

Implementation of the regulatory requirements applicable to on-site transport operations

GUIDE No. 34

Version of 06/27/2017



Preamble

The ASN collection of guides is intended for professionals concerned by the nuclear safety and radiation protection regulations (licensees, users or transporters of ionising radiation sources, health professionals).

These guides can also be issued to the various stakeholders, such as the local information committees (CLIs).

Each guide sets out recommendations with the aim of:

- explaining the regulations and the rights and obligations of the persons concerned by the regulations;*
- explaining the regulatory objectives and, as applicable, describing the practices considered by ASN to be satisfactory*
- giving practical tips and information concerning nuclear safety and radiation protection*



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1. INTRODUCTION

1.1. Purpose of the guide

The internal transport operations of dangerous goods conducted on the private roadways of a nuclear site, that is to say a site accommodating one basic nuclear installation (BNI) or more, are generally not subject to the regulations applicable to the transport of dangerous goods on the public highway¹.

Control of the risks and adverse effects for the interests mentioned in article L. 593-1 of the Environment Code (public health and safety and protection of nature and the environment) resulting from the on-site transport operations is governed by the regulations applicable to BNIs.

The definition of on-site transport operations is given in article 1.3 of the order [1].

Extract from article 1.3 of the order of 7th February 2012

- on-site transport operation: transport of hazardous goods within the perimeter of a basic nuclear installation, outside the buildings and storage yards, or operation contributing to transport safety, including within the buildings and storage yards;

The purpose of this guide is to set out the ASN recommendations to help BNI licensees take into account the risks that the on-site transport operations represent for the interests mentioned in article L. 593-1 of the Environment Code. Taking account of the risks forms the subject of the demonstrations mentioned in article L. 593-7 of the Environment Code.

1.2. Scope of application

This guide applies to all on-site dangerous goods transport operations, which includes transport operations going to or coming from the public highway. It concerns all **dangerous goods transport operations, all risk classes combined**, not just radioactive substances, and all modes of transport.

The guide concerns all the life cycle phases of BNIs, from creation authorisation through to delicensing. It nevertheless focuses on the phases that come after commissioning (or partial commissioning if applicable).

For the phases extending from creation authorisation to commissioning – including partial commissioning if applicable - the on-site transport operations that do not comply with the regulations applicable to the public highway must be taken into account in the safety analysis report (SAR) as indicated in part 3 below and the requirements that regulate them should be described in the integrated management system with content similar to that of part 4 below.

1.3. Status of the guide

This guide was subject to public consultation from 29 August to 26 September 2016. It will be updated when the ASN resolution concerning the general operating rules of basic nuclear installations, known as the "RGE resolution", enters into effect.

¹ Article 1, paragraph 4 of the TMD order [3] stipulates that these regulations do not apply to transport operations carried out entirely within a closed perimeter



2. REGULATORY CONTEXT AND FRAMEWORK

2.1. Regulatory references and ASN guides

The main reference texts for on-site dangerous goods transport operations are listed below:

- [1] Order of 7th February 2012 amended setting the general rules concerning basic nuclear installations, known as the "BNI order"
- [2] Decree 2007-1557 of 2nd November 2007 amended concerning basic nuclear installations and the oversight, with respect to nuclear safety, of the transport of radioactive substances, known as the "BNI procedures decree"
- [3] Order of 29th May 2009 amended relative to the land transport of dangerous goods (known as the "TMD order").
- [4] ASN resolution 2008-DC-0106 of 11th July 2008 concerning the implementation of internal authorisation systems in basic nuclear installations
- [5] ASN resolution 2015-DC-0532 of 17th November 2015 relative to the safety analysis report for basic nuclear installations, known as the "RDS resolution"
- [6] ASN resolution 2014-DC-0462 of 7th October 2014 relative to control of the criticality risk in basic nuclear installations
- [7] ASN Guide No. 9 "Determining the perimeter of a BNI"

Note: The ASN resolution relative to the general operating rules for basic nuclear installations, known as the "RGE resolution", was not yet issued on the date of publication of this guide. When this resolution enters into effect, its requirements will prevail over those of this guide, pending updating of the guide.

