AUTORITÉ DE SÛRETÉ NUCLÉAIRE

A S N G U I D E

TRANSPORT

GUIDE

Procedures for notification of events concerning the transport of radioactive materials on the terrestrial public highway, by sea or by air

GUIDE N° 31

Rev. 1 - Version of 04/24/2017

Preamble

The collection of ASN guides gathers documents intended for professionals who are interested in regulating nuclear safety and radiation protection (operators, users or carriers of ionizing radiation, health professionals).
These guides can also be forwarded to the various stakeholders, such as Local Information Commissions.

The purpose of each guide is, in the form of recommendations:
- to clarify a regulation and the rights and obligations of people interested in regulation;
- to explain regulatory objectives and to describe, where appropriate, the practices that ASN considers satisfactory;
- to provide practical and useful information on nuclear safety and radiation protection.

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1. INTRODUCTION

1.1. Purpose of the guide

The purpose of this guide is to define the procedures for notifying ASN of events relating to the transport of radioactive substances on the terrestrial public highway (road, rail and inland waterways), by sea or by air, with actual or potential consequences for the protection of the interests mentioned in Article L. 593-1 of the Environment Code (in other words, public health and safety or the protection of nature and the environment).

This guide supersedes the part of the modified ASN Guide of 21 October 2005 on the transport of radioactive substances on the public highway, with regard to the conditions of notification and the codification of criteria related to significant safety, radiation protection or environmental events applicable to basic nuclear installations and to radioactive material transport operations.

1.1.1 Objectives of the assessment and notification of events

The safety of transport of radioactive substances is based on the defence in depth concept and is built around:

- package robustness,
- the reliability of the transport operations,
- the efficiency of emergency management in accident situations.

The principle of defence in depth takes the form of several levels of technical or organisational protection, designed to maintain the effectiveness of the physical barriers placed between the radioactive substances and the workers, the public and the environment, in routine transport conditions and, when the potential consequences so warrant, in the event of an incident or accident.

Compliance with this principle more specifically requires the implementation of a reliable system for detecting anomalies or deviations that could occur. Moreover, it would be unacceptable for there to be a situation in which anomalies, deviations and, more generally, other abnormal events are identified, without attempts being made to prevent them from happening again. The events identified must therefore be analysed in order to:

- prevent identical or similar events from happening again, by taking appropriate corrective and preventive measures;
- prevent a more serious situation from occurring, by analysing the potential consequences of events which could be precursors of more serious events;
- identify the best practices to be promoted in order to improve transport safety.

The purpose of this analysis is not to establish the responsibility of individuals with a view to possible sanctions, but to achieve progress in the safety of the transport of radioactive substances.

This events analysis approach is referred to as "operating experience feedback", which is one of the foundations of continuous improvement and thus of the safety of transport operations. It provides valuable information about the effectiveness of the various levels of defence in depth.

The notification of the events covered by this guide contributes to the correct working of the detection system, the analysis approach and the integration of operating experience feedback. It also enables the administrative authority to gain an overview of all events such as to promote the sharing of operating experience feedback among the various stakeholders – including internationally – and to enable thought

to be given to possible changes to the regulations and provisions concerning the design and utilisation of packagings, the organisation of transport operations and the training of the various stakeholders.

1.1.2 Regulatory obligation

The radioactive substances transport stakeholders are required by the regulations (see part 2.3 of this guide) to notify ASN of any event with actual or potential consequences for the protection of the interests mentioned in article L. 593-1 of the Environment Code. In this respect, this guide specifies the practicalities of this notification.

1.1.3 Categorisation of events

Categorisation of events should allow processing appropriate to their potential consequences, both by contractors and by ASN. This guide therefore defines two event categories: significant events, and events affecting transport safety, described in part 2.2 of this guide.

1.2. Scope of application

Activities concerned

This guide covers the events concerning all steps in the transport of radioactive substances that have used, are or will be using the terrestrial public highway, sea or air. Transport shall be understood according to the definition in the modal regulations (references [7] to [11] of section 2.1 below):

> "*Transport comprises all the operations and conditions associated with the movement of radioactive materials, such as the design and manufacture of packagings, their maintenance and repair and the preparation, shipment, loading, carriage, including storage in transit, unloading and receipt up to the final destination of the consignments of radioactive materials and packages".*

Design covers the demonstration of the conformity of the package model with the applicable regulations. It more specifically comprises a demonstration of the ability of the package model to withstand routine conditions and the tests representative of normal and transport accident conditions.

The carriage phase includes stops and parking of the vehicle during carriage, along with package storage during transit (possibly outside the vehicle), between the beginning of shipment and arrival at the final destination.

Air transport includes package handling and movements in airports.

1.2.2 Modes of transport concerned

All modes of transport are concerned: terrestrial (road, rail and river), sea and air.

1.2.3 International transport operations

This guide only covers the events identified in France, or occurring as the result of a transport operation taking place in France, or which could have an impact on safety or radiation protection of a transport operation taking place, at least partially, in France (for example: deviation during maintenance of a packaging intended for use in France).

1.2.4 Exclusions and special cases

1.2.4.1 Radioactive substance transports not scheduled to use the public highway

This guide does not apply to events concerning transports of radioactive substances taking place in full within the perimeter of basic nuclear installations (BNI) or between installations on the same industrial site and without using the public highway. ASN must be notified of any significant events concerning these transports pursuant to the order of 7 February 2012 as amended, setting the general rules for BNIs (known as the "BNI order") in accordance with the criteria and procedures set out by ASN.

However, if an event occurs or is identified within the perimeter of a BNI and concerns a transport operation scheduled to use the public highway, or coming from the public highway, it is then covered by this guide. In this case, a second notification to ASN under the BNI order is not necessary.

1.2.4.2 Transports of radioactive substances involving the Ministry of Defence

This guide does not apply to events concerning transports of radioactive substances involving the Ministry of Defence, which are subject to special provisions defined by this Ministry.

More specifically, in accordance with article 1 of the TMD order (reference [3] of section 2.1 below), this guide does not apply to:

- the transport of radioactive and fissile materials for civil use within the context of civil security or policing missions,
- the transport of radioactive substances linked to nuclear weapons or naval nuclear propulsion activities.

1.2.4.3 Events connected to malicious acts

Events which have actual or potential consequences for the protection of the interests mentioned in article L. 593-1 are covered by this guide, whatever the initiating element, including a malicious act.

