Development of Guidance on Application of the Concepts of Exemption (DS499) and Clearance (DS500)
Update from the Secretariat on the Revision of RS-G-1.7
– For information and discussion –

Haridasan Pappinisseri
Radiation Safety and Monitoring Section, NSRW
Vladan Ljubenov
Waste and Environmental Safety Section, NSRW
Related IAEA publications

1996

International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources

2004

Application of the Concepts of Exclusion, Exemption and Clearance

2005

Derivation of Activity Concentration Values for Exclusion, Exemption and Clearance

2012

Monitoring for Compliance with Exemption and Clearance Levels

2014

Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

General Safety Requirements Part 3
No. GSR Part 3
Revision of RS-G-1.7

New Safety Guide on Application of the Concept of Exemption (DS499)

New Safety Guide on Application of the Concept of Clearance (DS500)

Being developed in parallel
New Safety Guide on Application of the Concept of Exemption

- Lead committee: RASSC
- Other committees: WASSC, TRANSSC
- Scientific secretary: H. Pappinisseri, RSM
DS499: Objective and Scope

- Safety Guide is to provide guidance on exemption issues in the framework of planned exposure situations.
- The safety guide will cover similar subject matter to that in RS-G-1.7, but use the newer concepts and definitions, such as exposure situations given in GSR Part 3.
- Particular value to Regulatory bodies in applying GSR Part 3 requirements.
- To describe the process of exemption from regulatory control
- Exclusion concept and its relation with exemption and clearance included.
- Reference to SSG36 – consumer products included.
Current draft – content

1. INTRODUCTION
2. THE CONCEPTS
3. ROLES AND RESPONSIBILITIES
4. GENERIC EXEMPTION
5. SPECIFIC EXEMPTION
6. OTHER ISSUES
   • APPENDIX I Tables from GSR Part 3
   • APPENDIX II Verification for compliance

• ANNEX I Examples of existing dosimetric models for surface contamination
• ANNEX II Screening levels applied after Fukushima nuclear accident.
Status of DS499

• Following CSS endorsement of the DPP in its 42\textsuperscript{nd} meeting, drafting work started in 2018.
  – Three consultancy meetings held between Feb.2018-Jan.2019
    • Some structural changes
    • Add new section 5: Specific exemption
    • Add two Appendices [Exemption tables from GSR Part 3; Verification for compliance]
  – Summary was presented to the previous RASSC/WASSC.
  – Fourth CS meeting held during 15-19 July 2019. (mainly to address the TM inputs)
  – Few outstanding issues need further work before submission of the draft to the Committees.
Discussion in fourth CS meeting

• Two key topics were discussed at length
  1) how to deal natural radionuclides
  2) Trade and Existing exposure situations.
• Further the group undertook thorough review of the draft and several paragraphs modified, added or deleted. Minor structural changes also have been made in the document.
• Issues discussed and addressed in the revised draft include;
  – Exemption of moderate and bulk quantities of material containing natural radionuclides
  – Other primordial radionuclides
  – Exclusion (definition in safety glossary 2018)
  – How to treat mixture of radionuclides, artificial, natural, artificial + natural, radon
  – Screening tools in existing exposure situations for decision making
  – Trade of non-food commodities
  – Construction materials
  – Post-accident situations
  – Consumer products
  – What is trivial dose, explanation on “of the order of 10µSv” and “of the order of 1 mSv”
  – Applicability of the BSS Schedule I Tables
  – Specific exemption cases
  – Radiation generators
  – Type approved equipment
  – Frivolous use of materials; justification
  – Surface contaminated items
• Developed three new flow charts to summarise the guidance
• Reviewed the Appendices and Annexes
New Safety Guide on Application of the Concept of Clearance

- Lead committee: WASSC
- Other committees: RASSC, TRANSSC
- Scientific secretary: V. Ljubenov, WES
Current guidance in RS-G-1.7

- Mass specific values for unconditional clearance of bulk quantities of solid material
- For both natural and artificial radionuclides
- Calculation models are described in SRS-44 (scenarios primarily relevant for clearance - the most restrictive ones)

- No guidance and values for surface specific clearance
- No guidance and values for conditional clearance
- No guidance on clearance of liquids and gases
- Limited guidance on the planning, organization and implementation of the clearance process
DS500 - Objective and Scope

• The objective of the Safety Guide is to provide detailed guidance on the application of the concept of clearance for materials and buildings that are to be released from regulatory control.