2.2. Definition

The definition of *on-site transport operations* is given in article 1.3 of the BNI order [1]. On-site transport operations include:

- *the transport of dangerous goods within the perimeter of a basic nuclear installation outside the buildings and storage yards*, that is to say the **carriage** of dangerous goods:
 - from a BNI building or BNI storage yard to the exit of the BNI perimeter;
 - from the entrance of the BNI perimeter to a building or a storage yard that is part of the BNI;
 - between buildings or storage yards of a given BNI;
 - or any other transport operation transiting within the perimeter of a BNI, outside buildings and storage yards.

Note: Carriage operations within the buildings or storage yards are outside the scope of this guide². Carriage operations outside buildings, including those taking place off roadways, are governed by this guide because they constitute on-site transport operations.

- *the operations that contribute to transport safety, including inside buildings and storage yards*. The operations referred to here are those that contribute to the safety of all the transport phases, and more specifically: **loading the content into the packaging, closing the packaging, loading onto the means of transport, handling, pre-transportation checks, parking during carriage, in-transit storage, unloading, maintenance of the packages and means of transport, etc.**

² They are nevertheless to be taken into account in the internal baseline safety requirements of the installations concerned.



In the case of dangerous goods going onto or coming from the public highway, the "pre-carriage" phases, that is to say before the dangerous goods leave the BNI perimeter, and the "post-carriage" phases, that is to say after entry into the BNI perimeter, are on-site transport operations. Either they comply with the regulations applicable on the public highway or they are described in the BNI's safety baseline requirements and are taken into account in the nuclear safety cases associated with the BNIs concerned (consignor, consignee and transit BNIs).

The following figure provides a schematic illustration of the regulatory framework applicable according to the routes taken by the dangerous goods consignments, assumed in this diagram to be by road (which is the most common case).

