45th Meeting of the Waste Safety Standards Committee

2 – 5 July 2018

Agenda Item W 6.1
DS459 Draft Safety Guide: Management of Radioactive Residues from Uranium Production and Other NORM Activities (Revision of WS-G-1.2) – Update on the Status and Issues for Discussion

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Waste and Environmental Safety Section
Division of Radiation, Transport and Waste Safety
Outline

• Background

• Status of development
  – Summary of Member State comments
  – Draft structure

• Activities supporting application of DS459
  – Regulatory Forum for Safety of UP and NORM (REGSUN)
  – Safety Report on In-situ Leaching
  – Safety Report on application of graded approach

• Issues for discussion
Background

• WS-G-1.2: Management of Radioactive Waste from the Mining and Milling of Ores (2002),

• WASSC 31 (June 2011) concluded that: WS-G-1.2 is to be revised at the light of the new requirements and developments.

• WASSC 32 (Nov 2011) and CSS 31 (March 2012) endorsed the DPP

• First review of the draft publication by the review Committees in June 2016

• 120 day Member States consultation completed in December 2016

• The draft was reviewed and endorsed by the Coordination Committee on 1 March 2018
Background - Issues to be addressed (1/2)

- The inclusion of “in situ recovery”, as this has become a major resource recovery and process for uranium.
- NORM residues can include other contaminated objects, like pipes, scaling, sludge, etc.
- Risk based approach and graded approach to managing different residues, based on the wide range of activity levels in NORM residues.
- Regulation and management of mixed residues (i.e., containing radiological and non-radiological contaminants).
- Differences among some Member States in their regulation of NORM, which may or may not include uranium and thorium mine and milling residues.
• General updates to document to reflect current IAEA terminology, definitions, references etc.

• **Predisposal management** of Radioactive Waste (GSR Part 5). For example, pre-treatment, treatment, storage, transport, and conditioning.

• Residues may contain other components which may be retrieved, and *segregation of residue, reuse and recycle, and disposal* should be addressed.

• Make connection to *remediation or decommissioning*, and how these activities can generate a waste or a residue in the context of NORM.
Scope covered

- Uranium mining and processing
- Rare earth extraction
- Thorium extraction and use
- Niobium extraction
- Non-U mining – including radon
- Oil and gas
- TiO₂
- Phosphates
- Zircon and Zirconia
- Metal production (Sn, Cu, Al, Fe, Zn, Pb)
- Burning of coal etc.
- Water treatment – including radon

Decommissioning and closure
  - Operation
  - Storage
  - Construction
  - Reuse/Recycle
  - Design
  - Treatment
  - Siting
  - Characterization
  - Generation
  - Planning

Liquid waste
- Manufactured items containing NORM
- Contaminated items
- Higher activity waste
- Uranium mill tailings

Bulk minerals processing residues other than uranium mill tailings
Waste rock, mineralized waste rock and similar residues
### Status of Development of DS459 - Summary of MSs’ comments

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Status of Development of DS459 - Summary of MSs’ comments

• 275 comments from 11 MSs
• 248 (90%) accepted and accepted with modifications
• 27 (10%) rejected:
  ✓ Beyond the scope of the document
  ✓ Fraction of 1 mSv/a
  ✓ Citation and reference
Structure of DS459

1. Introduction
2. Overview of NORM Residues
3. Governmental, legal and regulatory framework
4. Protection of people and the environment
5. System for regulatory control
6. Strategies for NORM residue management
7. The safety case and safety assessment for NORM residues management
8. Safety consideration for long term Management of NORM Residues

Appendix A. Special considerations of residues from uranium production
Appendix B. Residue management plan for uranium production
Appendix C. Decommissioning plan for uranium production facility

References
Annex I. Example residue be assessed for possible regulatory control
Annex II. Questionnaire for survey of NORM residues management
Annex III. Application of the graded approach to the management of NORM residues
Annex IV. Reuse and Recycling of NORM Residues
Annex V. Sampling and determining radionuclide activity concentrations
Annex VI. Bibliography
System for Regulatory Control