This guide does not however apply to events which would only have actual or potential consequences for the provisions for protection against malicious acts. These can as necessary be notified to the Defence and Security High Official of the Ministry in charge of the Environment.

1.2.5 Alerting the public authorities in an emergency situation

A distinction must be made between the notification of events, described in this guide, and alerting of the administrative authorities in the event of an incident or accident for which the resources of the public authorities could be called on to mitigate the consequences. The alert must be given as rapidly as possible, this regulatory obligation being distinct from the notification of events and not covered by this guide (see details in part 2.3.1 below).

1.2.6 Other obligations to inform the public authorities

This guide does not cover other information obligations that may result from application of the Labour Code, the Public Health Code, the Environment Code or any other regulations. Events notification as dealt with in this guide more specifically does not take the place of the provisions of article R. 4451-99 of the Labour Code.

Article R. 4451-99 of the Labour Code

With regard to the nuclear activities subject to authorisation or notification pursuant to article L. 1333-4 of the Public Health Code, the employer notifies ASN of any significant event which led to or is liable to lead to one of the limit values set in articles D. 4152-5, D. 4153-34, R. 4451-12 and R. 4451-13 being exceeded.
The employer analyses these events in order to prevent future events.

1.3. Document status

Previously, the procedures for the notification of events linked to the transport of radioactive substances were described in the ASN Guide on the conditions of notification and the codification of criteria related to significant safety, radiation protection or environmental events applicable to basic nuclear installations and to radioactive material transport operations.
ASN Guide n°31 supersedes the provisions of this guide concerning the transport of radioactive substances. Drafting of ASN Guide n°31 involved extensive consultation of professionals and of the public from 9 January to 6 February 2017.

2. REGULATORY CONTEXT AND FRAMEWORK

2.1. Regulatory references

The main reference texts are as follows:

[1] Commission Regulation (EU) n° 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) n° 216/2008 of the European Parliament and of the Council;

[2] Commission Regulation (EC) n° 859/2008 of 20 August 2008 amending Council Regulation (EEC) n° 3922/91 as regards common technical requirements and administrative procedures applicable to commercial transportation by aeroplane;

[3] Order of 29 May 2009 amended, on the land transport of dangerous goods (called the "TMD order");

[4] Order of 23 November 1987 amended on the safety of ships;

[5] Order of 18 July 2000 amended regulating the transport and handling of dangerous goods in seaports;

[6] Order of 22 March 2001 on postal dispatch of radioactive materials;

[7] European agreement concerning the international carriage of dangerous goods by road, known as "ADR";

[8] Regulations concerning the international carriage of dangerous goods by rail, appearing as appendix C to the COTIF convention, "known as "RID";

[9] European Agreement concerning the international carriage of dangerous goods by inland waterways, known as "ADN";

[10] International maritime code for dangerous goods, regulations implementing chapter VII part A of the 1974 international convention for the safety of human life at sea (SOLAS convention), known as the "IMDG code";

[11] Technical instructions for the safe transport of dangerous goods by air, supplementing annex 18 to the 1944 Chicago convention on international civil aviation, known as "ICAO TI".

2.2. Definitions

2.2.1 Definition of an event linked to the transport of radioactive substances

An event is an anomaly which has occurred during one of the radioactive substances transport phases (as defined in part 1.2), which had or which could have had direct or indirect consequences on the level of protection of the interests mentioned in article L. 593-1 of the Environment Code. These actual or potential consequences justify the analysis of the event in order to learn lessons such as to prevent it occurring again and, more generally, to improve the safety of the transport of radioactive substances (see part 1.1.1).

The events are more specifically:

- deviations from a regulatory requirement (in particular the requirements of the orders specific to each mode of transport, but also those of the approval certificates);
- deviations from a requirement mentioned in a reference document applicable to shipments (special instruction, operating procedure, instructions for utilisation and maintenance, manufacturing specifications, etc.);
- incidents which led to degraded transport safety conditions (intervention by unqualified personnel, incorrect closure of a package, incorrect stowage, etc.) or which stressed the robustness of the package beyond routine conditions (fall or impact on package during handling or during transport, incorrect stowage, etc.);
- incidents or accidents which led to package damage, or even the release of radioactive substances;

- accidents which caused death or injury owing to the radioactive substances being transported.

These events can be divided into two categories – events affecting the safety of transports (EIT) and significant events involving transports (EST) – defined below.

If a deviation occurring during a transport phase other than during carriage is identified by means of the provisions of the management system covering this phase (in particular if identification is as a result of quality control) and is corrected in accordance with the applicable procedures, before the carriage phase starts and without there being any consequences, then this deviation does not constitute an event as defined by this Guide. However, if the deviation is identified accidentally, this then becomes an event subject to the provisions of this Guide.
For example, if, during a maintenance operation, an operator fits an incorrect seal on a groove and a second operator realises this when carrying out an independent check, this is not then an event. However, if an independent check does not detect the deviation, but the error is identified subsequently by the painter touching up the packaging, then this is an accidental identification demonstrating a flaw in the checks and the deviation must be considered to be an event. Similarly, if the packaging is handed over to the consignor without the deviation having been identified and if this latter finds the error during its pre-shipment checks, then this is also considered to be an event. The management system of the party responsible for maintenance is faulty and it was only the consignor's management system which enabled the deviation to be detected.

2.2.2 Significant event involving transports (EST)

A significant event for transport is an event which meets one of the criteria defined in the appendix to this guide. Its importance warrants an in-depth analysis, with transmission of it to ASN.

More specifically, the events defined in 1.8.5.3 of the ADR (and similar sections of regulations [8] to [11], see part 2.3 below) are significant events as defined in this Guide.

2.2.3 Events affecting transport safety (EIT)

An "event affecting transport safety" is one which does not have any real direct consequences for the protection of the interests mentioned in article L. 593-1 of the Environment Code and the potential consequences of which are slight.
These events are however of interest in terms of operating experience feedback, notably because their repetition could be a warning sign of a more serious problem. They must therefore be recorded and analysed as part of the management system applicable to activities subject to the regulations on the carriage of dangerous materials (1.7.3.1 of the ADR and similar sections of regulations [8] to [11]). This analysis must be carried out without waiting for any ASN notification.

Section 1.7.3.1 of the ADR
"A management system based on international, national or other standards acceptable to the competent authority shall be established and implemented for all activities within the scope of ADR, as identified in 1.7.1.3, to ensure compliance with the relevant provisions of ADR. […]"

ASN urges the transport stakeholders to notify it, for information purposes, of the EITs in accordance with the procedures of this Guide, in order to build up operating experience feedback and thus acquire a tool for observing the quality of the transport situation. However, it should be noted that notifying ASN of the EITs is not a regulatory obligation.

