

# HOW SPECIFIC SHOULD BE THE REGULATIONS?

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## **ABSTRACT**

The transport of radioactive materials has to comply with the requirements of the modal regulations for the transport of dangerous goods. These are based on the “Regulations for the Safe Transport of Radioactive Material” set forth by the International Atomic Energy Agency (IAEA).

When analysing these Regulations, it appears that the requirements can be roughly classified in three categories:

- (very) general requirements,
- “normal” requirements,
- (very) detailed requirements.

The second category does not induce any difficulty, by the definition of this level of requirements.

The first category leads to difficulties when implementing the Regulations. The industry may not know exactly what is expected by the Regulations and the regulators. Also, as these requirements are (too) general, they may be interpreted differently in various countries. Eventually, it can also be considered that they are not really requirements, but clauses establishing the background of the “true” requirements.

The third category may lead to safety issues. They can generally be considered as giving examples of what is requested in a “normal” requirement. But this may also be understood as clarifying a “normal” requirement: the detailed requirement is no longer understood as an example but as the true (and limiting) requirement.

The paper provides examples of these three levels of requirements and the issues which are linked to these examples.

There is a will within the IAEA to improve the wording of the Regulations, to make the Regulations more easily understandable. This initiative should be strongly supported and the issues described above should be carefully taken into account when rephrasing the text.

In parallel, there is also a trend within the IAEA to define overarching requirements. The paper explains our views on what could be overarching requirements, how they should interact with the other requirements (i.e. non overarching requirements), and what should be the limits with companion documents including explanatory and / or guidance material.

## **1. INTRODUCTION**

The transport of radioactive materials has to comply with the requirements of the modal regulations for the transport of dangerous goods. These are based on the “Regulations for the Safe Transport of Radioactive Material” set forth by the International Atomic Energy Agency (IAEA).

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The paper provides examples of these three levels of requirements and the issues which are linked to these examples. It also gives our view on the necessary improvement of the wording of the Regulations. Finally, it discusses the need (or not) for overarching requirements and the link with companion documents including explanatory and / or guidance material.

## **2. “NORMAL” REQUIREMENTS**

In most instances, the IAEA “Regulations for the Safe Transport of Radioactive Material” is well written.

As a random example, let us have a look at the paragraph 555 in the 2009 Edition of the Regulations. It is written as follows:

*“555. For each shipment listed in (a), (b), (c) or (d) below, the consignor shall notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be transported. This notification shall be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance. (...)”.*

In this paragraph, the most important questions which arise when having to implement the requirements are answered:

- **Who** has to perform the action? Here, it is “*the consignor*”.
- **What** has to be done? Here, it is “*to notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be transported*”.
- **In which instances** has the action to be performed? Here, it “*for each shipment listed in (a), (b), (c) or (d)*”.
- **When** has the action to be performed? Here, it is “*prior to the commencement of the shipment, and preferably at least 7 days in advance*”.

The implementation of such a requirement does not induce significant problems of understanding.

### 3. (VERY) GENERAL REQUIREMENTS

Let us consider other paragraphs in the Regulations.

3.1 The first example is with paragraph 671 dealing with packages containing fissile material. It is written as follows.

*“671. Fissile material shall be transported so as to:*

- (a) Maintain subcriticality during normal and accident conditions of transport; in particular, the following contingencies shall be considered:*
  - (i) Leakage of water into or out of packages;*
  - (ii) Loss of efficiency of built-in neutron absorbers or moderators;*
  - (iii) Rearrangement of the contents either within the package or as a result of loss from the package;*
  - (iv) Reduction of spaces within or between packages;*
  - (v) Packages becoming immersed in water or buried in snow; and*
  - (vi) Temperature changes.*
- (b) Meet the requirements:*
  - (i) Of para. 634 for packages containing fissile material;*
  - (ii) Prescribed elsewhere in these Regulations which pertain to the radioactive properties of the material; and*
  - (iii) Specified in paras 635 and 673–683, unless excepted by para. 417.”*

The question is then: what are the links between the sub-paragraphs (a) and (b)? In other words, do we have to comply with both (a) and (b)?