1. List of NORM activities

2. Operating organization intended to conduct NORM activities

3. Notification

4. Residues used for construction materials
   - Meet criteria in SG-32
   - Construction materials

5. Disposal of bulk amounts of residues

6. Other NORM activities
   - U, Th > 1 Bq/g
   - K-40 > 10 Bq/g

7. Screening Assessment
   - Below 1 mSv/ha
     - YES: Exemption
     - Safety Assessment
     - Below 1 mSv/ha
       - YES: Authorized disposal
       - Registration/License
       - Clearance

8. Landfill
A new IAEA project was launched on Regulatory Forum for Safe Management of Uranium and Naturally Occurring Radioactive Material Residues (REGSUN) – Kick off meeting was held at the IAEA Headquarters in Vienna, Austria from 18 to 22 June 2018 with thirty-six participants representing twenty-seven MSs

Three working groups
  – Regulation and Crossing Issue Working Group
  – Uranium Production Working Group
  – NORM Working Group
## Open-pit Underground ISL

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<td>Big volume of tailings which cause significant concerns</td>
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<td>Big volume of tailings which cause significant concerns</td>
<td>Significantly potential risk of groundwater</td>
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<td>Large stockpiles of waste rock, sub-economic ore and/or overburden</td>
<td>Much smaller waste rock production volumes</td>
<td>Large volume of waste water</td>
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<td>Potential for waste water, drainage and seepage to cause environmental problems</td>
<td>Potential for waste water, drainage and seepage to cause environmental problems</td>
<td>Waste sludge and evaporate salts of high specific activity but small volume</td>
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- To address the safety of ISR appropriately, development of a specific safety report for ISR was proposed at WASSC 38 (November 2014)
- The document is under development.
1. Introduction
2. Overview of ISL Facilities
3. Safety Approach
4. Legal Framework and Regulatory Supervision
5. Safety Consideration in the Development and Management of an ISL Facility
6. Groundwater Protection
7. Other Considerations
Appendix I. Groundwater restoration techniques
Appendix II. Example of the USA and Australia Legal and Regulatory Approach for ISL
Appendix III Performance of the Regulatory Review
Appendix IV. Detailed Inspection Guidance for ISL Facility
Appendix V. Examples of Accidents and Events That Have Occurred at ISL Operation
Appendix VI. Glossary
Application of graded approach

- TECDOC on Application of the Graded Approach to the Safe Management of Naturally Occurring Radioactive Material (NORM) Residue is being developed
  - Technical Meeting on Application of the Graded Approach to Safety for Management of NORM Residues, Vienna, Austria, 19-23 June 2017
  - Consultancy Meeting to Review and Revise the draft TECDOC on Graded Approach for NORM Residues Management, 20-24 November 2017
  - Second Consultancy Meeting to Review and Revise the draft TECDOC on Graded Approach for NORM Residues Management, 12-16 March 2018
Issue for discussion No. 1
- Title of the DS459

- Current working title:
  - Management of **Radioactive** Resides from Uranium Production and Other NORM Activities

- Proposed title:
  - Management of **Residues containing Naturally Occurring Radioactive Material** from Uranium Production and from Other Activities
Issue for discussion No. 2
- long term management of NORM residues

• How to define time frame for post closure management (institutional control)
  • TM on the Planning and Implementation of Long Term Institutional Controls and on the Release of Sites from Regulatory Control, was held in Vienna, December, 2017
  • A review of the information and from discussions with participants it was noted that a lot of Member States had very little experience with or systems in place for institutional control of sites released with restrictions.
Issue for discussion No. 2
- long term management of NORM residues

- for safety assessment
  - TM on Safety Assessment for Long Term Management of Radioactive Residues from Uranium Production will be organized in Vienna, Austria, from 12 to 16 November 2018
  - Regulatory requirements, such as safety criteria, time framework for safety assessment, format and content
  - Approach and methodology to conduct a safety assessment, including application of conceptual site model, screening approach, and graded approach
  - Safety assessment in supporting development of residue management plan, decommissioning plan, remediation plan and long term institutional control
  - Use of safety assessment in supporting regulatory decision making
  - Communication of safety assessment with interested parties
  - Issues and challenges to apply safety assessment methodology and tools to other NORM residues management
Thank you!