A summary of the lessons learned from the EIT is periodically drawn up by ASN and intended for both professionals and the general public.

2.2.4 INES scale

The INES (*International Nuclear Event Scale*) is a communication scale draw up by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA), which is an agency of the Organisation for Economic Cooperation and Development (OECD). Its purpose is to facilitate media and public perception of the scale and scope of the events.

An INES scale user's manual is published by IAEA, presenting the rating approach. It is available on the IAEA website. A presentation of this scale and how to use it is also available in French on the ASN website (www.asn.fr).

The EST are systematically rated on the INES scale or, as applicable, using level 0 (below the scale). EIT are not however rated on this scale (which is consistent with the fact that they are not significant).

2.3. Regulatory framework

2.3.1 Environment Code

Article L. 591-5 of the Environment Code sets out the principle of ASN notification of certain significant transport events.

Article L. 591-5 of the Environment Code
"The licensee of a BNI or the person responsible for transporting radioactive substances is required to notify ASN and the administrative authority, as rapidly as possible, of any accidents or incidents which have occurred owing to the operation of this installation or to this transport operation, such as to significantly jeopardise the interests mentioned in article L. 593-1. *This notification takes the place of that stipulated in article L. 1333-13 of the Public Health Code, should it be required."*

The "*transport operation"* mentioned in this article should be considered in the broad sense recalled in part 1.2.

The *"accidents and incidents such as to significantly jeopardise the interests mentioned in article L. 593-1"* form a sub-set of the significant events (EST): those with the highest potential consequences for the protection of the interests mentioned in article L. 593-1.

"As rapidly as possible" depends on the urgency of the situation, which must be assessed by the person responsible for the transport operation in the light of the confirmed or potential consequences of the event and the rapidity of the reaction needed to prevent the situation from worsening or to mitigate its consequences. This time can thus in certain cases mean "immediately", which requires notification within a period shorter than that defined in part 3.

The *"person responsible for the transport operation"* is to be taken as defined in part 3.1 of this Guide (or part 3.3 for air transport).
It should be noted that in addition to these provisions, all the transport stakeholders aware of an emergency situation must immediately notify the competent authorities (sections 1.4.1.2 and 1.7.6.1 of the ADR [7], the RID [8] and the ADN [9], sections 1-6.6 and 7-4.1 of the ICAO TI [11]).

If the situation is not particularly urgent, the notification of the events according to the procedures in this Guide is sufficient to meet the obligations of article L. 591-5 (and thus those of article L. 1333-13 of the Public Health Code). In particular, *"as rapidly as possible"* and *"the person responsible for a transport operation"*, concerned by the notification obligation, are those indicated in part 3.1 of this Guide (or in part 3.3 for air transport).

The prescriptions of article L. 591-5 apply whatever the mode of transport considered.

2.3.2 Terrestrial transport: road, rail and river

Sections 1.8.5 of the ADR [7], the RID [8] and the ADN [9] require the notification of certain events involving the carriage of dangerous goods by road, rail or river.

Section 1.8.5.1

"If a serious accident or incident takes place during loading, filling, carriage or unloading of dangerous goods on the territory of a Contracting Party, the loader, filler, carrier or consignee respectively [and as applicable the rail infrastructure manager] shall ascertain that a report […] is made to the competent authority at the latest one month after the occurrence."

Section 1.8.5.3

"An occurrence subject to report in accordance with 1.8.5.1 has occurred if dangerous goods were released or if there was an imminent risk of loss of product, if personal injury, material or environmental damage occurred, or if the authorities were involved and one or more of the following criteria has/have been met:

Personal injury means an occurrence in which death or injury directly relating to the dangerous goods carried has occurred, and where the injury

a) requires intensive medical treatment;

b) requires a stay in hospital of at least one day; or

c) results in the inability to work for at least three consecutive days.

[…]

In occurrences involving radioactive material, the criteria for loss of product are:

a) any release of radioactive material from the package;

b) exposure leading to a breach of the limits set out in the regulations for protection of workers and members of the public against ionising radiation (Schedule II of the IAEA Safety Series No. 115 – "International Basic Safety Standards for Protection Against Ionising Radiation and for Safety of Radiation Sources"); or

c) Where there is reason to believe that there has been significant degradation in any package safety function (containment, shielding, thermal protection or criticality) that may have rendered the package unsuitable for continued carriage without additional safety measures.

"Material damage or environmental damage" means the release of dangerous goods, irrespective of the quantity, where the estimated amount of the damage exceeds 50,000 euros. Damage to any directly involved means of carriage containing dangerous goods and to the modal infrastructure shall not be taken into account for this purpose.

"Involvement of authorities" means the direct involvement of the authorities or emergency services during the occurrence involving dangerous goods and the evacuation of persons or closure of public traffic routes (road/railways) for at least three hours owing to the danger posed by the dangerous goods.

If necessary, the competent authority may request further relevant information".

These provisions are supplemented by sections 1.7.6.1 of the ADR [7], RID [8] and ADN [9], which require notification and processing of the event.

Section 1.7.6.1

"In the event of non-compliance with any limit in ADR [or RID, or ADN] applicable to radiation level or contamination,

a) the consignor, consignee, carrier and any organisation involved during carriage who may be affected, as appropriate, shall be informed of the non-compliance by:

i. the carrier if the non-compliance is identified during carriage; or

ii. the consignee if the non-compliance is identified at receipt;

b) the carrier, consignor or consignee, as appropriate, shall:

i. take immediate steps to mitigate the consequences of the non-compliance;

ii. investigate the non-compliance and its causes, circumstances and consequences;

iii. take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and

iv. communicate to the competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and

c) *The communication of the non-compliance to the consignor and competent authority(ies) respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing."*

The provisions of section 1.8.5 and those of sub-sections b-iv) and c) (with regard to ASN) of section 1.7.6.1, are considered to be met for carriage by road, rail and inland waterway, once the prescriptions of article 7.4 of order [3] have been met (provided that in an emergency situation, notification is made as rapidly as possible as stated in part 2.3.1 of this Guide).

Article 7-4 of the TMD order

" *4. Provisions concerning notification of events involving the carriage of radioactive materials*

4.1. Significant events involving the carriage of radioactive materials, defined in the ASN Guide on procedures for the notification of transport-related events (see https://www.asn.fr) are, independently of the report obligations concerning the safety of transport, to be notified and reported owing to their potential impact on the protection of nature and the environment and public health and safety.