The contents of (a) is very general and too general. For instance, according to (ii), the “loss of efficiency of built-in neutron absorbers or moderators” shall be considered. But, does it mean that this loss of efficiency has to be considered as a basis in any conditions of transport? Or is it following some conditions prescribed elsewhere in the Regulations? According to (vi), the “temperature changes” has to be considered. But, what is the range of change to be considered?

On the other side, (b) includes quite precise requirements.

It is the common understanding that the detailed prescriptions are in (b) and that (b) has to be applied. (a) provides the roots of the requirements in (b), and is not an “operational” requirement.

But then, why is (a) included in the Regulations? It should be better placed in the companion document of the Regulations, the “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material” (Safety Guide No TS-G-1.1), which historically is the combination of two documents: the formerly “Explanatory material” (Safety Series No 7), on the one hand, and the formerly “Advisory material” (Safety Series No 37), on the other hand. Whilst the Regulations has to provide the answers to “**What** are the requirements”, the “Explanatory material” should provide the answers to “**Why** are the requirements as they are” and the “Advisory material” should provide the answers to “**How** to meet the requirements”. Again, it appears that the sub-paragraph (a) is of an explanatory nature and explains the origin of the requirements in (b).

3.2 The second example is with paragraph 302 dealing with radiation protection programmes. It is written as follows.

*“ 302. A radiation protection programme shall be established for the transport of radioactive material.(...) The programme shall incorporate the requirements of paras 301, 303–305, 311 and 559. (...)”*

The requirement by itself is clear and straightforward. But, one information is lacking in the requirement: **who** should establish this radiation protection programme?

We can find a partial answer in the “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material”, where, in paragraph 302.5, it is stated that “the RPP will best be established through the cooperative effort of consignors, carriers and consignees engaged in the transport of radioactive material”. This cooperation between the parties must be encouraged, no doubt about that. In addition, to give flexibility in the process is also a good thing. Depending of the situation, the party which has the better position to issue the radiation protection programme may differ.

But, if for any reason, the radiation protection programme is not prepared or not available, who should be blamed? The Regulations must provide flexibility in the responsibilities, but each requirements should be allocated to a precise actor by default.

#### **4. (VERY) DETAILED REQUIREMENTS**

On the opposite side of the range, there are requirements which are very specific. For instance the paragraph 501 (a) requires that:

*“501. Before a packaging is first used to transport radioactive material, the following requirements shall be fulfilled:*

*(a) If the design pressure of the containment system exceeds 35 kPa (gauge), it shall be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure.”*

How shall we understand this threshold of 35 kPa? Does it mean that, below 35 kPa, there is no need to “*ensure that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure*”? Obviously, this is not the case. Generally speaking, assurance needs to be provided regarding the capacity of the containment system to withstand the design pressure, whatever is the pressure, and this requirement is enhanced when the design pressure exceeds 35 kPa. In the “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material”, it is stated that this additional assurance may be provided by a test. But the “Advisory material” is not legally binding.

This paragraph 501 (a) is a good example of a requirement which is not well balanced. It is too prescriptive, by establishing a threshold, and it is also too vague, by not specifying what is required under this threshold, on the one hand, and beyond this threshold, on the other hand. The consequence is that some will understand that there is something to do beyond the threshold (but what?) and nothing to do under the threshold (as there is no requirement). A detailed requirement may be unsafe!

## **5. IMPROVEMENT OF THE WORDING OF THE REGULATIONS**

The next edition of the IAEA “Regulations for the Safe Transport of Radioactive Material” will be published in the coming years. As the date of publication is still suffering from some uncertainties, it is colloquially designated as the 20XX Edition.

When preparing this new edition, it was agreed that the paragraphs which needed to be revised in the framework of the normal review and revision process should also be revisited in order to improve the user-friendliness of the Regulations. For those paragraphs, the aim was to simplify and clarify the regulatory provisions, removing extraneous and unnecessary wording whilst retaining the essential meaning of the requirements. This recognises that advice on how to fulfil the regulatory requirements is now comprehensively covered in a series of supporting guidance documents. It is no longer necessary to burden and complicate the Regulations themselves with text which is merely explanation or advisory in nature. They should only present the bare requirements.

