



NEW BASIC SAFETY REGULATIONS OF RADIOACTIVE MATERIAL TRANSPORT IN RUSSIA

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SUMMARY

In the paper the system of normative regulation of radioactive material transport in Russia, basic principles and provisions of the new Russian regulations, available deviations from rules IAEA regulations are briefly considered. The problems, connected with putting in force of the new regulations in practice of transport, including problems of usage earlier designed and manufactured packages are considered as well.

1. INTRODUCTION

The first registered shipment of radioactive material (RM) in Russia was held about 100 years ago in 1903. Then in St.-Petersburg at the request D.I. Mendeleev from Germany the apparatus of radium bromide for researches in "Chamber of Measures and Weights" was delivered. The mass transportations of RM in Russia (former USSR) are carried out about 50 years. Now the list of transported RM in country includes all kinds of a nuclear fuel cycle materials (from ore, physical and chemical concentrates, UF₆ up to the fresh and spent fissile material and radioactive waste), and also numerous kinds of RM and articles using RM, which are widely applied in other industries, medicine, agriculture etc.

The main part of RM used in all fields is produced inside country, and the main part of the shipments is internal shipments. Considerable, nevertheless, there is also volume of international carriages of various types of RM in Russia and from Russia, and also as transit traffic of RM through territory of Russia.

For all years of mass shipments of RM in Russia (former USSR) there were not registered not only severe radiation effects on the population or staff owing to such shipments, but practically there were not severe transport accidents during such transport. Even total number of transport incidents with RM, which, apparently, are inevitable at transport, for these years is calculated only by units.

Such results for safety, apparently, are determined by an operating and operational now management system of safety by transport including a system of state bodies and organizations, and system of the statutory acts in this area. Below in the present paper the main component of management systems of safety in RM transport area are briefly reviewed, including, main provisions new federal "Regulations of safety at transportation of radioactive materials" (NP-053-2004) [1], and also some problems, connected with a forthcoming intrusion of these rules in practice of management and safety control by transport of RM.

2. GOVERNMENT MANAGEMENT IN THE FIELD OF SAFE TRANSPORT OF RM IN RUSSIA

The state governing and regulating the safety at transport of RM in Russia provide a number of the specially authorized state bodies, namely:

- Federal agency for atomic energy (Rosatom), being by management state body in the field of usage of atomic energy and executing functions of a State competent authority on nuclear and radiation safety by transport of nuclear materials, radioactive substances and articles using such materials;
- Federal service on ecology, technology and atomic supervision of Russia (Rostekhnadzor), a state body of state regulating the safety at usage of atomic energy (technical aspects), including RM transport;
- Ministry of Public Health and social development of the Russian Federation being a state body of state regulating the safety at usage of atomic energy (sanitary and hygien aspects), including RM transport;
- Ministry of the Russian Federation on civil defense affairs and extraordinary situations (MChS) carrying out the state regulating fire safety at usage of atomic energy.

The Ministry of Transport of the Russian Federation carries out the functions on providing transport safety at shipments by all modes. Ministry of Internal Affairs of Russian Federation (MVD) fulfills some functions on regulating safety at transport of RM;

The particular functions, right and duty of the mentioned state bodies in the field of safety of RM transport are determined by provisions about these bodies stated by Government of Russian Federation. For maintenance of coordination of the activity and distribution of particular functions in the field of RM transport safety the system of the agreements between the indicated bodies is stipulated, which are realized directly as the agreements between bodies and/or as the applicable provisions in the statutory acts in the field of RM transport safety approved by the bodies concerned.

Within the framework of the paper it is not obviously possible to describe all functions, right and duty of the indicated bodies in part of RM transport. For example, Rosatom, as the State competent authority [2], approved by the governmental order of Russian Federation, fulfills 18 general functions, which else can be partitioned on specific subfunctions. Nevertheless, it is possible in the brief description to understand a general picture if to consider the functions of the indicated state bodies with reference to the main tools of government management on safety regulating in the field of RM transport. Such main tools in Russia, apparently, as well as all over the world (with variations), are:

- Development, agreement, approval and input in force the statutory acts in the field of RM safe transport;
- Licensing of activity of organizations, connected with safety control by RM transport;
- Certification of RM, packages designs and conditions of shipments on conformity to the requirements of national and international rules;
- Certification of transport conveyances;
- System of warning and liquidation of accident situations by RM transport;
- State supervision and control for safety control by RM transport.