4.2. The notification is sent to ASN within four working days of identification of the event in accordance with the procedures in the above-mentioned ASN guide. It is transmitted within the time set in article L. 591-5 of the Environment Code, or article L. 1333-13 of the Public Health Code, when these articles apply.

4.3. The event report is transmitted to ASN within two months of identification of the event, in accordance with the procedures of the above-mentioned ASN guide.

4.4. For events covered by 1.8.5, the further information provided for in the report mentioned in section 4.3 of this article is systematically added to the standard report of 1.8.5.4. Sending the report to ASN in accordance with section 4.3 is deemed to have met the report transmission obligation of 1.8.5."

Compliance with the procedures of this Guide, taking account of part 2.3.1 above, complies with the requirements of article 7-4, and thus those of section 1.8.5 and sub-sections b-iv) and c) (regarding ASN) of section 1.7.6.1 of regulations [7], [8] and [9].

2.3.3 Air transport

With regard to air transport, section 7 of part 1 and sections 4.4 and 4.5 of part 7 of the ICAO's Technical Instructions (TI) [11] stipulate a number of requirements regarding the notification of events.

Section 7 of part 1
"When an incident or accident involving dangerous goods occurs, or it is found that an incident or accident concerning dangerous goods has occurred, the entities other than the operators in possession of dangerous goods should comply with the relevant prescriptions of the reports in § 4.4 of Part 7. The entities other than the operators who identify undeclared or incorrectly declared dangerous goods should comply with the relevant prescriptions of the reports of § 4.5 of Part 7. These entities may include but are not restricted to forwarding agents, customs administrations and suppliers of inspection/security services."
Section 4.4 of part 7
"The operator is required to notify accidents and incidents involving dangerous goods to the competent authorities of the operators State and the State in which the accident or incident occurred, in accordance with the requirements for reporting to the competent authorities."
Section 4.5 of part 7
"The operator shall notify all cases in which undeclared or incorrectly declared dangerous goods have been identified in the cargo or in the post. These reports shall be presented to the competent authorities of the State of the operator and the State in which the case occurred. The operator shall also notify all cases in which dangerous goods, the carriage of which is prohibited by § 1.1.1 of Part 8 are identified in the baggage or on the person of passengers or crewmembers. These reports shall be presented to the competent authority of the State in which the case occurred."

These provisions are supplemented by the "French divergence", in other words a section which applies only to France, the code of which is FR 5.

FR5
"A written report concerning all incidents/accidents involving a class 7 package and occurring on French territory shall be sent by the operator (or its representative) within 48 hours to ASN[…], with a copy to the DGAC, and drafted in accordance with the procedures guide for notification of events in the carriage of radioactive materials, available on its website (www.asn.fr). *This provision also applies on French territory:* - *to the airport assistance company acting on behalf of the operator;* - *to any company in charge of dangerous goods loading/unloading operations;* - *to any company in charge of handling and warehousing of dangerous goods in an airport facility."*

With regard to the notification and processing of the event, section 6.6 of part 1 of the ICAO TI [11] set out several requirements.

Section 6.6 of part 1
"*In the event of non-compliance with any limit in these Instructions applicable to radiation level or contamination:* *a) the consignor, consignee, operator and any organisation involved in carriage, which could suffer the effects, shall be informed of this non-compliance:* *1) by the operator if the non-compliance is identified during carriage;* *2) by the consignee if the non-compliance is identified on receipt;* *b) the operator, consignor or consignee, as applicable, shall:* *1) take immediate steps to mitigate the consequences of the non-compliance;* *2) investigate the non-compliance and its causes, circumstances and impacts;*

3) take appropriate steps to eliminate the causes and circumstances leading to the non-compliance and prevent the same circumstances from occurring again;

4) inform the competent authority(ies) of the causes of the non-compliance and the correction or prevention measures which have been or should be taken;

c) the non-compliance shall as soon as possible be made known to the consignor and the competent authority(ies) concerned, respectively, and shall be immediately notified when an emergency exposure situation develops or is in the process of developing."

The ICAO IT [11] are made binding by European regulations [2]. Article "OPS 1.1225" of these regulations also specifies maximum times by which the authorities must be informed.

OPS 1.1225

"*a) An operator shall report dangerous goods incidents and accidents to the Authority and the appropriate Authority in the State where the accident or incident occurred, as provided for in Appendix 1 to OPS 1.1225. The first report shall be dispatched within 72 hours of the event unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established."*

A difference in vocabulary should be noted between the ICAO IT [11] and the regulations applicable to the other modes of transport: in the above extracts, the "*report"* in question is the notification as defined in this Guide. It should not be confused with the significant event report required by this Guide. Similarly, the *"report"* mentioned in the regulations [2] is also the notification as defined in this Guide.

The notification of events as described in this Guide, taking account of part 2.3.1, enables the prescriptions of the European regulations [2] and those of sections 7.1 of part 1 and 4.4 of part 7, the divergence FR5 and sub-sections b-4) and c) (with regard to ASN) of section 6.6 of part 1 of the ICAO IT [11] all to be met.

2.3.4 Maritime transport

With regard to maritime transport, section 1.5.6.1 of the IMDG code [10] requires event notification and processing measures.

Section 1.5.6.1 if the IMDG code

"*In the event of a non-compliance with any limit in the provisions of this Code applicable to radiation level or contamination,*

1. *the consignor, consignee, carrier and any other organisation involved in carriage, which could suffer the effects, shall be informed of this non-compliance by:*
    1. *the carrier if the non-compliance is identified during transport;*
    2. *the consignee if the non-compliance is identified at receipt;*
2. *the carrier, consignor or consignee shall, as applicable:*
    1. *take immediate steps to mitigate the consequences of the non-compliance;*
    2. *investigate the non-compliance and its causes, circumstances and consequences;*
    3. *take appropriate action to remedy the causes and circumstances which led to the non-compliance and to prevent a recurrence of similar circumstances which led to the non-compliance;*
    4. *communicate to the relevant competent authority(ies) on the causes of the non-compliance and the corrective or preventive actions taken to be taken;*

3. *the communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable when an emergency exposure situation has developed or is developing".*

These provisions are supplemented by a non-mandatory section (7.8.4.6) valid only for ships in ports.