The IAEA organized a consultancy on that subject. Later on, the result of the work done by the consultants was reviewed by the IAEA TRANsport Safety Standards Committee (TRANSSC). Whilst the goal is unanimously shared by all the members of TRANSSC, there are different views about how far this task should go. There are reluctances and fears:

- Are we impoverishing the Regulations?
- How to be sure not to miss something?
- How to combine the simplification / improvement of the wording of the Regulations whilst seeking also for stability in the Regulations?

As a result, TRANSSC partly endorsed the work of the consultants and what was accepted by TRANSSC is included in the draft currently under review by the Member States and International Organizations, in the framework of the 120-day review period.

We certainly laud this initiative and encourage the IAEA to pursue it. It is a challenging task and an appropriate framework has to be established for that, but this should go on.

## **6. REQUIREMENTS VS. OVERARCHING REQUIREMENTS**

In the continuity of the publication by the IAEA of the “Fundamental Safety Principles” (No SF-1), there is (there was?) the willingness to introduce in the “Regulations for the Safe Transport of Radioactive Material” some general principles or overarching requirements, in order to identify the basis of the Regulations. This intent is certainly commendable.

Nevertheless, we should keep in mind that the Transport Regulations have a specific feature: they are (almost) directly implemented, through the modal regulations. Then, it is necessary to clearly understand what has to be implemented. How to identify and how to use these overarching requirements?

In the Section 3 of this paper, we have seen the difficulties with requirement which are expressed in too general terms. If overarching requirements are identified and specified, how should (and even shall) they be implemented? Is so-called overarching requirements are established, are they more important than normal requirements? Is non-compliance with a normal requirement acceptable? Many questions arise from such a distinction between overarching requirements and other requirements. And the layman, the day-to-day user of the Transport Regulations, would probably face inextricable difficulties when implementing the Regulations, if they include two levels of requirements.

However, as we mentioned earlier, the willingness to identify the basis of the Regulations is a good thing and should not be discouraged. The educational virtues of such undertaking are obvious. We are eagerly waiting for the outcome of the Technical Meeting “to facilitate and coordinate the technical basis” for the Transport Regulations. “The purpose of this Technical Meeting is to identify the essential safety requirements for packages containing radioactive material and to analyse the historical development of each requirement. A clear and concise rationale for each requirement that is consistent with its development will be documented. The results will be consolidated into working material setting out the technical basis on which safety is assured in transport. If time permits, the meeting will also identify key indicators to enable the continued validity of the requirements to be reviewed.”

On this basis, our view is that this should not lead to the definition of overarching requirements in the Regulations. The Regulations are not a training course! It should lead to a revival or a new development of the “Explanatory Material” (formerly Safety Series No 7):

- either by its own as it existed in the past before being combined with the “Advisory Material” (formerly Safety Series No 37), in the new “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material” (Safety Guide No TS-G-1.1),
- or still in a combined document with the explanation including the rationale for each requirement, on the one hand, and the advice on how to comply with the requirements on the other hand, as currently in the “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material” (Safety Guide No TS-G-1.1).

## **7. CONCLUSION**

A proper implementation of the IAEA “Regulations for the Safe Transport of radioactive Material” requires a proper wording of the Regulations. It is essential that the requirements set clearly what is required and who is in charge of their implementation. Requirements which are vague or general should be avoided. A single level of requirements is also necessary: the layman (and also the others!) cannot afford pseudo-subtle distinctions between objectives, principles, requirements and so on. In this regards, there is still room for improvement, and vigilance is necessary to avoid moving backwards.

Stability of the Transport Regulations is key for the Industry. But what is important is the stability in the essence of the requirements and in the way it is understood by the Authorities. And stability in the Transport Regulations and rewriting of (some parts of) the Transport Regulations do not oppose each other. In this regards, the improvement / change of the wording should not be restrained. Improvements in the wording of the Regulations leading to better share the understanding of the Transport Regulations should be encouraged, as they should eventually contribute to stabilizing their implementation.

Let us conclude by an oxymoron: more revision for more stability!