• There is no intention to revise numerical values provided in GSR Part 3

• Clarification on the use of terminology, especially the use of terms clearance and release;

• Responsibilities of the licensee and the regulatory body;

• All relevant steps of the clearance process including characterization, determination of the nuclide vector, measurement techniques, sampling, management of the clearance process;

• Mass specific and surface specific clearance criteria for unconditional clearance;
Examples of derivation of mass specific and surface specific clearance criteria for conditional clearance (actual values would depend on specific conditions applied, so no universal set of values could be proposed);

Case by case approach, which can be used for small quantities of material, or for other situations where the assumptions for the generic derivation of clearance levels do not apply;

Provide explanations on needs for control of conditionally cleared materials (for example during transport), clarify at which point clearance act happens in case of conditional clearance;

Clearance in an area affected by consequences of a nuclear or radiological accident;

Considerations of clearance of liquids and gases;
DS500 - Objective and Scope

- Additional considerations for building materials containing naturally occurring radionuclides;
- Considerations of averaging masses and averaging areas;
- Discussion of the degree of homogeneity that was assumed in the calculation of the clearance levels and the implications for application of the clearance levels to non-homogenous material;
- Involvement of interested parties.

- The guide will not address:
  - Exemption (DS499)
  - Application of radiological criteria for international trade of non-food commodities containing radionuclides (separate publication to be prepared)
  - Release of sites from regulatory control (Safety Guide WS-G-5.1, its revision will be discussed soon).
Structure

1. INTRODUCTION
2. REGULATORY FRAMEWORK FOR CLEARANCE
3. GENERAL ASPECTS OF CLEARANCE
4. CLEARANCE OF SOLID MATERIAL
5: CLEARANCE OF LIQUID MATERIAL
6: CLEARANCE OF GASEOUS MATERIAL
7. CONCEPT OF CONDITIONAL CLEARANCE
8. INVOLVEMENT OF INTERESTED PARTIES AND ENHANCING PUBLIC UNDERSTANDING

APPENDIX - Screening Level for Recycle or Disposal on Landfills of Material and Waste in the Post-Accident Existing Exposure Situation

ANNEX I - Dosimetric modelling for derivation of radionuclide specific values for clearance based on surface contamination measurements

ANNEX II - Examples of surface specific values for unconditional clearance

ANNEX III - Examples of mass specific values for conditional clearance

ANNEX IV - Considerations related to uncertainty of the radionuclide vector

ANNEX V - Relevant literature
## Production schedule

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<td>July 2016</td>
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<td>STEP 2:</td>
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<td>September 2016</td>
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<td>STEP 4:</td>
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<td>November 2017</td>
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<td>STEP 5:</td>
<td>Preparing the draft</td>
<td>December 2017 - June 2019</td>
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<td>STEP 6:</td>
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<td>August 2019</td>
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<td>STEP 7:</td>
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<td>June 2021</td>
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<td>Establishment by the Publications Committee and/or Board of Governors (for SF and SR only)</td>
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<td>STEP 14:</td>
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Progress in preparing the draft