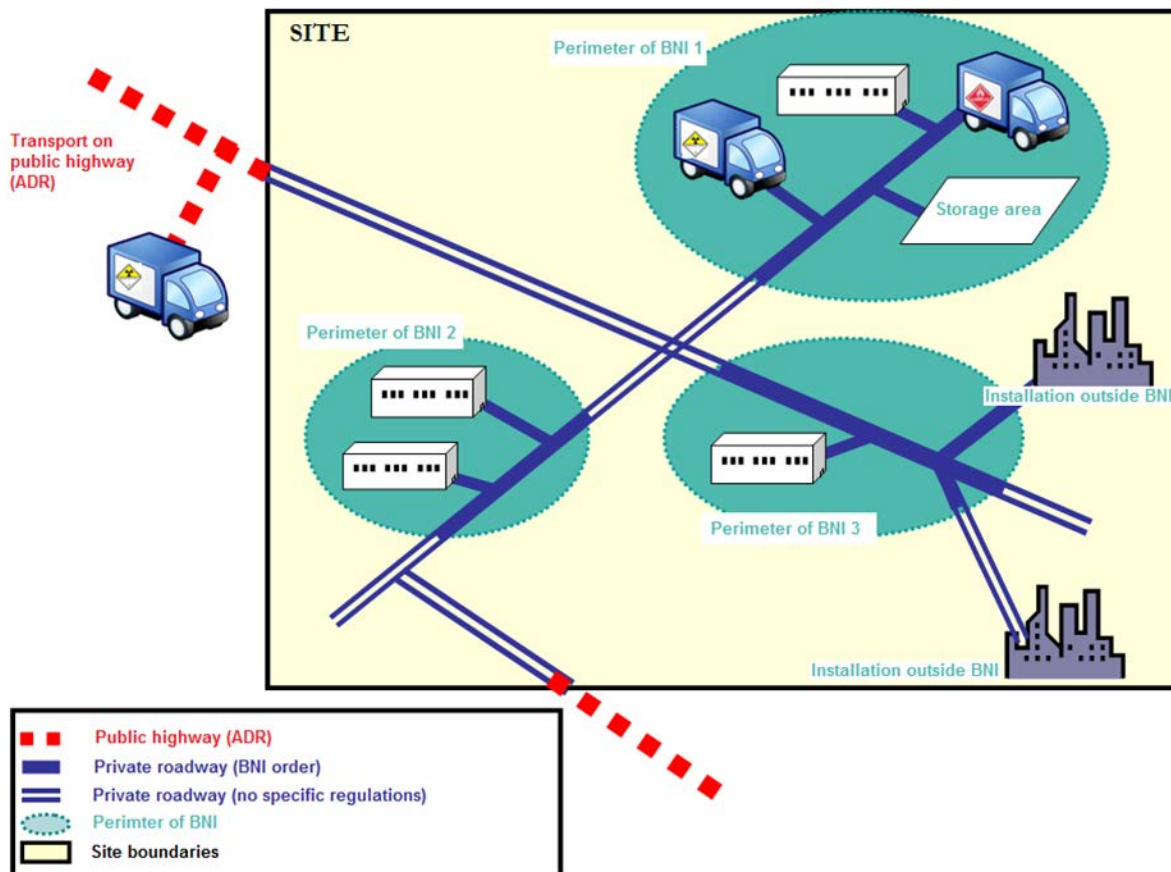


Figure 1: Diagram indicating the regulatory framework applicable to the transport of dangerous goods

It is to be noted that in the case of consignments going onto or coming from the public highway, the transport operations conducted on the private roadways within the site but outside the BNI perimeters remain subject to the TMD order [3].

The other terms used in this guide ("dangerous goods", "package", "packaging", etc.) are defined in the TMD order [3] and its appendices. To simplify the authoring, the terms "packaging" and "package" are also used in this guide to designate the tanks of tanker trucks, including for non-radioactive dangerous goods.

Note: In this guide, unless otherwise specified, the term "safety analysis report" (SAR) means all the versions of the safety analysis report under their various designations, namely preliminary safety



analysis report, safety analysis report and preliminary version of the revision of the safety analysis report mentioned in articles 8, 20, 37-1, 38, 38-1 and 42 of the decree reference [2].

The term "general operating rules" (RGE) designates the general operating roles mentioned in articles 20, 38 and 38-1 of the decree reference [2]. It thus covers the documents drawn up under the designations "general monitoring and maintenance rules" (RGSE) or "general monitoring rules" (RGS) in effect before the amendment of the decree reference [2] introduced by decree 2016-846 of 28th June 2016 *relative to the modification, final shutdown and decommissioning of basic nuclear installations, and to subcontracting*.

Lastly, in this guide the term "internal baseline safety requirements" designates indifferently the SAR, the RGE and the documents of the licensee's integrated management system.

2.3. Regulatory framework

In application of article 1.2 of the BNI order [1], the BNI licensee ascertains that the measures adopted for on-site transport operations allow the achievement of a level of risks and adverse effects that is as low as possible under economically acceptable conditions.

The risks and adverse effects associated with on-site transport operations must be addressed in the various documents mentioned in article L. 593-6 of the Environment Code and in articles 8, 20, 31, 37 and 43 of the decree [2]:

- in the impact study to determine their impact on the environment and human health, with the exception of aspects concerning accident situations, which come under the safety analysis report (SAR);
- in the SAR, including the part entitled "dimensioning study of the on-site emergency plan", for the nuclear safety case;
- in the risk control study;
- in the RGE for aspects concerning the operating measures taken for the control of their risks and adverse effects;
- in the on-site emergency plan (French acronym "PUI"), if applicable;
- in the licensee's integrated management system, particularly the measures implemented to:
 - identify the items important to protection (EIP) and activities important to protection (AIP) associated with these operations;
 - identify and comply with the specified related requirements;
 - identify the deviations, including significant events, address them, analyse the experience feedback and capitalise on progress in knowledge.

For application of article 8.2.2 of the BNI order [1], ASN considers that:

- the on-site transport operations that comply with the regulations relative to the transport of dangerous goods on the public highway display a satisfactory level of nuclear safety if organisational provisions are in place to guarantee this compliance. One must nevertheless ensure that the conditions of performance of these operations remain within the limits authorised by these regulations (this concerns, for example, handling at great height, which is not authorised on the public highway);
- the other on-site transport operations must be regulated by rules figuring in the RGEs, which ensure compliance with the assumptions adopted in the nuclear safety case presented in the SAR, in accordance with the provisions set in the "RDS" (French acronym for SAR) resolution [5].



2.3.1 Modification of on-site transport conditions

Modification of the conditions of application for on-site transport operations and the addition of new on-site transport operations are subject to chapter VII of title III of the decree [2], and more specifically its articles 26 and 27, if they lead to modifications of the RGEs.

