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General Radiation Protection Considerations in Uranium Mining and Processing

Training Package on Occupational Radiation Protection in Uranium Mining and Processing Industry

International Safety Standards

- 2006 IAEA – Fundamental Safety Principles
 - Justification
 - Optimisation
 - Limitation
- 2014 IAEA – Radiation Protection and Safety of Radiation Sources, General Safety Requirements – Part 3
 - General requirements for planned, emergency & existing exposure situations



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Scope of Regulations



Exposure Situations

- Prior to human intervention (exploration or mining) exposure to naturally occurring radioactive material (NORM), including uranium, is an existing exposure situation
 - Regulation & controls generally not required
- The mining & processing of NORM that results in occupational exposures is a planned exposure situation
 - Regulation & controls generally required

Planned Exposure Situation



- GSR Part 3 requirements for planned exposure situation apply when:
 - Activity concentration of any radionuclide of uranium decay chain >1 Bq/g or K-40 >10 Bq/g
 - Public exposures exist
 - Exposure to radon & radon progeny is controlled or above reference levels
- Uranium mining typically has activity concentrations >1 Bq/g
- Graded approach required based on exposure risk



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Responsibilities



- For all exposure situations (existing, planned & emergency):
 - Establish & maintain a legal & regulatory framework for protection & safety
 - Establish independent regulatory body with clear responsibilities & functions
- Including:
 - Graded approach based on risk; education, training, qualifications & competence; technical services (i.e. dosimetry, environmental, calibrations); decommissioning & transport (IAEA Requirements SSR 6);

Regulatory Body



- General Requirements
 - Establish requirements for radiation protection; specific requirements; education & training; incident learnings; acceptance & performance requirements for sources; provision to accept & maintain records
- Planned exposure situations
 - Establish & enforce requirements for protection & safety; compliance with dose limits; ensure operator monitors & records occupational exposures

Organisation & Workers



- The organisation has primary responsibility for protection & safety
 - Optimisation of protection & safety; compliance to dose limits; programs established & maintained
- Workers have responsibility to fulfil obligations related to protection & safety
 - Use of monitoring & personal protection equipment (PPE); compliance with health surveillance; dose assessment; instructions & training; feedback to management

Organisational Responsibilities



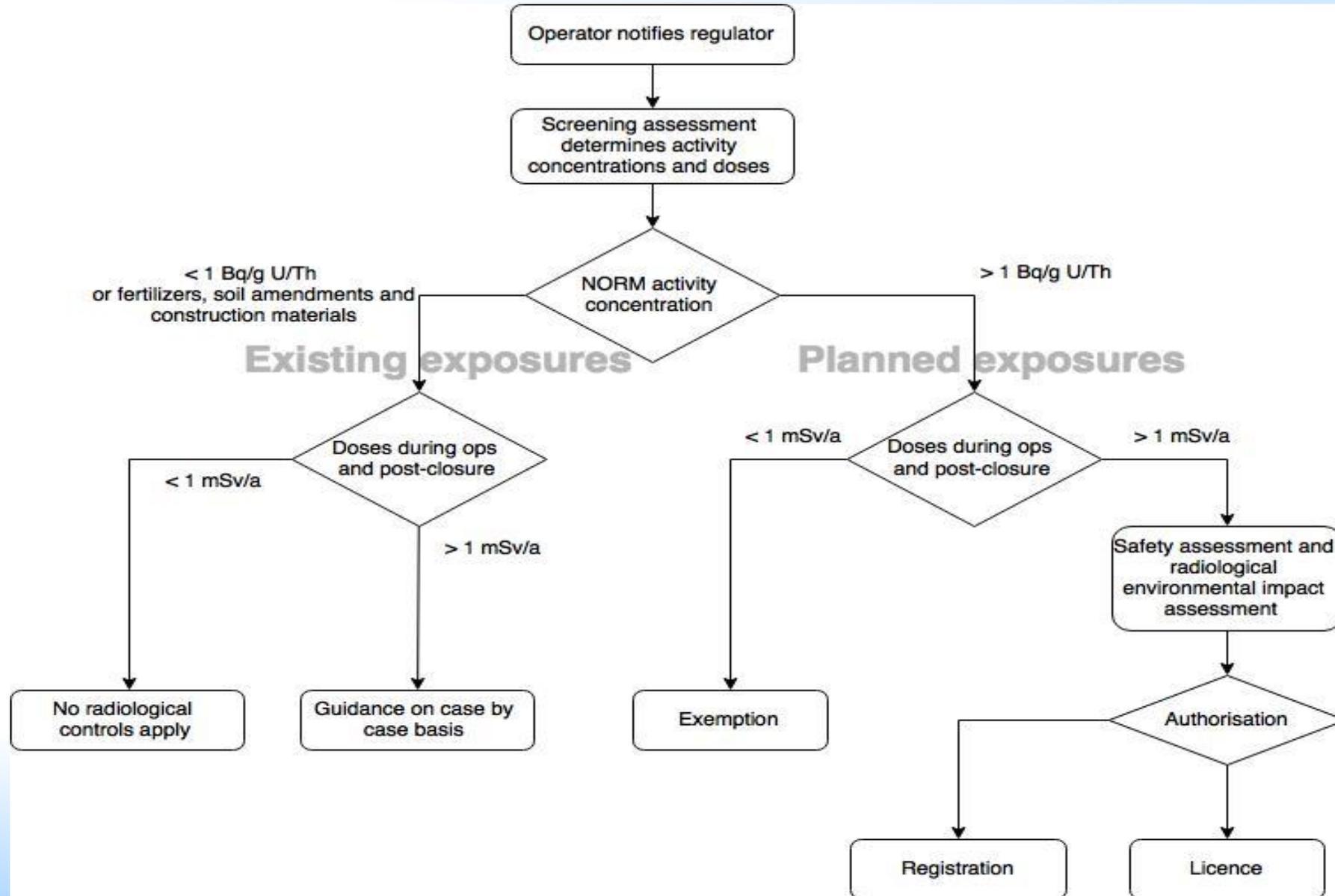
| Role | Key Responsibilities |
|---------------------------------------|---|
| Management | Provision of appropriate resources to meet radiation safety requirements. |
| Technical Management | Implement and maintain engineering controls. |
| Supervisors | Implement and maintain administrative and PPE controls. |
| Radiation Protection/Safety Officers* | Develop and implement monitoring programs. Review and provide feedback for other controls. |
| Workers | Use all controls as directed. Follow requirements for protection. |

* Dependent on organisational structure & arrangements

Graded Approach

- Optimise resources commensurate with risk
- Assess risk at all stages of operation
 - Exploration; mining; processing; decommissioning; closure & remediation

Overview to Graded Approach



Key Messages



- IAEA provides guidance for safety requirements
- Scope of regulations dependent on exposure situation
- Government establishes framework, regulatory body enforces requirements, organisations & workers implement
- Know key responsibilities
- Graded approach commensurate with risk

Facilitated Discussion 1



- What are some of the key differences in the responsibilities of the Government, Regulatory Body and the Operator?
 - The government must ensure that they establish the legal framework for establishment of the regulatory body. The regulatory body must enforce the requirements on all operations and operators must implement all regulatory requirements

Facilitated Discussion 2



- Discuss the implementation of a graded approach under a number of different potential exposure situations (i.e. <1 Bq/g U/Th & <1 mSv pa. vs. >1 Bq/g U/Th & >1 mSv pa.)
 - The first case is an existing exposure situations where no radiological controls are required. The second case is a planned exposure situation that requires regulation and the application of appropriate controls.



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Thank you!