Section 7.8.4.6 of the IMDG code

"In the event of a package containing radioactive material suffering from breakage or leakage while the ship is in port, the port authorities should be informed and advice obtained from them or from the competent authority."

The notification of events as described in this guide, taking account of part 2.3.1 of this Guide, enable the provisions of paragraphs 2-4) and 3) (with regard to ASN) of section 1.5.6.1. to be met.

2.3.5 Penalty for non-notification

Article R. 1252-9 of the Transports Code imposes a fine applicable to fifth category violations for any failure to comply with the prescriptions of order [3], the ADR [7], the RID [8] and the ADN [9] with regard *"to the documents to be sent to or held at the disposal of the competent authority(ies)"*. This includes failure to notify events when the authorities must be informed of such events (see previous sections).

Under article L. 596-11 of the Environment Code, any failure to notify may also lead to a fine or term of imprisonment.

Article L. 596-11 of the Environment Code

"V. – *Failure by the licensee of a BNI or the person responsible for the transport of radioactive substances to submit the notifications required by article L.591-5 is punishable by one year of imprisonment and a fine of €15,000 in the event of an incident or accident with actual or potential significant consequences for the nuclear safety of the facility or transport, or owing to significant exposure to ionising radiation, which could prejudice persons, property or the environment."*

3. RESPONSIBILITY FOR NOTIFICATION OF AN EVENT AND ITS ANALYSIS, PLUS THE CORRESPONDING TIME-FRAMES

3.1. Notification of events

3.1.1 Party required to make the notification

Except for the special case covered in part 3.3 below, the obligation for notifying ASN of an EST that has occurred owing to the transport of radioactive substances lies with the person responsible for this transport. This provision is consistent with that of article L. 591-5 of the Environment Code, which only concerns the EST with the most significant implications for the protection of the interests mentioned in article L. 593-1 (see part 2.3.1). As recalled in part 1.2, transport covers a vast range of different operations and the party responsible for the transport may therefore differ depending on the operation in question. **ASN must therefore be notified by the party responsible for the transport operation during which the event was identified**. These provisions also apply to the non-mandatory notification of EITs.

Thus, for events identified during:

- the design of the radioactive substances package model: notification is the responsibility of the company to which package model approval was issued, in the case of packages requiring approval by the authority, or of the company which drew up the package model compliance certificate, in all other cases;
- manufacture of the transport packaging: notification is the responsibility of the manufacturing owner;
- maintenance or repair of the packaging: notification is the responsibility of the packaging owner;
- preparation for transport of the package, including its documents, in other words the packaging and its contents: notification is the responsibility of the consignor;
- loading of the package, or of the radioactive substances, into the vehicle, the overpack or the container (including filling of tankers): notification is the responsibility of the consignor;
- carriage or parking of the vehicle during transport: notification is the responsibility of the carrier physically in charge of the package at the moment of identification;
- handling of the package or storage of the package during transit (possibly off a vehicle) when changing transport modes or vehicles: notification is the responsibility of the party organising transport;
- unloading of the package at its destination (including emptying of tankers): notification is the responsibility of the consignee;
- receipt, which more specifically includes the checks to be made when the package is received at its destination: notification is the responsibility of the consignee.

In all other cases, notification is the responsibility of the consignor.

Exceptionally, if the party responsible for notification as identified above has no site in France, the order of priority of responsibility for notification is as follows:

- the consignor, if the place of dispatch is in France; or
- the organiser of the transport, if it has a site in France; or
- the consignee, if the destination is in France; or
- the carrier.

If, for whatever reason, notification of the EST to ASN is carried out by a different entity (for example by the party responsible for drafting the CRES: see part 3.2 below), the party responsible for notification as identified above is not absolved of responsibility: it shall more specifically ensure that the notification was made within the allotted time (see part 3.1.2 below).

The other transport stakeholders concerned by an event are not required to notify ASN of it. They shall nonetheless provide the party responsible for notification with the necessary information in sufficiently good time for the notification to be made within the allotted time.

In the case of events, whether EST or EIT, for which at least one consignor is identified, the party issuing the notification shall inform this consignor and send it a copy of the notification. This provision is designed to ensure that the consignor has an overview of events affecting all of its shipments and is thus able to identify any recurring events. This also enables it to meet its obligations regarding the analysis of the event (see part 3.2).

Finally, it should be remembered that notification of events to ASN is part of the process to compile and analyse operating experience feedback with a view to improving transport safety: this notification has no punitive scope and in no way prejudges any criminal liability.

3.1.2 Notification time-frame

Other than in emergencies, the notification of significant events (EST) must be transmitted by the party responsible for notification within **four working days** following identification of the event[1] for all modes of transport concerned, except for air (see part 3.3 below).

In an emergency, as recalled in part 2.3.1 above, ASN must be immediately alerted by any stakeholder aware of the event. A notification complying with the procedures of this guide will be made subsequently, once the emergency phase is over.

With regard to transport-related events (EIT), as stated in 2.2.3, ASN wishes to be notified for information purposes. This notification can take the form of a summary grouping similar EITs together. The frequency of transmission to ASN is tailored to the frequency of the reviews of deviations and anomalies carried out by the management system, but should not exceed one year. It is however necessary to rapidly determine whether the event is category EIT or EST.

3.2. Analysis of events

3.2.1 Principles

The EIT and EST must undergo an analysis proportionate to the implications of the event, in order to learn fully from them, within the framework of the management system required by regulations [7] to [11]. The analysis process must be triggered independently of the ASN notification time-frame.

In the case of an EIT, the analysis does not need to be transmitted to ASN. It must however be formally recorded and may be examined by ASN during the course of an inspection.

[1] ASN nonetheless wishes to be rapidly informed of any circumstance liable to attract particular attention from the media or public, regardless of the severity. This information, for which there is no specific format, is independent of any notification as EST or EIT.

In the case of an EST, a significant event report (CRES) containing an in-depth analysis of the EST must be sent to ASN **within two months** following identification of the event.

The CRES shall comprise at least the following:

- the detailed description of the EST and its management, including any remedial steps taken to deal with the consequences;
- an analysis of the potential consequences, in order to determine whether the EST could be a precursor of more serious events;
- a detailed analysis of the causes of the EST, more specifically its root causes;
- a presentation of the corrective and preventive measures taken to prevent such an event or a similar event from recurring;
- the identification of any best practices to be systematically adopted.

