than we do - unless we ensure it, we have no business.

We have been doing a lot of listening around the world to understand local concerns and have been discussing rather than preaching. We have produced user-friendly briefing materials which address local concerns - often for audiences with little or no understanding about nuclear energy. A 10 minute video has been produced, which is available in different languages and formats, so that politicians, officials and journalists can visually appreciate the safety measures employed for the shipments. There is also a range of written information

covering all the main issues in varying degrees of detail. And we have personally briefed officials and journalists in many regions - from the Caribbean and South America to South Africa and the Pacific.

We have also become far more transparent in our operations. For example, prior to the second and third vitrified residue shipments we jointly released in advance our schedule for publicly disclosing information about the shipment and subsequently communicated the route to be taken. This reinforced a positive perception of openness and subsequent media coverage running up to the departure was relatively muted. Together with our briefings, this contributed to a significant reduction in the number of countries formally expressing concerns about the shipment.

We have also brought together journalists and academics from many countries to see our facilities first hand. It is hoped that this will enable more informed discussion and knowledgeable reporting to take place about the shipments in the future. When the third vitrified residue shipment transited the Panama Canal a group of journalists, together with the local environmental group Ancon, were invited to see the ship and its cargo and stayed on board for about four hours as the ship moved through the Canal.

Conclusions

It is perhaps frustrating for our transport industry managers that behind the genuine concern felt in some quarters about the safety of nuclear shipments, the real drive against the shipments, directed by the leading aparatchiks in the anti-nuclear pressure groups, is actually not safety at all. Yet this should be no surprise since, as indicated earlier, 'worst-case' analysis is promoted by these groups not as a means to make transportation *safer* but as an argument not to do it at all; after all these groups do not campaign for the same restrictions to be applied to other, potentially more hazardous cargoes - although nuclear shipments account for only a fraction of one per cent of all hazardous sea traffic.

However successful our opponents are at manufacturing opposition around the world, and however successful we are at reassuring politicians, officials, journalists and the public that the shipments are carefully managed, we must not lose sight of the fact that international opposition and concern is a means to an end for them. International bodies like the IMO have responsibilities for governing nuclear shipments and, given their capability to introduce new global regulations, it is crucial that informed decisions are taken by them. Recently, concerted pressure has been applied to introduce a range of new restrictions against shipments of nuclear material, despite the fact that objective assessments do not justify such proposals. It is important that we understand not only our audiences, but where our opponents are coming from, or more precisely, what they are aiming to achieve in terms of regulations which would place unique burdens on our businesses. We can be sure that there is no level of safety that will satisfy the anti-nuclear groups and therefore no prospect that 'technical' initiatives will reduce their future opposition. We therefore need to reflect on the words of a character in Henry Fielding's novel *Tom Jones*, "It is not enough that your Designs, nay that your Actions are intrinsically good, you must take Care they shall appear so." The way forward is therefore to continue to enhance our communication capabilities.

We must continue to be open about our shipments, for example by using the internet to make our information more accessible. Most importantly, we must present the facts to all those politicians, officials and journalists who are interested about the shipments. The feedback that we are getting from various coastal states is that they accept that the shipments are carried out in a safe manner, but they are concerned by the continuing 'problem of public perception'.

We have a number of advantages over our opponents. Most importantly, we have credible, solid arguments and an unblemished safety record on our side, backed up by the support of genuine experts. We should therefore aim to ensure that there is rational discussion about the shipments where scientific facts are considered and where there is perspective with other issues.

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