Development, agreement, approval and input in force the state acts in the field of RM safe transport;

All mentioned above the state bodies participate in development the basic federal safety regulations at RM transport (now the Regulation NP-053-2004, [1]) and execute its agreement, that is necessary for official issuing the regulations and put it in force at practice. The approval of regulations and input them in force is assigned on Rostekhnadzor. The procedures of development, agreement, approval and input in force of the federal rules are regulated by special provision approved by governmental order [3].

Development of other federal or branch standards and rules in the field of RM transport, as well as, in general, the development of rules and standards in the field of usage of atomic energy, and its agreement are carried out with necessary participations of Rosatom and Rostekhnadzor. Other state bodies participate in development and agreement of the documents as appropriate and according to its scope.

The current national rules and state standards on safety at RM transport [4], [5], [6] etc., and new national rules [1] grounded and practically completely meet to the guidelines of IAEA which has been set up in the applicable transport rules of Agency.

According to the Federal Act «About technical regulating » safety requirements having federal nature, i.e., ones applicable at all territory of the state, should be issued in form federal law stating the technical standing orders in appropriate field. In atomic area transition to issue of such federal law instead of the federal standards and rules is previewed as well although the particular procedures and the classification of issue of the such laws in atomic area have not been developed up till now.

Licensing of activity of organizations, connected with providing safety at RM transport

For activities, connected with safety at RM transport, the organization concerned have to get the licenses depend on kind of activity. The licenses should be got by organizations consignors, consignees, carriers of RM, and organizations executing designing of packages, its manufacturers, and also organizations carrying out examination of safety of package designs and conditions and technologies of RM shipments. A licensing body for RM transportations for peace usage of RM is Rostekhnadzor, and at usage of RM in the defense purposes - Rosatom. The appropriate Provisions determining requirements and procedures of licensing are approved by the governmental orders [7], [8].

Certification of RM, package designs and conditions of transport

The certification of designs of special form RM and RM with low dispersible radioactive material, designs of packages and shipments on conformity to the requirements of national and international RM transport rules implements is carried out by Rosatom as issue of the certificates – permission, approved by this body. The certificates - permission before approval by Rostom have to be agreed by Rostekhnadzor and Minzdrav (for fissile RM). Last body also executes issue of the sanitary - epidemiological conclusions for the technical specifications of package in accordance with “The main sanitary regulations on providing radiation safety” (OSPORB-99), [9]).

The applications for obtaining of the certificates-permission should contain all necessary information, whose consideration by the competent bodies can assure it in fulfillment of the applicable requirements of national and/or international safety regulations at RM transport. In this respect requirements to the application for obtaining of the certificates-permission practically do not differ from the requirements of IAEA Rules.

The system of issue of the certificates-permission envisions a restricted period of validity of the certificates. On expiration of validity date the new endorsement of meeting to the requirements of safety and obtaining the new certificate-permission are necessary.

Certification of transport conveyances

The certification of transport conveyances provided by organizations of Mintrans. The designs of special transport conveyances or specially modernized transport conveyances (intended only for transport of RM) are subject to the agreement with Rosatom, Rostekhnadzor and Minzdrav (last as issue of the sanitary - epidemiological conclusion on the technical specifications of transport conveyance [9]).

Uniform state system of warning and liquidation of extraordinary situations

The planning and realization of emergency measures in case of accidents at RM transport are provided by Accident-Emergency Service for Transport of Rosatom (AES T), included in branch (in nuclear branch) system responses to extraordinary situations in atomic field within the framework of a uniform state system of warning and liquidation of extraordinary situations. This uniform system is headed by MChS [10].

AES T consist of special staff formations (5 through the country) and non staff formations of consignors and consignees.

State supervision and control for safety at RM transport

The state supervision and control for safety at RM transport, that is, in fact for exact fulfillment of the proper provisions of standards and rules (of federal and branch level) and documents of organizations, are provided by all of indicated state bodies in the applicable directions.

3. SAFETY STANDARD AND REGULATIONS FOR RM TRANSPORT USED IN RUSSIA

The system of the standards and rules in the field of safe transport of RM as a whole corresponds to the system of the similar documents of IAEA and, apparently, to systems of the normative-technical document system in this area which is operational in other countries. Schematically this system operational in Russia, and system of the documents of IAEA in the field of RM transport carrier are shown in a figure.