- 4 CS meetings and 1 TM
- CS1: 19-23 Feb 2018 in Vienna in parallel with DS499 CS1
  - Consultants from Belgium, Germany, Japan and UK, with experience from development of RS-G-1.7
  - Changes to the DS500 structure
    - Add Section 4.6. Averaging masses and averaging areas
    - Add Appendix I on release of material and waste from regulatory control in the context of post-accident situations
- CS2: 4-8 June 2018 in Vienna with the same team of consultants
  - Collective review/revisions of the draft, new contributions
- CS3: 21-25 Jan 2019 in parallel with DS499
  - Main part of the document completed
- CS4: 24-28 June 2019 – address the recommendations of the TM, finalize the Appendix and the Annexes
Present the DS499 and DS500 to MS, collect feedback and additional information for finalization of the two guides

40 Participants from 27 Member States

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TM - Structure

• Plenary sessions of Days 1 and 2
  – Presentations by the IAEA on the status of DS499/500 and open issues
  – 15 presentations by MS on their approaches and experiences
  – Identification of topics for the WG discussions, formation of WGs

• Day 3 – 5 WGs discussing selected technical topics
  – Artificial / Natural Radionuclides
  – Specific Issues for Exemption
  – Specific Issues for Clearance
  – Exemption and Clearance of Liquids
  – Confidence Building and Stakeholder Relations

• Day 4 – plenary
  – Reports by the WGs
  – Summary discussion and closing
**TM – Working groups discussion**

- **WG1: Artificial / Natural Radionuclides**
  - In connection to clearance, address radon more comprehensively, both in terms of dose evaluation and measurements
  - Radionuclides of natural origin as part of practices (U fuel fabrication, enrichment, conversion) – 1 Bq/g or 10 µSv/year?

- **WG2: Specific Issues for Exemption**
  - Need for screening values for exemption purposes, e.g. at border protection or customs - criteria could either be based on dose rate or surface contamination. Applicability of values of 0.04/0.4 Bq/cm² from the transport regulations (?)

- **WG3: Specific Issues for Clearance**
  - Inventory of conditionally cleared material at a landfill site, accumulation of RNs over time, need for public consultations (?)
  - Confidence level for each measurement in case of stochastic measurement approaches, i.e. calculating the average, mean, 95 percentile, etc., for comparison with clearance levels
• **WG3: Specific Issues for Clearance**
  – Guidance on how many radionuclides to include and where to use a cut-off criterion

• **WG4: Exemption and Clearance of Liquids**
  – Concentration or filtration process, crystallization, sedimentation, accumulation of radionuclides in plants or on the ground - include in radiological model or exclude/make impossible by attached conditions

• **WG5: Confidence Building and Stakeholder Relations**
  – Cleared material poses no or insignificant radiological risk to the people and the environment, irrespective of the future use
  – Recognition that the clearance / cleared material is beneficial to the society
  – Understand the concerns of stakeholders and address them respectfully
Summary of the TM

- The TM provided opportunity to MS to better understand the progress and current status of the DS499 and DS500
- In general, the participants agree with the approaches in the concepts, the contents as presented and the way forward
- Participants noted that although the concepts apply for planned exposure situations, several instances of clearance and of exemption may occur in existing exposure situations
- No objections were raised in using the screening levels for decision making in existing exposure situations as proposed in the drafts
- In both safety guides, better clarity is needed in dealing with natural radionuclides in applying the concepts
- Participants noted the approaches for surface contaminated objects and explored the possibilities for using a simple screening value especially for international trade
- The TM welcomed guidance on exemption and clearance of liquids and gases.
- Transparency and public trust were underlined in process of exemption and clearance.
Workplan

• Discussions with experts on several points:
  – Radionuclides of natural origin coming from practices – radiological basis for exemption and clearance
  – Exemption and clearance of material / waste from remediation actions
  – Decision making – what to compare with exemption and clearance levels (mean value, MV+total uncertainty, MV+Nσ, N=1,2,3)
What next?

Future work:

• Resolve outstanding issues
• Submit the draft to the coordination committee – early 2020
• Address if any comments and submit the draft to Standards Committee
• Two months comments period by Committee members
• Address comments from the Committees
• Prepare the draft for submission to the RASSC/WASSC (in June 2020)
• In addition:
  – Start the work of the supporting safety report on international trade
Thank you!