

# Potential Impact of Public Perception on the Transport of Radioactive Material

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**Abstract.** In the last 50 years, the transport of radioactive material, with the exception of some used fuel and nuclear waste shipments, has remained in relative obscurity when it comes to the realm of public interest and concern. Only a few shipments out of the millions that take place every year have been the subject of protest or public demonstrations, mostly attributed to anti-nuclear sentiment rather than concern over transportation safety. However, with the advent of the Internet and greater accessibility to information, the public has begun to show greater scrutiny towards the transportation activities associated with the use of nuclear substances. More frequently, the safety of transportation is questioned and debated in the various public fora. The challenge to regulators in years to come will be to continue to assure safety through regulations based on science, knowledge and experience while responding to the public demand for transparency and input without compromising national and international security. Better communication skills will be required by both competent authorities and industry to ensure that the public comprehends what the risks actually are and how they are mitigated. Regulators will have to examine long established and recognized processes to determine if they are still appropriate in the 21<sup>st</sup> century, striking a balance between security and the public's right to know. This paper examines the public interest in two Canadian cases and the related issues.

## 1. Introduction

The basic philosophy behind regulations governing the transport of radioactive material (RAM) is that safety relies mainly on the package design, with less reliance on operational controls. As a result, in most countries regulatory approval is, with few exceptions, only required for the package design and not for the actual shipment.

Packages are designed by engineers and assessed by engineers on a technical and scientific basis. Accidents are assumed to occur and specific regulatory requirements were developed to ensure that packages are designed accordingly. The origin of the material or its intended end use is not relevant in the realm of transport. High level waste, used nuclear fuel, and medical isotopes; all are considered radioactive materials with specific characteristics (such as fissile, solid, gas or liquid) when it comes to transport. Over the last 50 years, the regulatory framework has shown to be effective in ensuring the safe transport of RAM, with millions of shipments annually and no transport accident resulting in significant radiological consequences to people or the environment.

The transport of RAM has gone almost unnoticed by the public with only a few shipments having been the subject of protest or public demonstrations. This is no longer true as the public is now demanding to be informed. The way the transport of RAM has been regulated, while effective in ensuring safety and security, may no longer be sufficient to the public.

## 2. The changing public

Indeed, the world in which we live has changed in the past 50 years. The general population has become more educated. Information which was previously only available in universities or government agencies is now widely available and accessible with the advent of the Internet. The few nuclear accidents that have occurred (Three-Mile Island, Chernobyl, and more recently Fukushima

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Daiichi) have been reported on at length and in great detail. However, better access to information does not always ensure a better understanding of the issue by the public. Nuclear science and all its related activities is a complex subject of a highly technical nature. In addition, not all of the information available to the public is accurate, correct or truthful. Statements and figures are often misquoted or taken out of context by those seeking to manipulate the information in order to advance their particular viewpoint or cause.

A greater understanding of the importance of public perception with respect to risk has also been developed. People will lobby for government policies that protect them more from what they fear than from what is more likely to harm or kill them [1]. The words *nuclear* or *radioactive* are often portrayed, and therefore perceived, as dangerous.

In Canada, under the *Nuclear Safety and Control Act*, the Canadian Nuclear Safety Commission (CNSC) mandate involves four major areas:

- regulation of the development, production and use of nuclear energy in Canada to protect health, safety and the environment
- regulation of the production, possession, use and transport of nuclear substances, and the production, possession and use of prescribed equipment and prescribed information
- achieving conformity with measures of control and international obligations for the development, production, transport and use of nuclear energy and substances, including measures respecting the non-proliferation of nuclear weapons and nuclear explosive devices
- dissemination of scientific, technical and regulatory information concerning the activities of CNSC, and the effects on the environment, on the health and safety of persons, of the development, production, possession, transport and use of nuclear substances.

As the competent authority, the CNSC plays a leading role in providing accurate information to the public in a timely fashion on the transport of RAM and ensuring that this information is easily accessible.

Current Canadian regulations prohibit the public disclosure of security information such as transport security plans, location, routing and timing of shipments related to the transportation of nuclear material (namely Plutonium and Uranium, covered under INFCIRC/225) [2]. This type of information is considered “Prescribed Information” as defined by the regulations and must be treated accordingly. The dissemination of this information is restricted and classified to protect both the public and national security. There are no current similar restrictions applicable to the transport of other radioactive materials in Canada.

### 3. Case Study #1

In 2010, the CNSC received an application to transport under special arrangement 16 decommissioned steam generators characterized as Surface Contaminated Objects Group I (SCO-I) from Canada to Sweden. This was the first application in Canada for the transport of large components.

As many reactors around the world are reaching the end of their service life or planned refurbishment, the transport of large RAM contaminated components is a type of shipment that is becoming more frequent. Internationally, over 100 of these shipments have taken place. While the International Atomic Energy Agency (IAEA) regulations are very effective in regulating the transport of well characterized packaged material, they were not developed to deal with large components.

The only way to transport large components is usually under special arrangement. The concepts behind special arrangements, such as equivalent level of safety and compensatory measures, are easily grasped and well understood by the experts within the transport field. However, these are foreign notions to the public, concepts that are perceived as dangerous and non-compliant; simply the use of the word “special” evokes images of preferential treatment.

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In Canada, under the *Nuclear Safety and Control Act*, the Commission (a quasi-judicial tribunal) may delegate its decision making authority on certain matters to individual staff members of the CNSC. These staff members are referred to as designated officers. In the case of approvals related to transport, such as special arrangements, transport specialists who are engineers conduct the technical safety assessments. These specialists then make a recommendation based on their evaluation to a designated officer who in turn decides on whether or not to issue an authorization. This process usually takes place without public involvement.