3. CONTENT OF THE SAR RELATIVE TO ON-SITE TRANSPORT OPERATIONS INVOLVING DANGEROUS GOODS

The content of the SAR of a BNI is set by ASN resolution [5]. The SAR more specifically covers the risks created by the on-site transport operations involving dangerous goods, whether radioactive or not. The SAR presents the nuclear safety case for the on-site transport operations. It describes the on-site transport provisions concerning the technical, organisational and human aspects and demonstrates that these provisions allow the achievement of a level of risk that is as low as possible under economically acceptable conditions, in view of the current state of knowledge, of practices, and the vulnerability of the environment in which the transport operations take place.

The content of the safety analysis report drawn up by the BNI licensee must therefore contain the information required by articles 4.9.5 and 4.9.6 of the appendix to the RDS resolution [5].

Articles 4.9.5 and 4.9.6 of the appendix to the RDS resolution [5]

Article 4.9.5 The safety analysis report describes the main on-site transport operations and identifies the operations that are not carried out under exactly the same conditions as the transport of dangerous goods on public highways.

Article 4.9.6 The safety analysis report describes the risks associated with the on-site transport operations and the measures to prevent and mitigate the associated consequences. It analyses these measures and demonstrates that they are appropriate for the risks created by these goods, for their on-site transport conditions and more generally for the conditions of functioning of the BNI during its period of operation. Where applicable, it provides proof that the deviations from the regulations

The licensee adopts the most appropriate approach to provide the nuclear safety case for the on-site transport operations. The chosen approach can therefore differ according to the type of transport operation considered. Whatever the case, the licensee takes account of the factors mentioned in article 8.2.1 of the BNI order [1].

Article 8.2.1 of the BNI order [1]

The on-site hazardous goods transport operations are conducted taking into account:

- constraints due to the concomitant activity induced by vehicle movements;
- the characteristics of the roadways used and their environment;
- the operational conditions of transport operations;
- organisational and human factors.



In accordance with article 2 of the "RDS" resolution [5], the level of detail presented in the SAR for a given transport operation (description and demonstration) is proportionate to the extent of the risks presented by that operation.

Articles 3.1.4 and 3.1.5 of the appendix to the RDS resolution [5]

Article 3.1.4 The safety analysis report shall be sufficiently explicit and self-supporting. If the licensee chooses not to integrate in the safety analysis report the content of certain documents supporting the nuclear safety demonstration, it shall include those documents as reference documents. In this case, the safety analysis report shall contain the date and the precise reference of each referenced document. It shall also contain the conclusions of the documents other than the regulatory texts.

Article 3.1.5 The safety analysis report can make reference, where applicable, to the information mentioned in the following documents when they exist:

[...]

- the general operating rules (RGE) mentioned in article 20 of the abovementioned decree of 2nd November 2007,

[...]

As provided for in articles 3.1.5 and 3.1.4 of the RDS resolution appendix, some elements identified in this chapter as being included in the SAR might figure in the RGE's if they exist, or be detailed in supporting documents.

Furthermore, the elements relative to certain operations, such as the carriage operations conducted in the operating areas outside the buildings, or certain transport phases taking place inside the buildings or storage yards, can figure in the sections of the internal safety baseline requirements relating to the installations concerned.

3.1. BNI licensee's organisation

The SAR describes the principles of the licensee's organisation for all the steps necessary for the on-site transport operations involving dangerous goods, and more specifically:

- the design and manufacture of the packaging (if applicable);
- the maintenance of the packaging and the means of transport (if applicable);
- the preparation of the packages or the non-packaged transported goods (loading, closing the packaging, stowage, pre-shipment checks, mixed loading of dangerous goods in different hazard classes, handling, etc.) ;
- the carriage (route, in-transit parking, etc.);
- reception of the packages or non-packaged goods (unloading, handling, etc.);
- management of the documents associated with the operations;
- the inspection and monitoring of the activities relating to the on-site transport operations.

It also describes the organisation and response procedures in the event of an incident or accident (possibly by making reference to the on-site emergency plan if one exists).

3.1.1 Interfaces between players

In situations where several players are concerned, such as when loading the content into the packaging if the services in charge of the facilities and transport are involved, or with transport operations crossing several BNIs, an organisation is set up to facilitate communication between these players and



ensure consistency between the various applicable baseline safety requirements (or the different parts of a given set of baseline requirements).