As seen at figure the systems of the documents of IAEA and Russia on safety of RM transport in many respects are similar. Under the indicated scheme it is necessary to give following add explanations:

- 1) The basic documents on a radiation safety in Russia are the standards NRB-99 and rule OSPORB-99. These documents are similar to IAEA document SS-115. The requirements of transport rules (OPBZ-83 and PBTRV-73 and since 2005 rules NP-053-04) are directed on maintenance of limiting doses and other limits established in NRB and OSPORB at conditions of RM transport, as it takes place concerning relations of the documents IAEA SS-115 and ST-1;
- 2) For transport of dangerous goods in Russia by air, sea, inland water and auto transport (for an internal traffic) the rules of appropriate international transport organizations act. Only for a railway transport and internal carriages by road the special national rules of transport of dangerous goods act;
- 3) The technical requirements for RM and packages in the Russian rules completely correspond to Rules of IAEA. At the same time for transport of many types of the most dangerous RM the special organizational measures are used (as contrasted to by Rules of IAEA) that must provide decrease of probability of transport accidents.

4. MAIN PRINCIPLES AND PROVISIONS OF THE NEW RUSSIAN SAFETY REGULATIONS

New Russian "Regulations of safety at transportation of radioactive materials" (NP-053-2004) were approved by Rostekhnadzor 2004. This regulations should be put into action since 05.01.2005 year. The rules are grounded on and practically completely repeat the provisions of IAEA Rules, edition 1996 (ST-1) [11] in a part of technical requirements to RM, packaging and packages, its tests and certification, and also concerning the main conditions at RM transport, including environmental conditions, preparing and checking of consignments before transport, level limits of radiation, requirements on collecting and segregation of consignments, marking, labeling and signs of hazard etc.

This concerns to the conceptual bases and principles of safety at RM transport. The regulations are designed in accordance with these principles. In accordance with these principles the regulations have to be used and modified as well, namely:

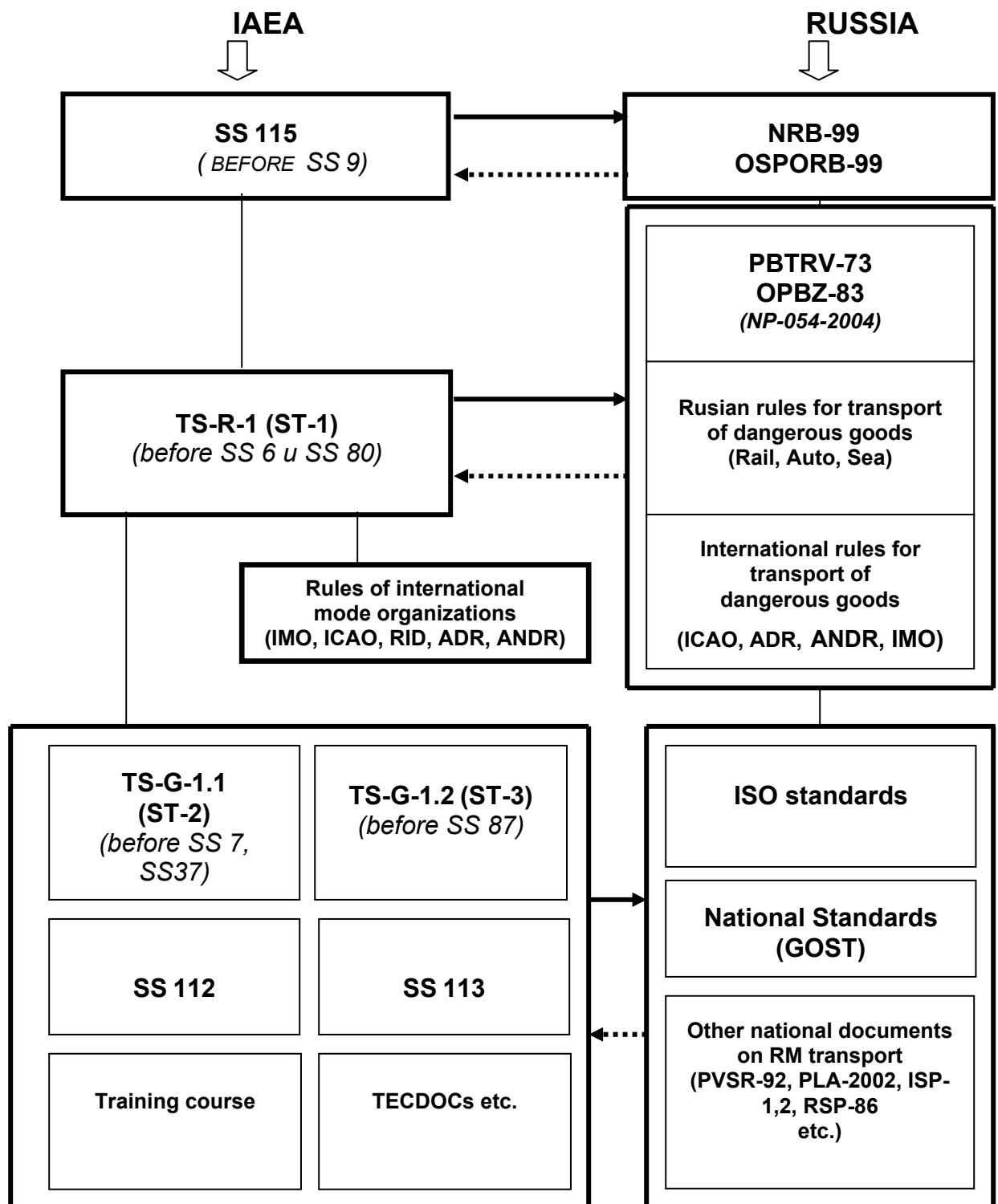


FIGURE. IAEA AND RUSSIADOCUMENT SYSTEM IN RM TRANSPORT FIELD

- Liability of a consignor;
- Design (or built-in in a design) safety (at any rate, in the greater degree, than organizational safety);
- Uniformity of the requirements for all modes of transports;
- Conformity with the basic principles of radioactivity protection;

- Gradation of the requirements to packages as dependence of potential hazard of RM;
- Preliminary planning of measures on a case of accident;
- Quality assurance;
- Compatibility with the requirements to transport of other dangerous goods;
- Taking into account the changes of infrastructure of transport, technological advances;
- Maximum usage of the identical requirements at internal and international carriages;
- Liability of a competent authority in compliance of regulations in the state;
- Maintenance of a maximum simplicity and efficiency of rules.

Among available differences of the new Russian safety regulations of transport and IAEA Rules it is necessary to dedicate the following:

- Requirement about issue of the certificates-permissions of competent authority not only for package designs type B, type C and packages for fissile materials and UF₆ but for design of package type A as well;
- Requirements about issue of the certificates-permissions for all shipments except shipment of exempted packages and packages type IP-1;
- Permissions of RM transport by rail without labels with signs of radiation hazard on a transport means (under condition of mandatory accompanying staff for such transport).

Some more detailed provisions, which are not present in IAEA Rules, on organization of RM transport by separate modes are included in the regulations as well. A part of these provisions are presented also in the rules of the applicable international transport organizations, and a part of the provisions are absent in international rules. In many cases these requirements and the provisions of the Russian rules have more restraining nature as contrasted to international rules.

Besides, it is necessary to mark, that many special appropriate organizational measures at RM transport in Russia are not canceled by the new safety regulations NP-053-04, such as special requirements: for shipments of irradiated fissile material, plutonium etc. The appropriate special documents envision for such RM the special condition of carriages practically eliminating severe transport accidents (as it has been confirmed during long time). More details on conceptual reasons and approaches, on the whose basis such conditions of many shipments are in force till today and are planned for future as well may be found in the paper [12], presented at conferences of IAEA in 2003.

As a whole, thus, it is possible to state, that the developed new Russian safety regulations can ensure a level of safety at RM transport not below, than at meeting of the requirements and provisions of IAEA Rules.

5. MAIN PROBLEMS OF APPLYING OF THE NEW SAFETY REGULATIONS

It is understandable, that issue of the new regulations does not provide automatic safety control, at a level, which was planned at development of the regulations. This level depends on not less a practical capability of putting it in force and capability of quality fulfillment of the established requirements. In this aspect it is possible to dedicate following new safety issues, which should be resolved in connection with the new regulations:

- Development, computational and experimental substantiation of designs of packages Type C and packages with fissile materials for transport by air;
- Development and implementation radiation protection programs;
- Certification of RM shipments;
- Certification and usage of packages, designed under the requirements of "old" rules;
- Certification of foreign designs;
- Modernization of the regulations in connection of two-years cycle of revision of IAEA Rules.

Development of Type C packages

Concerning type C packages and packages for fissile materials transported by air it is necessary to note, that the Russian firms already possess experience of the computational and experimental substantiation of safety of such packages at tests imitating the air catastrophes. There are program computational means, validated for such calculations and test facilities to conduct the appropriate tests. There is an applicable practice. Both the used computational programs and testing techniques and their results are acceptable for the competent authority and supervision bodies. More details on these problems it is possible to be acquainted in paper of Russian specialists from RFNC VNIIEF presented at the symposium.

