40th Meeting of the Radiation Safety Standards Committee
41st Meeting of the Waste Safety Standards Committee

21 – 22 June 2016

Agenda Item R2.3
Existing Guidance on the Graded Approach

Helen Rycraft
NSNI/OSS
Graded Approach guidance:
SSG 22 – Use of Graded Approach in application of Safety Requirements for Research Reactors (2012)
Tech Doc – 1740 Use of Graded Approach in the Application of management systems requirements for facilities and activities (2014)

Grading Factors

- Via Safety Analysis, & “Engineering Judgement” – must be documented
- Complexity
- Maturity of technology
- Operating experience
- Stage of lifetime
- Significance of product or activity
- Consequence of failure
- Size of Organisation

Can be graded:
- Regulatory Requirements
- Training and experience requirements
- Operating procedures

Not graded

- Basic Safety Functions eg Shut down
- Decay heat removal
- Emergency core cooling
- The confinement requirement
- Legislative acceptance criteria
- Adequate training
- High consequence but low probability events
- Occupational exposure
- “Commissioning processes”
Definitions of ‘Graded Approach’

Graded approach GSR part 3

• For a system of control, such as a regulatory system or a safety system, a process or method in which the stringency of the control measures and conditions to be applied is commensurate, to the extent practicable, with the likelihood and possible consequences of, and the level of risk associated with, a loss of control.

Graded approach GSR part 7.

• As above and
• (2) An application of safety requirements that is commensurate with the characteristics of the facilities and activities or the source and with the magnitude and likelihood of the exposures.

Graded approach “Glossary”

• (as above and ….
• (1) The significance and complexity of a product or service are determined;

• (2) The potential impacts of the product or service on health, safety, security, the environment, and the achieving of quality and the organization’s objectives are determined;

• (3) The consequences if a product fails or if a service is carried out incorrectly are taken into account.
The following Standards Have the ‘Graded approach’ as part of their application:

- GSR part 1 rev 1 - Government Legal and Regulatory Frameworks
- GSR part 2 (and previous GSR3)
- GSR part 3 - Radiation Protection and Safety of Radiation Sources
- GSR part 4 - Safety Assessment for Facilities and Activities
- GSR part 5 - Predisposal management of Radioactive waste
- GSR part 6 - Decommissioning of facilities
- GSR part 7 - Preparedness and Response for a Nuclear or Radiological Emergency
Other Standards

- NS R 3 – Site Evaluation for Nuclear Installations
- NS R 4 – Safety of Research Reactors

- NS R 5 – Safety Of Nuclear Fuel Cycle Facilities
- 1.14. The implementation of the safety requirements for any fuel cycle facility shall be commensurate with its potential hazards (the ‘graded approach’). The facility type and the following facility specific attributes shall be taken into account:
  - (a) The nature and the physical and chemical forms of the radioactive materials that are used, processed and stored at the facility;
  - (b) The scale of operations undertaken at the facility (i.e. the ‘throughput’ of the facility) and the inventory of hazardous material, including products and waste in storage;
  - (c) The processes, technologies and hazardous chemicals that are used;
  - (d) The available routes for the disposal of effluents and the storage of radioactive waste.
In summary – Factors that should or can be ‘Graded’ in different Standards

GSR part 1

• National Policy and strategy
• Authorizations
• Reviews and Assessments
• Inspections
• Regulatory Functions
• Application of the resources of the Regulator
• Regulatory Response
• National Regulations and Guides
• Public Information
GSR part 3

• Safety Assessment
• Emergency Exposure

GSR part 4

• Safety Assessment requirements:
  – Scope
  – Level of Detail
  – Deterministic and Probabilistic approaches
• Operational Experience Data – Collection and Scope
• Independent Verification
GSR part 5/ GSR part 6

GSR Part 5 – application of the requirements for:
- the predisposal management of radioactive waste, depending on:
  - the hazards,
  - the complexity of facilities and activities,
  - the characteristics of the waste

GSR part 6 –
- Reduction of Radiation Risk
- All aspects of Decommissioning – management of Radiation Risks
GSR part 7

General requirements that are to be met before effective emergency arrangements can be made, defined by using a graded approach

Requirement 4: Hazard assessment
The government shall ensure that a hazard assessment is performed to provide a basis for a graded approach in preparedness and response for a nuclear or radiological emergency:
Work Going Forward

- Proposal on Tuesday in NUSSC by Director of NSNI
  - Develop a Top level guide on ‘Graded Approach’
  - Discussions on ‘Graded Approach’ to identify possible application scenarios (e.g., small modular reactors, generation IV reactors, etc)
- Use both SSG(2012) and Tech Doc 1740 (2014)
- All guidance to be included or referred to, by GSR part 2 revised guide.
Thank you!