

**A GUIDE TO THE APPLICATION OF EUROPEAN TECHNICAL GUIDE, PACKAGE  
DESIGN SAFETY REPORTS TO THE TRANSPORT OF RADIOACTIVE MATERIAL  
(PDSR) TO MEET US NRC REGULATORY GUIDE 7.9**

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**ABSTRACT**

The Nuclear Regulatory Commission (USNRC) establishes “requirements for packaging, preparation for shipment, and transportation of licensed material; and procedures and standards for USNRC approval of packaging and shipping procedures for fissile material and for a quantity of other licensed material in excess of a Type A quantity” in 10 CFR Part 71 [1]. Subpart D of 10 CFR 71 describes application for package approval requirements. USNRC Regulatory Guide 7.9 (RG7.9) provides guidance on preparing applications for approval of Type B and fissile material transportation packages. NUREG-1609, “Standard Review Plan for Transportation Packages for Radioactive Material,” dated May 1999, and NUREG-1617, “Standard Review Plan for Transportation Packages for Spent Nuclear Fuel,” dated March 2000, describe the practices that the NRC staff has developed for use in reviewing applications for package approval. These standard review plans are intended to be compatible with RG7.9. A Technical Guide for Package Design Safety Reports for Transport of Radioactive Material (PDSR) has been developed by the competent authorities and their support organizations responsible for the transport of radioactive material of Belgium, France, Germany, Spain and the United Kingdom and the World Nuclear Transport Institute (WNTI) and Areva as industry representatives. It is intended that this Technical Guide will be used within European member states and that all European competent authorities responsible for the transport of radioactive material will authorize the issuing of this Technical Guide and consider it as assistance for meeting the package design requirements in compliance with the applicable dangerous goods regulations.

An Application Guide has been written that may be used by applicants intending to submit a European Package Design Safety Report (PDSR) to the USNRC for a package approval certificate. This Guide describes how Technical Guide, Package Design Safety Reports for the Transport of Radioactive Material (PDSR) addresses USNRC package approval application content requirements and identifies the USNRC requirements not addressed by the PDSR.

**BACKGROUND**

The PDSR-RG7.9 Application Guide (The Guide) is available to assist clients intending to submit a European Package approval based on the PDSR Technical Guide format to the USNRC for a package approval certificate. The Guide is not intended to be a critique of either application protocol, but rather it is an effort to serve as a bridge from the PDSR Technical Guide to RG7.9. It provides such information as corresponding location and level of detail of information required, and highlights information that is required by the one but not requested by the other.

The Guide is not an appropriate tool for those looking to have their foreign package approval certificates revalidated by the U.S. Competent Authority, the U.S. Department of Transportation. Such applications are to be made in accordance with 49 CFR Part 173.473, *Requirements for foreign-made packages*. Note, however, that a Competent Authority revalidation authorizes the package to be used only for import and export. Licensees wishing to use their packages for domestic transports within the United States must obtain a USNRC Certificate of Compliance.

### **CORRELATION OF REQUIREMENTS FROM PDSR TO RG7.9**

In general, the content requirements in RG7.9 and the PDSR Technical Guide are nearly identical. A few differences exist, however, due to the structure and level of detail required by the application guides. RG7.9 generally provides a more prescriptive standard format than the PDSR. RG7.9 gives specific guidance for Type B and fissile material transportation packages. The PDSR Technical Guide provides specific guidance for any type of radioactive material package including excepted package, industrial package (Type IP), Type A, Type B, Type C package, fissile material package, and packages containing uranium hexafluoride. There is no provision in the U. S. regulations for approval of a Type IP package containing fissile material. Also, although the U. S. regulations have provisions for air transport of radioactive material packages, the Type C approval has not been adopted. U. S. regulations require certification of excepted package, Type A package and industrial packages, but there is no requirement to submit a package design safety report to the U. S. Competent Authority for these package types.

#### RG7.9

The format of a RG7.9 provides a generic structure and contents of the application, namely eight sections, which are applicable to Type B and fissile material packages. The RG7.9 application contains an introduction and a general description of the package (Section 1), provides the detailed technical analyses (Sections 2–6), and instructions and provisions for operation and maintenance of the package (Section 7– 8).