Development and implementation radiation protection programs

The requirement about development and applying of the special programs on radiation protection (RPP) practically for all transports of RM was included for the first time in IAEA Rules edition 1996 and for the first time is included in the Russian transport rules NP-053-04. The documents of such type are not stipulated by the Russian system designer and operating documentation. Therefore, apparently, in practice there can be difficulties, as till

now there is not applicable guidance of IAEA on this problem, though the separate guidelines provisions are available in the Advisory Reference material to IAEA Rules, ST-2 [13].

Evidently that a general approach to the purposes, problems and contents of RPP should recognize that RPP is description of a system of safety control (radiation, and, apparently, and safety on criticality for transport of fissile materials) used in particular firm concerning activities, connected with safety at transport of RM. This document should give assurance to a management of firm and competent bodies that the system of safety control is adequate and provides fulfillment of the established requirements on safety.

Certification of conditions of RM shipments

The rules of IAEA as a matter of fact do not determine cases, at which the presence of the certificate of approval for internal shipment of RM is necessary (except for transportations in special conditions). Our proposals on installation in IAEA Rules the applicable provisions for such certification within the framework of IAEA regulation revision has not found support from the Revision panel. Such decision was based by thesis that this matter is a problem of internal national rules but not international ones.

In new Russian rules NP-053-04, as it was already indicated above, the certification of shipments is required for transport of packages IP-2, IP-3, type A, type B, type C and packages with fissile material and with UF₆. The main conceptual task of such broad certification are endorsement of conformity of condition of shipments to the requirements of rules (conformity to environmental conditions, proper service of packages, requirements to transport conveyance, the adequacy of the programs of a radioactivity protection etc.) and the control of meeting the real packages to design approved.

Now in practice the certificates of approval concern only to a design not to the real packages. The link between the approved design and real packages is established by systems of quality assurance. Such link seems, at any rate for our conditions poor, to be not sufficient and reliable even if the programs of quality assurance are agreed within the framework of consideration of the application for certificates for designs. Especially, it is necessary to take into account, that within the framework of the application for certification of a design the programs of quality assurance of all consignors (carriers, manufacturers), using the packages of approved design can not be considered.

Certification and usage of packages, designed under the requirements of "old" rules

Provisions of the regulations NP-053-04 on usage of designs, designed under the earlier rules, correspond to similar provisions of IAEA Rules both on terms, and on conditions. However, considerations of such designs will represent an enough composite problem and for uniform understanding of the approaches for such certification both from the competent bodies side and applicants side, evidently the special guidance must be prepared. However the conceptual approach for such certification should not be based on full and sharp prohibition of "old" designs.

Certification of foreign designs

Usage of foreign designs for transport of RM in territory of Russia can be generally realized on several versions. First, it is transport of RM within the framework of international shipment in the package, whosedesign has been developed and certificated abroad. For such transportations in practice in the past basically the separate certificates of the Russian competent authority were issued. Simple validation of the foreign certificates was a little applied. As a whole, it seems that such practice will be kept, though the practice of issue of the certificates on shipment can allow not use in some cases issue of the separate Russian certificate on a foreign design. For design simple validation would be sufficient but control for real packages will provide by certificate for shipment.

At usage the designs developed and/or manufactured abroad only in territory of Russia the issue of the certificate is required on the basis of consideration of the full application with all materials, justifying safety. If the package of strange design is manufactured in Russia, in this case the full scale Russian certificate on such design will be required as well.

Modernization of the regulations in connection of two-years cycle of revision of IAEA Rules

In connection with adopted 2 years cycle of revision of transport Rules of IAEA the appropriate task on maintenance of well-timed modernization of national rules takes place. Though it is impossible to call our experience in this respect positive, the objective capabilities for the effective solution of this problem are available.

It seems that the main problem in this respect is even not well-timed change of national rules, but maintenance of coordination of activity in this area of all countries and information on the changes. In this respect role of IAEA is very important for installation of unified terms and identical conditions for multiple transition periods, and for providing the collection and dissemination of information about national rule changes.

6. CONCLUSION

In conclusion of the paper it is necessary to note, that the development of the new national safety regulations for RM transport in Russia has been carrying out long enough, as, except the solution of only technical problems in relation of requirements for RM, packages, test specifications and transport condition, it was necessary to decide the problems of responsibility, liability and interconnections of many state bodies connected with control and regulation of safety in this area. It seems that such problem has been resolved as well, although during the development of these regulations such bodies and its statuses strongly and many times have been transforming.

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