3.2. General description of on-site transport movements

The SAR describes the main on-site dangerous goods transport operations, indicating:

- the packagings and their contents, or the non-packaged transported goods, and the means of transport;
- the modes of transport;
- the environment of the dangerous goods during their carriage (assumptions concerning the choice of route, characteristics of roadways, possibilities of passing other vehicles, particularly tankers transporting inflammable liquids, traffic conditions, etc.) ;
- the parking or in-transit storage areas for the transport containers loaded with their contents or of non-packaged transported goods.

An estimation of the maximum projected frequency of transport operations is also indicated if relevant for the nuclear safety case (for example, requirement alleviated if transport operations are very infrequent).

Remark: the term "main on-site transport operations" is to be taken as meaning in view of the potential risks of each operation and not their frequency. If a transport operation involves a significant level of risk it must be described, even if it is a one-off event.

3.3. Nuclear safety cases

The SAR presents the nuclear safety case for all the on-site transport operations taking place in the installation (package preparation, loading, unloading, carriage, handling, etc.). Some of these cases may, where relevant, be presented in parts of the SAR other than that concerning on-site transport.

All the accident risks, radiological or not, presented by the on-site transport operations are examined in the nuclear safety case, including those associated with operations inside buildings (e.g. handling fuel packages using a pressurised water reactor crane at heights of up to several tens of metres, irradiation risk in certain installation or package situations, fire risks associated with the proximity of inflammables materials, etc.). The most plausible cases of on-site deficiencies (e.g. operating failure of a safety-related device) and on-site or off-site hazards affecting the packages are also studied (in accordance with section 3 of chapter IV of title IV of the RDS resolution). This approach includes the transport of packages complying with the "public highway" regulations in order to identify any conditions that could lead to hazards of greater severity than those provided for in these regulations and to analyse these cases.

In order to produce the nuclear safety cases and define the resulting operational requirements, it may be necessary to consider substantiations concerning transport phases that are not carried out within the BNI if they could have an impact on the operations carried out within the BNI perimeter. This can, for example, be the case with:

- transport preparation operations carried out in another installation;
- transport operations that require the neighbouring installations to be placed in a particular configuration;
- packaging manufacturing operations.

To do this, the licensee can use the elements provided by those responsible for these transport phases (see section 3.1.1 above).



On-site transport operations can also create hazards for the installation, for example if an object is dropped during handling or if an explosion occurs near buildings. These cases must be addressed in the appropriate sections of the safety analysis report, under the potential hazards for the BNI.

The nuclear safety case for the on-site transport operations can be based on:

- demonstrations of conformity with the requirements of the regulations applicable to the public highway, including for operations contributing to transport safety. The organisation to guarantee this conformity³ during the various phases of the transport operation must be described. It should also be demonstrated that there are no hazards that could be more severe than those provided for in these regulations (for example, handling operations at great height, which are prohibited on the public highway, must be examined);
- demonstrations examining the potential hazards in a given installation and their consequences, indicating the relevant assumptions (type of packaging and content, frequency of the operations, installation operating states, special provisions, etc.) ;
- demonstrations of conformity with generic baseline requirements, provided they are appropriate for the BNI considered and figure in its SAR or its RGEs. The generic baseline requirements define more specifically the requirements for package models that can be used for on-site transport in terms of design, resistance, putting into service after manufacture, utilisation, maintenance, etc. These requirements can be defined by adapting the requirements of the regulations relative to the transport of dangerous goods on the public highway, if it demonstrated that the level of safety is not reduced. Consequently, by way of example, the following adaptations may be considered in certain cases:

Possible adaptations	Justification examples
Reduction of drop height	Limitation of the speed of travel (based on a comparison of the kinetic energies of all the vehicles permitted within the BNI perimeter and the potential drop energies) and limitation of package handling heights
No drop test on rigid steel bar	There are no obstacles on the route that could harm the package, or else the rigid obstacles on the convoy route are protected to prevent them harming the packages
No immersion test	No water sources on the route, including in the event of loss of control of the vehicle
The criterion of "no increase exceeding 20% in the dose rate in contact with the package under normal transport conditions" replaced by another justified dose limit	Maximum dose rate criterion under normal transport conditions acceptable in view of the planned compensatory measures and on the basis of the calculated doses for workers

The nuclear safety case is not limited to radioactive substances: it also concerns other classes of dangerous goods.

