Occupational Radiation Protection

Introduction and Framework for ORP

GSG7: Sections 1 and 2
Presentation contents

- IAEA Safety Standards
- Background to GSG7
- GSG7 Structure and Course Programme
- Framework for ORP

- Exposure situations and RP Principles
- Responsibilities
- Graded approach
Expected outcomes

Understand the structure and contents of GSG7, and how this safety Report fits within the IAEA Safety Standards hierarchy.

Understand the specific requirements of GSG7 relating to planned, existing and emergency exposure situations, and the protection of workers in special cases (GSG7 sections 1 to 6).

Be aware of the GSG7 requirements relating to assessment of occupational exposures, technical service providers, workplace controls and PPE, and workers health surveillance (GSG7 sections 7 to 10, Appendices and Annex).
IAEA Safety Standards

Fundamental Safety Principles
SF-1

Basic Safety Standards (BSS),
eg GSR part 3

Safety Guide:
“Occupational Radiation Protection”
GSG7
IAEA GSG7: Background

1. Joint IAEA and ILO Safety Guide

2. Takes account of ICRP Publication 103
   • New system based on “exposure situations”

3. Updates and replaces:
   • Occupational RP: RS-G-1.1
   • Assessment of exposures from intakes: RS-G-1.2
   • Assessment of external exposures: RS-G-1.3
   • ORP in mining and milling: RS-G-1.6
   • Management of technical services: GS-G-3.2
GSG7: Structure and Course Programme

- Framework for ORP (GSG 7 chapter 2)
- Planned Exposure Situations (3)
- Emergency Exposure Situations (4)
- Existing Exposure Situations (5)
- Protection of workers in special cases (6)
- Assessment of occupational exposure (7)
- Management of technical service providers (8)
- Engineered, administrative controls and PPE (9)
- Workers’ health surveillance (10)

Appendices I to V, and Annex not specifically covered.
Framework for ORP: Exposure Situations

<table>
<thead>
<tr>
<th>Planned Exposure Situations</th>
<th>Emergency Exposure Situations</th>
<th>Existing Exposure Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Planned operations and activities</td>
<td>• From accidents, malicious acts or other unexpected event</td>
<td>• Already present when decisions on the need for control are required</td>
</tr>
<tr>
<td>• Provisions for safety can be made in advance</td>
<td>• Requires prompt action</td>
<td>• Exposure to cosmic rays, Rn in dwellings and workplaces, NORM</td>
</tr>
<tr>
<td>• Exposures can be restricted from the start</td>
<td>• Prevention and mitigation actions can be taken before</td>
<td>• Residual radioactivity from uncontrolled past practices, or following an emergency exposure situation.</td>
</tr>
<tr>
<td>• Essentially the same as “practices”</td>
<td>• Actions to restrict exposures taken after the accident occurs</td>
<td></td>
</tr>
</tbody>
</table>

Occupational exposures can occur in any exposure situation
Exposure Situations

Not always obvious which type of exposure situation applies
  • Transition from emergencies
  • Some exposures to natural sources
  • “potential exposures” (planned or emergency)

Exposures not amenable to control are **excluded**
  • E.g. K-40 in the body, cosmic rays at ground level
## Framework for ORP: Exposure Situations

<table>
<thead>
<tr>
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<th>Planned exposure situations</th>
<th>Emergency Exposure Situations</th>
<th>Existing Exposure Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JUSTIFICATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Practices (sources) must be justified.</td>
<td>• Protective actions to be justified</td>
<td>• Protective actions to be justified</td>
<td></td>
</tr>
<tr>
<td><strong>OPTMIZATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Individual and collective doses, and likelihood of potential exposures to be ALARA.</td>
<td>• Protection measures to be optimized</td>
<td>• Protection measures to be optimized</td>
<td></td>
</tr>
<tr>
<td>• Use of dose constraints</td>
<td>• Use of dose reference levels</td>
<td>• Use of dose reference levels</td>
<td></td>
</tr>
<tr>
<td><strong>DOSE LIMITATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Workers doses subject to individual dose limits</td>
<td>• Dose guidance values for restricting exposure of emergency workers</td>
<td>• No dose limits</td>
<td></td>
</tr>
</tbody>
</table>
## GSG7: Framework-Responsibilities

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| **Government**                            | • Regulatory and legal framework  
   • Legislation and regulatory body  
     • *Independence and authority*  
     • *Competence and resources*  
   • Requirements for education and training  
   • Provision of technical and training services |
| **Regulatory Body**                       | • Establish RP requirements and regulatory system  
   • Setting acceptance and performance criteria  
   • Dissemination of lessons learned from accidents  
   • Application of education and training requirements  
   • Record-keeping provisions |
| **Employers, registrants and licensees**  | • “prime responsibility for protection and safety…”  
   • Optimization of protection and dose limits  
   • Radiation Protection Programmes |
| **Workers**                               | • Following procedures, use of dosimeters, PPE, etc  
   • Act in a responsible manner |
Graded approach

BSS: “The application of the requirements for the system of protection and safety shall be commensurate with the radiation risks associated with the exposure situation.”

**Government**: Overall responsibility

**Regulatory Body**: incorporate into Regulations

Especially relevant to Planned Exposure Situations, eg exemption and clearance

“The government or the regulatory body shall determine which practices or sources ...are to be exempted from ...these Standards. The regulatory body shall approve which sources, including materials and objects ...may be cleared from regulatory control.”
MANAGEMENT SYSTEM


DOSIMETRIC QUANTITIES

➢ Radiation protection quantities (effective dose and equivalent dose)
➢ Operational quantities for workplace and individual monitoring
➢ Quantities for monitoring of radon
Questions and Discussion
Exercise-exposure situations

Create 3 lists giving examples of different exposure situations:
1. Planned
2. Emergency
3. Existing
QUESTIONS AND DISCUSSION