



ECONOMIC AND SOCIAL CONSEQUENCES OF DENIAL AND DELAY OF SHIPMENTS OF RADIOACTIVE MATERIAL

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ABSTRACT

The refusal of carriers in accepting radioactive shipments for transport produces are detrimental and causes series of consequences to the end users. One of these consequences refers to economic issues in the extent that the costs are severely increased. Additionally it produces lost of time and may impose a negative perception to the image of companies and individuals involved on this activity.

As part of the activities carried out by the Latin-American network on denials of shipment – the Montevideo Network - a methodology was developed to evaluate the economical impact of denials and delays on consignors, shippers and end users of radioisotopes. Four important relevant components are used to evaluate the economical impact: (i), labor cost; (ii) equipments, instrumentation and capital cost; (iii) material and services; and (iv) contingencies.

By encompassing relevant steps like loading, preparation of shipping papers, dispatch, carriage, stowage and in-transit storage and return of empty packages the methodology may be useful to consignors, shippers, consignees as well as suppliers of radioisotopes in evaluating the final cost for a single of multiple shipments and its consequences. This paper presents and describes also a methodology to evaluate economical impact on denial and delay of shipments of radioactive material.

INTRODUCTION

A major issue for users of radioactive materials is the denial of shipment by some carriers, sea ports and airports. There are problems with all modes of transport sometimes due to the perception of possible hazards rather than the reality. For example some maritime carriers and harbours have refused to transport and handle radioactive material, although the risk created by the material is very low: even excepted packages have been refused. The classification as 'radioactive' gives rise to a negative prejudgement that often makes it impossible or difficult to transport this kind of dangerous goods. Similar perception is not apparently frequent in the case of the other classes of dangerous goods. These situations, which are linked to perception and not to safety issues, may negatively affect future transports by sea, air and road. In order to allow a suitable and safe transport of radioactive material, it is necessary to investigate what actions should be adopted to avoid these problems.



This kind of problems cause a lot of negative consequences in the peaceful use of nuclear energy. Also generates economic problems and a very important negative social impact which is the case of medical applications. On the other hand it should be added that the IAEA is suely, in some cases,

experiencing difficulties in fulfilling its technical cooperation commitments to developing Member States as a result of these denials of shipments of radioactive material.

SOCIAL CONSEQUENCES OF DENIALS AND DELAYS

According to industry statistics 85,000 nuclear medicine procedures are carried out around the world every day. Additionally, radioactive material shipped every day all over the world is also used in a multitude of industrial applications, research and development, and in the generation of electricity and power. With an estimated 75 million medical treatments involving radioactive material taking place annually, rejection or interruption of shipment can have a deleterious effect on patients receiving cancer treatments or those awaiting diagnoses.

Denials or delays in international shipments of radioactive material, including short-lived isotopes used for medical diagnosis and treatment, are being reported more frequently. Many countries import isotopes used to treat cancer, diagnose heart attacks or sterilize medical equipment. Hospitals and clinics depend on these international shipments to arrive on time, particularly if the isotope has a short half-life and must be sent by air. Since then, If an airline or other transport provider refuses to take a shipment, or is unable to take a shipment, then this increases the prospect of someone missing a cancer treatment. Isotopes with short half lives, such as iodine used to treat and detect thyroid tumors, become useless if they miss a flight. Or if they miss a flight and make a later one, their use is limited.

There is a risk that if more airlines do deny, particularly where few airlines serve key regions, then this does raise a serious issue. It potentially means that medical clinics and hospitals in specific areas are at risk from being denied essential medical supplies. For all these considerations, the increasing difficulties in delivering lifesaving isotopes require a quick and urgent solution for the international transport.

ECONOMIC CONSEQUENCES OF DENIALS AND DELAYS

Denial and delay of shipments produce many economical issues. It depends on the stakeholder involved on the matter, but economical problems are produced and increased from every situation. For instance in the case of companies as customers of the air and maritime companies, denial and delay of shipments produce economical problems. They produce lost of money, time and image for companies. Also there are problems with many air and maritime companies and also road companies. Instead of transporting radioactive material that needs many different documents and segregation, they prefer to transport goods with no so many exigencies and they win more money; they have less problems and they will not be exposed to problems with authorities.

Some air companies prefer to transport luggage of the passengers than to transport dangerous goods. Transportation of radioactive material means special training for personnel in each airport; audits from regulatory authorities; costs of insurance and perhaps problems to board in some harbor that affects economical issues.