3.2.2 Party required to carry out the analysis

The entity most competent to analyse the events and define the corrective measures required is that responsible for the transport operation during which the event occurred. Experience in recent years shows that, in most cases, this is the consignor**. The responsibility for drafting the CRES and transmitting it to ASN, therefore lies, by default, with the consignor**, except for the special cases detailed in part 3.3 below.

So that the consignor can carry out the analysis, the notifying party must send it a copy of the notification made to ASN.

However, if a first analysis indicates that the main cause of the event is due to a transport operation not under the responsibility of the consignor, then responsibility for drafting the CRES and transmitting it to ASN lies with the party responsible for the operation which caused the event (see 3.2.3 below), provided that:

- the party responsible for the operation which caused the event can be identified fast enough for the CRES transmission time to be respected;
- the party responsible for the operation which caused the event gives the consignor its official consent;
- ASN must be informed of the identity of the party responsible for transmission of the CRES.

Moreover, if the place of dispatch is outside France or if no consignor is identified (for example, an event occurring during manufacturing), then drafting of the CRES and its transmission are the responsibility of the party responsible for the operation which caused the event. If this party does not have a site in France or cannot be identified or contacted, then this responsibility lies with the party responsible for notification, as identified in part 3.1.1.

The party responsible for transmission of the CRES may send ASN a notification amendment if it considers that the EST/EIT classification, the notification criterion or the INES rating of the event needs to be revised. In this case, this amended notification should be submitted rapidly, in order to make it easier for ASN to take account of this revision.

Once again, it should be remembered that notification of events to ASN is part of the process to compile and analyse operating experience feedback with a view to improving transport safety: this notification has no punitive scope and in no way prejudges any criminal liability.

3.2.3 Identification of the party responsible for the transport operation which caused the event

Therefore, for the events primarily caused by:

- the design of the radioactive substances package model (for example: design weakness undetected before an approval certificate is obtained): it is considered that the party responsible for the operation is the company to which package model approval was issued, in the case of packages requiring approval by the authority, or the company which drew up the package model compliance certificate, in all other cases;
- manufacture of the transport packaging (for example: non-compliance of the manufactured packaging undetected by the quality controls): it is considered that the party responsible for the operation is the manufacturing owner;
- maintenance or repair of the packaging (for example: error in installation of a spare part, undetected by quality controls): it is considered that the party responsible for the operation is the owner of the packaging;
- preparation for transport of the package, including its documents, in other words the packaging and its contents (for example: error in the shipment declaration, deviation at closure of the package): it is considered that the party responsible for the operation is the consignor;
- loading of the package, or of the radioactive substances, into the vehicle, the overpack or the container (including filling of tankers) (for example: non-conforming content placed in the package): it is considered that the party responsible for the operation is the consignor;
- carriage or parking of the vehicle during transport (for example: parking in an unauthorised location, untrained driver, non-conforming vehicle, collision during carriage, etc.): it is considered that the party responsible for the operation is the carrier physically in charge of the package at the moment of the event;
- handling of the package when changing transport modes or vehicles, or storage of the package during transit (possibly off a vehicle) (for example: significant impact during handling, package lost in warehouse, etc.): it is considered that the party responsible for the operation is the transport organiser;
- unloading of the package at its destination (including emptying of tankers) (for example: damage of the package during unloading): it is considered that the party responsible for the operation is the consignee;
- on receipt, which more specifically includes the checks to be made when the package is received (for example: absence of these checks, failure to record receipt of the package, etc.), or refusal to accept the package at its destination: it is considered that the party responsible for the operation is the consignee.

3.2.4 Information sharing and integration of experience feedback

All the transport stakeholders concerned by the event must provide the party drafting the CRES with the pertinent information at their disposal, within a time enabling the two-month deadline to be met. In return, once the CRES has been completed, its pertinent data must be transmitted to the other stakeholders so that they can learn all the relevant lessons.

Apart from the party responsible for drafting the CRES, all the stakeholders involved in the transport operation must analyse the events concerning them, in order to learn all relevant lessons, within the

framework of the management system required by the regulations [7] to [11]. This analysis does not need to be sent to ASN, but must be officially recorded and may be examined during an inspection.

3.3. Particularities of the air transport mode (notification of events and analysis)

In order to comply with the prescriptions of regulation [2], all the ESTs occurring or identified within an airport installation, or during carriage by air, must be notified by the operator (that is the entity which operates the aircraft involved in this event) **within 48 hours** of its identification. In this case, this notification acts as the notification of significant event and the information given in part 3.1.1 on the party responsible for notification does not apply.

In practice, it is acceptable for ASN to be notified by an entity more directly concerned and not by the operator, more specifically if this latter has no site in France. **However, the operator remains responsible for ensuring that a notification has actually been sent to ASN.**

The ICAO IT [11] specify that the obligation of EST notification within 48 hours, also applies to the following entities, if they are involved in the EST:

- the airport assistance company acting on behalf of the operator;
- any company responsible for loading/unloading of dangerous goods;
- any company responsible for handling and warehousing of dangerous goods in an airport installation.

If the operator or one of these entities has already notified ASN within 48 hours, the other entities are not required to send ASN an additional notification. Apart from these particularities, notification follows the procedures of part 3.1.

In accordance with part 3.2, a CRES shall be sent to ASN within two months of identification of the EST. This will be drafted either by the operator, or by the entity most directly concerned by the event, with the agreement of the operator. **In any case, the operator remains responsible for ensuring that a CRES has actually been sent to ASN.** Apart from this particularity, the procedures of part 3.2 above apply.

ASN also wishes to receive notification of EIT related to air transport. This is then carried out in the same way as for the other modes. The particularity lies in the fact that the party issuing the notification is the operator, if it has a site in France, or the entity most directly concerned, with the approval of the operator.

4. PRACTICAL ASPECTS

Step 1: Collating factual information about the event

When they become aware of the occurrence of an event, the party responsible for notification begins by collecting factual information about the event:

- date of the event (or of its identification);
- place where the event occurred (or was identified);
- identification of the package(s) (normal description of the goods, UN N°, package type, transport index, criticality safety index for fissile materials);
- description of what happened, in particular the damage to the package or whether a radioactive substance leak was detected;
- identification of transport stakeholders (consignor, consignee, carrier, freight forwarding agent);
- any interim or immediate remedial measures.

Step 2: Determine whether the event is an EST

Using the definitions given in part 2 and the notification criteria appearing in the appendix to this guide, as well as the operating experience feedback sheets available on the ASN website (www.asn.fr), the party responsible for notification identifies the nature of the event: EIT or EST.