Applications to the USNRC are typically non-proprietary. The applicant may include proprietary information if deemed crucial to the application. In this case a second, non-proprietary version is also submitted. Specific detailed technical reports for each analysis (e.g., mechanical, thermal, criticality) are not included with the application.

#### PDSR Technical Guide

The PDSR Technical Guide provides a generic structure and contents of the package design safety report (PDSR), namely Parts 1 and 2, which are applicable to all package types.

Part 1 of the PDSR contains all relevant information to specify and describe the package in detail (1.2-1.4) as well as the performance characteristics of the package (1.5), the demonstration of compliance with the applicable regulatory requirements (1.6), the instructions and provisions for operation and maintenance of the package (1.7-1.8), the management system including the quality assurance program as requested in TS-R-1 (1.9) and a package illustration (1.10). This part of the PDSR is non-proprietary, available to all.

Part 2 of the PDSR consists of the proprietary detailed technical reports for each analysis (e.g., mechanical, thermal, criticality) to support the demonstration of compliance with the regulatory requirements in Part 1 of the PDSR (see section 1.6 above). This information is treated by the European Competent Authorities as proprietary, unlike the USNRC, and is not made available to anyone other than the applicant, or to those who have written permission from by the applicant.

Section 2.1 spells out the common provisions for all of the technical analyses that are to be submitted in Part 2 of the PDSR. In other words, there is no specific section in the PDSR identified as Section 2.1. Rather, this is a description of the format and content of the specific technical reports that are submitted in Part 2. Section 2.2 gives the order in which the technical analyses are presented.

## **EXAMPLES FROM THE PDSR-RG7.9 GUIDE**

Some specific examples from the PDSR-RG7.9 Guide are given below to highlight “small” but nevertheless real gaps in the two application formats. Failure to include even this information, or to include it in a location that is difficult to find, could result in lengthy delays in the licensing process.

### Contents

RG7.9 Section 1.2.2, *Contents*, requests a description of the contents that is suitable for inclusion in the certificate of compliance, including the type and form of material and the maximum quantity of material per package. This information is particularly useful to the regulator when preparing the certificate of compliance because it ensures he is placing in the certificate exactly what the Licensee is requesting, and it is an opportunity for the Licensee to specify in one place in the SAR what contents are being licensed.

This is not specifically addressed in the PDSR. The PDSR, however, does contain a requirement to for identify what contents are not permitted.

### Operational Features /Package Performance Characteristics

Section 1.2.4, *Operational Features*, in RG7.9, requires the Licensee to include the engineering drawings for the packaging. These drawings should clearly detail the safety features considered in the package evaluation. They should include a materials list, dimensions, information on valves and fasteners, and welder and welding procedure qualification requirements. The drawings should give the specifications for all packaging weld joints, including the nondestructive examination method and the acceptance standard. Gasketed joints in the containment system should be sufficiently detailed to show, as a minimum, the surface finish and flatness requirements of the closure surfaces, the gasket or O-ring specification, and, if

appropriate, the method of gasket or O-ring retention.

These drawings are not to be the detailed construction drawings, especially of the large, complex packages. All packages authorized for shipment must conform to the approved package design. They must be fabricated per the construction drawings and be in conformance to the engineering drawings contained in the Application.

The PDSR contains no provision for engineering drawings apart from the construction drawings. In some cases, for the large, complex packages particularly, it may be necessary to develop engineering drawings, which are in some ways a sub-set of the fabrication drawings and specifications.

### Package Performance Characteristics

Section 1.5, *Package Performance Characteristics*, of the PDSR, has no equivalent in the RG7.9. The author's understanding is that it was included in the PDSR because there may be a possibility that the different technical reports in a PDSR do not agree with each other. To that end, this section has the purpose of describing how the different parts of the assessment (i.e., criticality, thermal, mechanical, etc.) interact with each other. An example of such an occurrence is as follows: Suppose a package design has been modified such that the accelerations are changed, but that part of the technical analysis was not revised. This section of the PDSR is to be used to explain how the different accelerations do not affect the safety of the package. When preparing the RG7.9 application it is important that the Section 1.5 items in the PDSR are thoroughly analyzed and explained.