In the case of the steam generators, the media began reporting on the proposed shipment and the public began speaking out against it, first only locally but the coverage grew rapidly to the provincial and national level. The perception of the shipment as dangerous was influenced by the size of the components rather than the activity of the RAM involved, the long list of contaminants which included plutonium, the portrayal of the material as nuclear waste, and the need for a “special” authorization. Many opponents of the project spoke out against the shipment because they perceived it as a precedent with respect to the transport of RAM on the Great Lakes and the St. Lawrence Seaway, one of the world’s largest supplies of fresh water. In response to the public interest generated by this application, the designated officer referred the decision to the Commission who decided to hold a public hearing on the matter.

The hearing was held over two days in September 2010. In all, 77 members of the public registered to participate, with 38 appearing in person or by telephone to make a presentation; the remainder of the submissions were in written form. Many of the participants shared the same concerns and were not aware as to how common the transport of RAM was, its excellent safety record, the minimal impact of past accidents, and how little information regarding this activity was available to the public.

With little or no information from official sources available, the public was left to rely on information disseminated by the media and non-governmental organizations or the Internet. It also became apparent that, to the public, not all radioactive materials are perceived the same, regardless of the actual risk associated. For instance, the transport of nuclear waste is perceived as much more dangerous and therefore less acceptable than the transport of medical isotopes. Also recurring in the interventions was the issue surrounding the lack of public consultation and/or notification for the transport of RAM, and concerns about the risk of malevolent acts. Opposition to the project also centred on the transport of RAM in waste as opposed to on-site treatment, the export aspect and fears surrounding the recycling of the steel and the potential for RAM to make its way into consumer products such as cutlery.

An extensive assessment was completed covering packaging and transport, environmental impact of potential accidents, radiation protection and emergency response. Based on the results of the assessment, the Commission concluded that that the proposed package configuration with respect to the requirements applicable to SCO-I material and Type IP-I packages meets regulatory requirements, that the proposed shipment complies with the *Nuclear Safety and Control Act* and the *Packaging and Transport of Nuclear Substances* (PTNS) Regulations and that the overall level of safety in transport meets or exceeds all the applicable requirements of the PTNS Regulations (which incorporate by reference the IAEA TS-R-1 Regulations).

On February 4, 2011, the Commission published its decision to approve the transport under special arrangement of the 16 steam generators. Following the announcement, CNSC staff continued outreach activities with various levels of government and the public in an effort to disseminate factual information regarding this project as well as the transport of RAM in general.

The Commission’s decision is currently under review by the Federal Court of Canada.

## 4. Case Study #2

In January 2011, an incident involving a shipment of Low Specific Activity (LSA-I) material of Canadian origin in Industrial Type packages occurred in international waters. There were no

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radiological consequences to people or the environment resulting from this accident; all contamination was contained within the hold of the ship.

Having recently dealt with the transport of the steam generators, CNSC staff strived to adapt the response in order to meet the expectations of the Canadian public for timely information. Upon notification of the incident, CNSC technical staff began working closely with the CNSC media relations group to prepare material for public release and also ensured ongoing contact with the consignor of the material and other regulatory agencies involved. The CNSC recognized the importance of making factual information from official sources available to the public early in the process. Soon after the incident, CNSC staff appeared before the Commission and presented an early notification report on the incident, making the information available to staff available to the public.

The incident received much less media coverage than anticipated by CNSC staff. In fact, the coverage was limited to the local and regional media and did not make national headlines.

The results of the incident were that the sea containers moved about in the cargo hold during a storm. Some of the containers suffered significant damage and the doors of one of the sea containers opened. As a result, a few drums fell out of the sea containers within the cargo hold area. Some of these drums were breached, with radioactive material powder spilled on the floor of the cargo hold. Despite the severe damage experienced by some of the sea containers, including in some cases total collapse of the structure of the container, less than 5% of the 840 drums in the shipment experienced a breach of containment. In other words, most of the packages in the shipment remained closed and the material stayed within. This actual accident experience demonstrates that the regulatory requirements applicable to this type of packaging and material are effective in ensuring safety.

## **5. Conclusions**

Going forward, the public will continue to request information on the safety and security of the transport of RAM. The role of competent authorities as the source of accurate information is central to filling the information void which may exist. The right timing in providing information is just as important in order to gain public trust. Competent authorities must strive to provide technical background information on the basis of the applicable regulations and the risk involved in transport. In addition, competent authorities should provide information on various transportation related projects and proposals early in the application and review process, anticipating public interest. When dealing with transport incidents, the competent authority also has the responsibility of providing timely updates on the situation.

Public disclosure of sensitive information has the potential to increase the threat to the security of transport. All authorities involved in the transport of radioactive materials need to exercise caution with this type of information and the amount of detail that is released with respect to a proposed shipment in order to prevent unauthorized access to any prescribed information contained in a transport security plan. The public's right to access information must be balanced with the competent authority's duty to safeguard national and international security.

The CNSC has increased its outreach activities with respect to transport. A packaging and transport factsheet was published in September 2010. The CNSC is actively involved in providing information on the transportation aspect in the early stages of major projects such as the proposal for a long term waste facility, and the proposal to construct new power reactors. In addition, CNSC staff continues to make presentations to and meet with interested groups.

The main lesson to be learned can be summed up by the following idiom: Nature abhors a vacuum. The public demands information on the transport of RAM and if competent authorities fail to provide them with this information, they will still obtain it. Competent authorities have a responsibility to disseminate timely scientific, technical and regulatory information to address the public's fears and concerns without compromising security.

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