3.4. Items and activities important to the protection of interests

³ For example, in certain cases the verification of conformity of the actual content of the package with the nuclear safety case assumptions can present particular difficulties. In such cases the responsibility for and methodology of this verification should be described.



Extract from article 1.3 of the BNI order [1]

— activity important to protection: activity important for protection of the interests mentioned in L. 593-1 of the Environment Code (public health and safety, protection of nature and the environment), that is to say activities participating in the technical or organisational provisions mentioned in the second paragraph of article L. 593-7 of the Environment Code, or that could affect them;

— item important to the protection: item important for protection of the interests mentioned in article L. 593-1 of the Environment Code (public health and safety, protection of nature and the environment), that is to say structure, equipment, system (programmed or not), hardware, component or software present in a basic nuclear installation or placed under the responsibility of the licensee, fulfilling a function necessary for the demonstration mentioned in the second paragraph of article L. 593-7 of the Environment Code. or checking that this function is ensured:

In accordance with the RDS resolution [5], the SAR describes the procedures for identifying the items important to protection (EIP) and the activities important to protection (AIP) relative to on-site transport operations. These EIPs and AIPs are subject to the provisions of chapter V or title II of the order [1].

Articles 4.5.1 and 4.5.2 of the appendix to the RDS resolution [5]

Article 4.5.1 The safety analysis report describes the procedure for identifying the AIPs necessary for nuclear safety, and particularly those relative to the design, construction and operation of the BNI.

Article 4.5.2 The safety analysis report describes the procedure for identifying the EIP's:

- that directly fulfil the functions addressed in chapter III of title IV of this appendix or fulfil the functions supporting these functions,
- that check that the functions addressed in chapter III of title IV of this appendix are ensured, considering in particular the instrumentation and control functions that fulfil or monitor fulfilment of these functions,
- to protect against a hazard on account of their role in the demonstration of nuclear safety.

The procedure describes the principles for taking into consideration hazards or design provisions providing protection against internal or external hazards in the determining of the EIPs.

This procedure moreover takes into account the contributions of the probabilistic analyses and studies, where applicable.

Article 4.3 of the appendix of the RDS resolution [5]

The safety analysis report identifies the risks presented by the BNI and the functions necessary for demonstrating nuclear safety mentioned in II of article 3.1 of the abovementioned order of 7th February 2012. The safety analysis report describes and analyses the measures implemented by the licensee to fulfil these functions.



Alongside this EIP and AIP identification procedure, the SAR identifies the safety functions⁴ fulfilled by the transport package for the purpose of the nuclear safety case. It then defines requirements, as appropriate for the risks, to guarantee maintaining of the safety functions, particularly in the context of package preparation and maintenance operations.

3.5. Management of accident and incident situations

In accordance with the RDS resolution, the SAR describes the principles of management of the incident and accident situations that can arise on the BNI. This description shall take into account the incidents and accidents that can affect the on-site transport operations, with a level of detail that is appropriate for the risks.

Article 4.6.1 of the appendix to the RDS resolution [5]

The safety analysis report describes the principles of management of the incident and accident situations that can arise on the BNI.

4. CONTENT OF THE RGEs RELATIVE TO ON-SITE TRANSPORT OPERATIONS INVOLVING DANGEROUS GOODS

The BNI general operating rules (RGE) contain the operational breakdown of the nuclear safety case provided in the SAR. On this account, the RGEs should at least contain the operational rules and the significant limits for this safety case. The other elements identified in this chapter as being part of the RGEs may be placed in the SAR if this corresponds to the licensee's practice.

In accordance with article 1.1 of the BNI order [1], the level of detail of the RGE content (and the level of stringency) is proportionate to the extent of the potential risks of the on-site transport operations. All the points mentioned in this chapter should be covered, but it is acceptable, under this principle, for certain elements to be summarised or expressed in a very general manner in the RGEs and detailed in the licensee's integrated management system.