### Compliance with regulatory requirements

Section 1.6 Compliance with regulatory requirements, of the PDSR, has no equivalent section in the RG7.9 application. It requires that the PDSR include a complete list of all paragraphs of the international regulations (TS-R-1 / SSR-6) and any other national regulations applicable to the respective package design. Demonstration of compliance with these paragraphs can be accomplished either with a sentence or short paragraph, or by cross-referencing to the technical analysis section in Part 2 that demonstrates compliance.

### Management Systems

Section 1.9, *Management Systems*, has no equivalent section in the RG7.9 application. This section contains the relevant information for the quality assurance program. In the United States, information pertaining to the quality assurance program (QAP) is submitted separate prior to the RG 7.9 application. The applicant must obtain US NRC approval of its quality assurance program prior to use, fabrication, testing, or modification of packagings.

The process for obtaining a USNRC certificate of compliance for packagings already fabricated requires additional QA procedural steps that are spelled out in The Guide.

## **ADDITIONAL ITEMS OF INTEREST**

### Licensing an IF-96 Packaging

The USNRC has no provision for licensing industrial package designs for fissile material, designated Type IF-96. Applicants wishing to license a Type IF-96 approved package for domestic transport in the United States must decide what type of transport the package will be used for, and then submit the U.S. application accordingly.

#### Proprietary Technical Reports and Analyses

As mentioned above, the PDSR Guide includes specific analyses and technical reports produced by the licensee as part of the application package. Difficulties may arise when preparing an application to the USNRC. Such technical reports are probably proprietary, and so applicants either have to submit both proprietary and non-proprietary versions of the application, or produce non-proprietary summaries of the analyses and include them in the U.S. application.

#### Joint US-Canadian Licensing

In 2009 the U. S. Nuclear Regulatory Commission, U.S. Department of Transportation, and the Canadian Nuclear Safety Commission (CNSC) issued NUREG-1886, Joint Canada – United States Guide for Approval of Type B(U) and Fissile Material Transportation Packages. Similar to the practice among some competent authorities in Europe, this NUREG provides applicants with the means to facilitate the Canadian and United States regulatory approvals of Type B(U) and fissile package design certificates. The NUREG then assists applicants in preparing applications that thoroughly and completely demonstrates the ability of the given package to meet Canadian regulations. The PDSR-RG7.9 Guide includes the information necessary to ensure that applicants are able to apply for the Canadian package approval in conjunction with the USNRC application. Note that adherence to NUREG-1886 does not preclude competent authorities of both countries from performing a more detailed technical review of any application.

### **CONCLUSION**

In general, the content requirements in RG7.9 and the PDSR Technical Guide are nearly identical. There are some differences in the applications, however, which if not addressed properly, could result in lengthy delays in the licensing process. Daher-TLI has prepared an Application Guide to assist applicants intending to submit a European PDSR to the USNRC for a package approval certificate. The Guide describes how the PDSR addresses RG7.9 package approval application requirements, thereby increasing the likelihood of a shorter licensing exercise.

### **REFERENCES**

1. UNITED STATES CODE OF FEDERAL REGULATIONS, Title 10, Energy, Part 71— Packaging and Transportation of Radioactive Material, No. 10CFR71, July 2013
2. UNITED STATES CODE OF FEDERAL REGULATIONS, Title 49, Transportation, Part 173--Shippers--General Requirements for Shipments and Packagings, No. 49CFR173, July 2013

3. Technical Guide, PACKAGE DESIGN SAFETY REPORTS FOR THE TRANSPORT OF RADIOACTIVE MATERIAL, Doc Ref: European PDSR Guide ISSUE 2 (September 2012)
4. REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL, 2012 Edition, Specific Safety Requirements No. SSR-6, International Atomic Energy Agency (IAEA), Vienna, 2012
5. REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL, 2009 Edition, Safety Requirements No. TS-R-1, International Atomic Energy Agency (IAEA), Vienna, 2009