An EST must systematically be classified according to one and only one notification criterion. Conversely, any event which corresponds to one of the criteria in the appendix is an EST.

Step 3: Propose a significant event (EST) rating on the INES scale

The EST notification must comprise a proposed rating on the INES scale, if necessary using level 0, which will then be confirmed or otherwise by ASN when investigating the EST.

To determine the INES rating, the party responsible for notification uses the INES scale user's manual published by IAEA on its website.

Step 4: Notify ASN of the event within the allotted time

Notification requires no analysis of the causes of the event and can therefore be made rapidly. However, if some causes are already known, they may appear in the notification.

Notification of an EST must be sent in accordance with the allotted time set out in part 3.1 (or in part 3.3 for air transport), even if certain data are still missing. It is then possible to make a notification correction.

For the ESTs, the notification must be made using the form provided on the website http://professionnels.asn.fr. This form may also be used to notify EITs.

The notification is transmitted by email or by post to all of the following entities:

ASN, Autorité de sûreté nucléaire (*French nuclear safety authority*)	dts-transport@asn.fr (transmission by email is preferred)	ASN - DTS 15, rue Louis Lejeune CS 70013 92541 Montrouge Cedex
IRSN, Institut de radioprotection et de sûreté nucléaire (*French Institute for Radiation Protection and Nuclear Safety*)	IRSN BP 17 92262 Fontenay-aux-Roses Cedex	

In addition, for air transport, the notification must also be sent to the French Civil Aviation Authority (DGAC) in accordance with its own specific procedures.

Finally, it should be remembered that a copy of the notification must be sent to the consignor if it has been identified (see part 3.1.1 above).

A remote-notification tool will be made available on the ASN website. Once in place, remote-notification will be used for notification of ASN and IRSN.

Step 5: Drawing up a significant event report (CRES)

For each EST, a CRES is drawn up and transmitted to ASN, as stipulated in part 3.2 of this Guide (or in part 3.3 for air transport).

The CRES is sent out to the entities mentioned in step 4, as well as to the ASN regional division of the party drafting the CRES (the particulars of the divisions can be found on the ASN website: www.asn.fr).

In order to comply with the requirements of this Guide, it is advisable to use the specimen CRES provided on the site http://professionnels.asn.fr. The CRES can be supplemented by any documents felt to be of use for satisfactory understanding and analysis of the event.

5. ASN INFORMATION OF THE PUBLIC AND INTERNATIONAL ORGANISATIONS

One of the duties of ASN is to take part in informing the public in the fields of nuclear safety and radiation protection.

Therefore:

- significant events (EST) rated level 0 on the INES scale are not systematically made public by ASN. They may however be revealed to the public if of particular interest;
- significant events (EST) rated level 1 and higher on the INES scale are the subject of an incident report on the ASN website;
- significant events (EST) rated level 2 and higher on the INES scale are also brought to the attention of journalists through ASN press releases or by telephone contacts.

ASN also informs IAEA of significant events rated level 2 or higher on the INES scale, and as of level 1 in the case of a loss of a package with a French consignor.

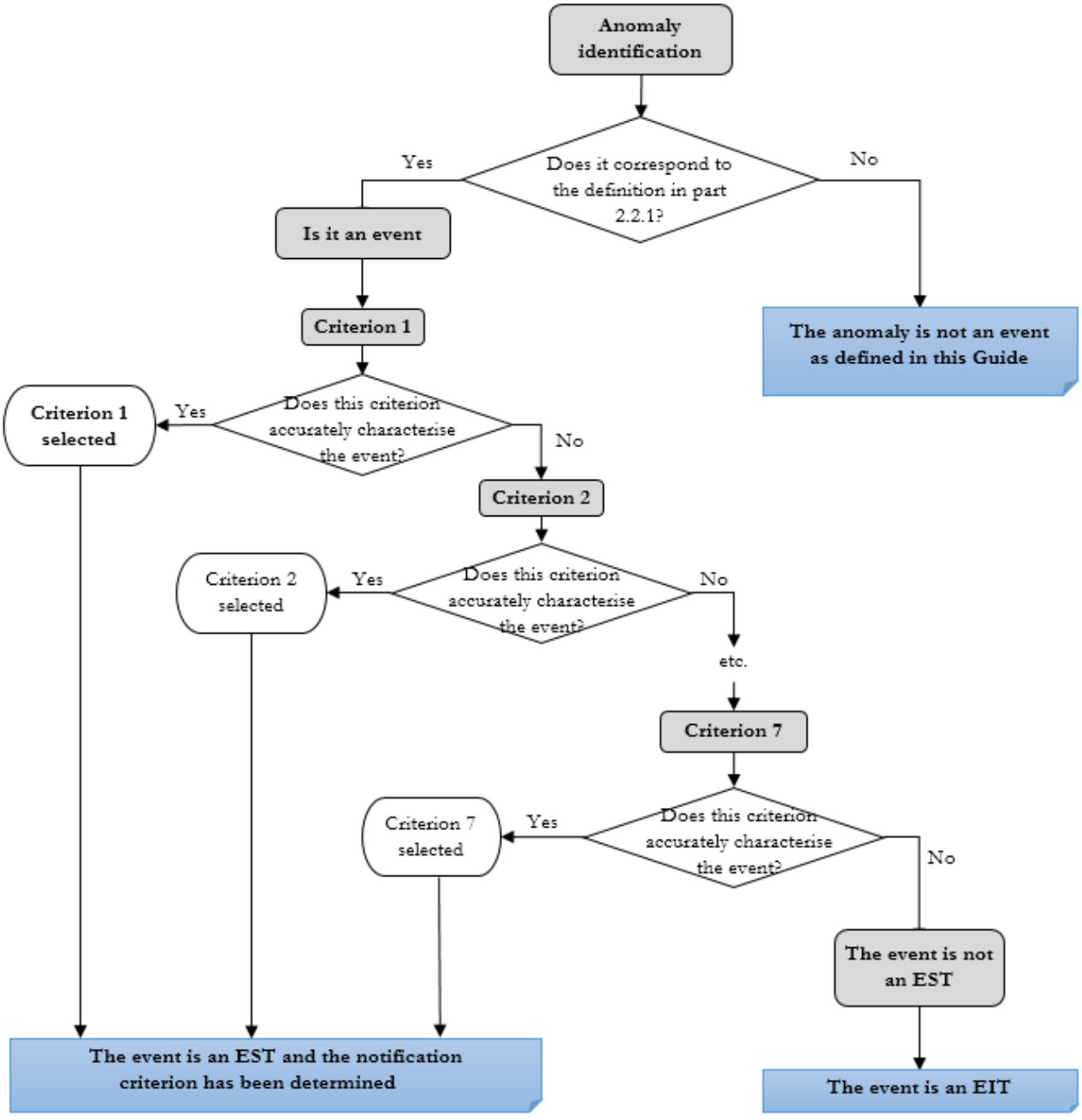
Finally, the ASN annual report includes a summary of significant events which have occurred during the past year.