Furthermore, the elements relative to certain operations, such as carriage operations conducted in the operating areas outside the buildings, or certain transport phases taking place inside the buildings or storage yards, can figure in the sections of the internal safety baseline requirements relating to the installations concerned.

In accordance with article 8.2.2 of the BNI order [1], the RGEs detail the provisions applicable for on-site transport operations that do not comply with the regulations applicable to the transport of dangerous goods on the public highway. They focus in particular on:

- the role, attributions and responsibilities of the various players,
- the main operational rules relative to the on-site transport operations, and more specifically:
 - the preparation of the packages or of the non-packaged transported goods (loading and filling procedures, closing of containers, internal bracing, placarding, pre-shipment checks, etc.) and their dispatch,
 - the carriage of the dangerous goods (in particular the contamination and radiation intensity limits – for radioactive substance transport operations only),

⁴ For example: containment, prevention of criticality, control of radiation intensity, prevention of damage caused by heat, protection against impacts, protection against fire. This notion is also applicable for non-radioactive dangerous goods.



- to the mixed loading (in the same vehicle) of dangerous goods belonging to different hazard classes,
- to the loading, stowage and unloading of the packages or non-packaged goods onto/from the means of transport,
- to the handling of the packages or the non-packaged transported goods,
- to the reception of the consignments,
- the documents or types of documents associated with on-site transport operations,
- the rules of travel, parking during the journey and in-transit storage (speed, route, rules of priority, maximum parking time, etc.),
- the transport restrictions where applicable (limited duration of transport, weather conditions prohibiting transport operations, time slots when transport operations are prohibited, etc.),
- maintenance of the packagings and of the vehicles,
- the rules in the event of an incident or accident.

4.1. Description of the planned on-site transport operations

The RGEs set out the main requirements associated with the various on-site transport operations that do not comply with the regulations applicable on the public highways. For each on-site transport operation, the RGEs indicate:

- the means of transport used;
- the packaging model used, if applicable, and the corresponding contents with maximum permissible quantities;
- any particular provisions relative to the conducting of the on-site transport operations;
- the maintenance and periodic inspection rules for the means of transport and the packagings;
- the packaging utilisation rules.

This description is provided once only when similar operations are involved.

4.2. Players involved in on-site transport operations and associated activities

The duties and responsibilities of the various players involved in the on-site transport of dangerous goods are described, for example those concerning:

- the licensee of the BNI or the site, who is responsible for the organisation and safety of the transport operations; for sites comprising several BNI's, the responsibilities shall be specified if resources are shared;
- the dispatching unit(s), which fulfil(s) the duties incumbent on the consignor;
- the transport operation consignee unit(s);
- the filler, the packer, the loader;
- the managers of the packagings and means of transport;
- the carrier and the unit responsible for organising the transport;
- the units responsible for the radiological inspections;
- the units in charge of the response in the event of a transport accident;
- the transport safety advisor, if applicable (indicating whether the advisor's scope of activity extends to the on-site transport operations or not);
- the units responsible for the maintenance and servicing of the packagings.



In cases where some of the transport phases take place outside the BNI, there is no need to describe the players external to the BNI here (except for the first point if applicable).

The general training requirements for the personnel are indicated.

4.3. Documents contributing to the nuclear safety of on-site transport operations

The RGEs describe the organisation of the documentation necessary for conducting on-site transport operations, and in particular:

- the documentation structure and the nature of the information indicated in each type of document;
- the interfaces between these documents;
- the interfaces, if any, between the permanent documents and the temporary documents;
- the rules concerning document retention times.

4.4. Operational rules

The operational rules and limits applicable to on-site dangerous goods transport operations and resulting from the nuclear safety case are described, and in particular:

For the preparation of the packages or the non-packaged goods, before their consignment and dispatch

The provisions relative to the following activities are described:

- the verification of the compatibility of the packaging and the content, in particular the conformity of the actual content with the assumptions adopted in the nuclear safety case or, if applicable, the verification that the goods can be transported non-packaged;
- the filling of the packages;
- the bracing of the content in the packaging;
- the closure of the packagings;
- the marking and labelling of the package;
- the vehicle placarding and signalling;
- the radiological checks for on-site radioactive substance transport operations;
- any other pre-shipment check on the package or means of transport stemming from the SAR (verification of the condition of packagings, sealing test, determining conformity of the content, etc.).