In the world there are many hundreds of workers involved solely with transporting radioactive materials and many thousands of workers occasionally involved in such operations. There are millions of specially designed and manufactured containers and a large number of dedicated vehicles associated with the movement of radioactive materials.

Transport of radioactive materials is essential to the nuclear industry. Careful attention is given to all stages of the design, manufacture, testing, use and maintenance of all the equipment involved.

Radioactive materials are important to the economic and social well-being of the people. The safe transport of such materials is necessary for their continuing use. The denial and delay of shipments of radioactive material are generating many economical problems with a negative impact.

METHODOLOGY FOR COST ANALYSIS TO EVALUATE ECONOMICAL IMPACT ON DENIAL AND DELAY OF SHIPMENTS

For the calculation of costs has been produced a spreadsheet. This spreadsheet describes and explains each of the aspects considered for the respective calculation.

SPREAD SHEET No.1:

It considers the following relevant costs :

1. Labour cost
2. Equipment, instrumentation and capital cost
3. Materials and services
4. Contingencies

MAIN SPREAD SHEET				
1 LABOUR COST				
Personnel	Travel Expenses	Complementary Social Payments	PARTIAL COST 1	
\$0.00	\$0.00	\$0.00		\$0.00
2 EQUIPMENTS, INSTRUMENTATION AND CAPITAL COST				
Machines & Equipments	Instrumentation	Capital Cost	PARTIAL COST 2	
\$0.00	\$0.00	\$0.00		\$0.00
3 MATERIAL AND SERVICES				
3.1 MATERIAL				
Material	Cost for radioactive decay	Other materials	PARTIAL COST 3	
\$0.00	\$0.00	\$0.00		\$0.00
3.2 SERVICES				
Insurances for equipments and Instrumentation	Maintenance for equipment and instrumentation	Legal and administrative services, expenses	PARTIAL COST 4	
\$0.00	\$0.00	\$0.00		\$0.00
4 CONTINGENCIES				
Cost for the use of different routes to the destination	Cost for incomplete documentation or additional documentation	Cost for denial of ships which transport radioactive material	Legal Cost	
\$0.00	\$0.00	\$0.00		\$0.00
Cost for loss of image of the company	Cost for loss of customers	Others	PARTIAL COST 5	
\$0.00	\$0.00	\$0.00		\$0.00
TOTAL COST = Σ PARTIAL COST				\$0.00



Figure 1. Main spread sheet for the economic analysis

The respective calculations have been made considering various spreadsheet, which are related amongst themselves, in order to they can show in ordered way each relevant factor for the cost analysis. From this way it is easy to follow the importance of different factors in each reported case.

SPREAD SHEET No.2:

It permits to make the calculation of detailed costs due to different relevant factor. "Labour cost". It considers the following :

- i) Personnel
- ii) Travel expenses
- iii) Complementary social payments

SPREAD SHEET No.3:

It permits to obtain the detailed costs due to the relevant factor "Equipments, Instrumentation and capital cost". It considers the following :

- i) Machines and equipments
- ii) Instrumentation
- iii) Capital costs

SPREAD SHEET No. 4 :

It permits to obtain detailed cost due to the relevant factor "Materials and services". It is posible to identify the importance of all different factors.

It considers the following :

- a). Materials
 - . Materials
 - . Cost for radioactive decay
 - . Other materials
- b) Services
 - . Insurances for equipments and instrumentations
 - . Maintenance for equipments and instrumentation
 - . Legal and administrative services, expenses



SPREAD SHEET No. 5 :

It permits to make the calculation of detailed costs for the relevant factor “Contingencies”. It is possible to identify the incidence of different considered factors.

It considers the following :

- i) Cost for the use of different routes to the destination.
- ii) Cost for incomplete documentation or additional documentation
- iii) Cost for denial of ships which transport radioactive material
- iv) Cost for loss of image of the company.
- v) Cost for loss of customers
- vi) Others

CONCLUSIONS

The cost analysis methodology permits to obtain the respective calculation of involved cost of denial and delay of shipments of radioactive material in an easy way. It is possible to identify the relevance and incidence of the different factors included. If many of the factors are not applied in some Member States, the respective cells must be filled in with zero.

In the same way, this cost analysis methodology permits to make an integral evaluation of the incurred costs and identify the negative economical impact for the consigners and providers of radioactive material.

Social and economic consequences of denial and delay of shipments of radioactive material are very important so they should be avoided or reduced. The IAEA is giving a good support for this objective. The methodology may be useful to consignors, shippers, consignees as well as suppliers of radioisotopes in evaluating the final cost for a single of multiple shipments and its consequences.

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