6. GLOSSARY

ADN	European Agreement concerning the international carriage of dangerous goods by inland waterways
ADR	European agreement concerning the international carriage of dangerous goods by road
NEA	OECD's Nuclear Energy Agency
IAEA	International Atomic Energy Agency
ASN	*Autorité de sûreté nucléaire* - French nuclear safety regulator
CRES	Significant event report
DGAC	French Civil Aviation Authority
EIT	Event affecting transport safety, see part 2.2.3
EST	Significant event involving transports, see part 2.2.2
IMDG	International Maritime Dangerous Goods code
BNI	Basic Nuclear Installation
INES	International Nuclear Events Scale, for rating nuclear events, see chapter 2.2.4
Interests mentioned in article L. 593-1 of the Environment Code	Public health and safety, protection of nature and the environment. Note: Here "safety" must be understood in terms of "public safety" rather than "nuclear safety".
IRSN	*Institut de radioprotection et de sûreté nucléaire* - French Institute for Radiation Protection and Nuclear Safety
ICAO	International Civil Aviation Organisation
RID	Regulations governing the international carriage of dangerous goods by rail
Radioactive substance	Any substance which contains one or more radionuclides, the activity or concentration of which cannot be ignored from the radiation protection standpoint. This term is equivalent to the term "radioactive materials" used in the texts in references [1] to [11].
TMD	Transport of dangerous goods

APPENDIX: NOTIFICATION CRITERIA FOR SIGNIFICANT EVENTS IN THE FIELD OF TRANSPORT OF RADIOACTIVE SUBSTANCES

A single notification criterion shall be used. To select the notification criterion, the criteria should be reviewed in order, starting with the first. The first criterion whose definition corresponds to the event should be used, as shown in the following flowchart.



The criteria allow easier identification of the characteristics common to different events and encourage the sharing of operating experience feedback. Their order does not correspond to any order of severity.

The criteria and examples of events corresponding to such or such a criterion are described in detail below.

Criterion 1	**Event leading to a significant degradation of a containment barrier for the radioactive substance carried, or of a package safety function.**

The safety functions are defined as being design provisions for the package (the packaging and its content) or the unpackaged transported material, which ensure containment of the radioactive content, management of external radiation, prevention of criticality, radiological protection, the prevention of damage caused by heat, the removal of residual heat. They also include protection against impacts and protection against fire.

Clarifications:

- significant deterioration of the lead radiological shielding (or other materials used for this purpose) fall within this criterion;
- significant degradation of the cooling fins of a spent fuel package fall within this criterion.

Criterion 2	**Event leading to or potentially leading to significant damage to the package, the unpackaged transported material or the conveyance, affecting transport safety, whatever the cause (natural phenomena or human activity).**

Clarifications:

- criterion 2 may be chosen in preference to criterion 1, provided that the hazard constituting the event has not significantly affected any of the package safety functions;
- stowage faults, if significant, fall within this criterion because they can lead to a hazard for the package in the event of an accident;
- incorrect attachment of package mechanical protection, if significant, falls within this criterion for the same reason;
- traffic accidents having significantly affected the conveyance or stressed the robustness of the package beyond routine transport conditions fall within this criterion;
- actual or attempted malicious acts are considered to be human activities within the meaning of this criterion.

Criterion 3	**Non-compliance with one of the regulation limits applicable to radiation level or contamination**

This criterion covers the events specified in 1.7.6.1 of the ADR. The following cases in particular fall within this category:

- regulation dose rate or contamination limits exceeded over entire outer surface of packages or at a distance of 1 metre;
- regulation dose rate or contamination limits exceeded over entire outer or inner surface of overpack, container or conveyance, or at a distance of 2 metres;
- dispersion of radioactive material, not as a result of a hazard, occurring during loading, unloading, handling or filling (for example when connecting a tanker for filling) and leading to the regulation contamination limits being exceeded.

Criterion 4	**Traceability error or presence of a package of radioactive substances in an inappropriate place.**

The following cases in particular fall within this category:

- confirmed theft of the package during transport operations (loading, unloading, transport, storage in transit): the consequence of the event being the disappearance of the radioactive substance being transported;
- loss of package traceability, even temporarily;
- delivery errors;
- delivery of a package to a consignee not authorised to receive the radioactive substance;
- discovery of a package from a shipment for which no loss of traceability had been notified.

Criterion 5	**Non-compliance with a regulatory requirement for the transport of radioactive substances with significant consequences, deviation or non-compliance linked to the provisions designed to guarantee the protection of the interests mentioned in L. 593-1 of the Environment Code.**

A regulatory requirement is more specifically understood to mean the provisions set out in the orders concerning each mode (road, rail, river, sea, air). This criterion also covers:

- non-compliance with the package model or material approval certificates and shipment approval certificates, conformity certifications, and utilisation and maintenance manuals, when these non-compliances can have significant safety consequences;
- non-compliance with the provisions of the Labour Code, the Public Health Code or the radiological protection programme (for example, failure to wear a dosimeter when required) with potential significant consequences for the radiation protection of workers or the public;
- signage and placarding deviations leading to under-estimation of the potential risk from the package (for example initial measurement error leading to under-estimation of the labelling category);
- storage during transit or parking in an inappropriate place;
- shipments of packages of radioactive substances via an unauthorised route (for example by post or by public transport if this is prohibited).

Criterion 6	**Event affecting a safety function considered to be minor and with no consequences, once it becomes repetitive and for which the cause has not been identified, or which is liable to be a precursor of significant events involving transports.**

More specifically, the repetition of EITs of the same type can, when taken together, be considered to be an EST in accordance with this criterion.

Criterion 7	**Other event linked to the transport of radioactive substances and considered to be significant.**

The following cases in particular fall within this category:

- events leading to death or hospitalisation but not affecting the package of radioactive substance or the package conveyance;
- any event considered to be significant by ASN or the party responsible for the transport but not covered by any of the previous criteria.