For the carriage of dangerous goods

The following are described in particular:

- the contamination and radiation intensity limits (for radioactive substance transport operations only);
- the transport documents;
- the equipment that must be present on the board the means of transport to ensure its safety or to minimise the damage in the event of an incident or accident.

For the handling of the packages or non-packaged goods

The measures taken to limit the heights of handling operations are described. When handling operations take place at heights that can result in damage to the packages exceeding the design-basis levels, the measures intended firstly to limit the risk of a fall and secondly to mitigate the consequences



in the event of a fall shall be described. This point also concerns packages that comply with the regulations applicable to the public highway.

For the loading and unloading of packages or non-packaged goods

The following are described:

- the measures put in place for loading the packages or goods onto the means of transport and unloading them (cordoning off work areas, stopping traffic, etc.) ;
- the bracing or stowage rules.

The package or goods loading and unloading areas are identified.

For reception of the consignments,

The checks carried out on reception of the consignments are described.

For the mixed loading (in the same vehicle) of different classes of dangerous goods

The following are described:

- the measures taken to avoid the mixed loading of incompatible dangerous goods or their mutual proximity in parking areas;
- the measures implemented to monitor the accumulation of goods, particularly with respect to the total radiation intensity or criticality risk (for example by limiting the sum of the transport indices and the criticality safety indices, as defined in the amended order of 29th May 2009);
- the measures taken for goods that present several types of hazard (for example, corrosive and radioactive).

4.5. Traffic movement rules

The traffic movement rules for on-site transport operations within the perimeter of the BNI are described, distinguishing if necessary the different classes of dangerous goods and the specific risks (fissile materials for example).

Any measures specific to certain on-site transport operations are also described. These can, for example, include:

- dedicated traffic lanes or prohibited routes;
- speed limitation;
- escorting the convoys;
- specific time slots (outside periods of heavy traffic for example);
- measures to prevent the certain vehicles from crossing paths with one another (for example, vehicles transporting fire-sensitive packages and tankers carrying inflammable liquids);
- transport restrictions in the event of adverse weather conditions;
- limitations on the maximum duration of the transport operation.

4.6. Parking and in-transit storage rules

The parking areas for the vehicles during carriage and the in-transit storage of dangerous goods are defined. The parking and storage conditions are described: maximum duration if applicable, signalling, radiological zoning if applicable, retention capacities, compatibility of vehicle loads, conditions of access and other specific measures (smoking ban), etc.



For transport operations complying with the public highway regulations (for example, transport operation involving a temporary stop within a BNI during a journey on the public highway), the measures taken to ensure compliance with the requirements of these regulations governing parking are specified (monitoring of the packages, fire protection, compliance with the maximum parking time, etc.).

4.7. Equipment checks and maintenance

The following should be specified:

- the servicing frequencies of the various elements necessary for maintaining the EIPs and the package safety functions;
- the maintenance and in-service monitoring of the packagings and means of transport, in particular those relative to the EIPs and the elements necessary for maintaining the package safety functions.

The frequency of these operations must be justified (in a document that is not necessarily integrated in the SAR or the RGEs) in the light of the manufacturer's recommendations, the transport movements and the demands during on-site transport operations.

4.8. Rules in the event of an incident or accident

The rules to follow in the event of an incident or accident are specified in the RGEs, distinguishing the different types of transport operations where necessary. They clearly identify the conditions that should lead to activation of the on-site emergency plan.

These rules cover in particular the situations of unintentional immobilisation of a vehicle or package elsewhere than in an area designated for this purpose.

If necessary, these rules are set out as operational instructions, indicating the actions to take and their sequencing or their interfaces. In this case these instructions are not part of the RGEs.

5. GLOSSARY

AIP	Activity important to protection, see definition in article 1.3 of the order [1]
Package	Packaging loaded with its content, see definition in article 1.2.1 of the ADR. In this guide this also encompasses loaded tankers, including when their content consists of non-radioactive dangerous goods.
EIP	Equipment or item important to protection, see definition in article 1.3 of the order [1]
BNI	Basic nuclear installation
PUI	On-site emergency plan
SAR	Safety analysis report
PWR	Pressurised water reactor
RGE	General operating rules
RGS	General monitoring rules
RGSE	General monitoring and maintenance rules





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