# Links between Regulatory Objectives, Assessment Methods and Scientific Support

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# ICRP 103 - ‘International’ Regulatory Principles

Justification:

- “any decision that alters the radiation exposure situation should do more good than harm” ICRP 103

Optimisation:

- “The likelihood of incurring exposure, the number of people exposed, and the magnitude of their individual doses, should all be kept as low as reasonably achievable, taking into account economic and social factors” ICRP 103

Individual dose limits:

- “The total dose to any individual from regulated sources in planned exposure situations other than medical exposure of patients should not exceed the appropriate limits” ICRP 103

*Our assessments should address these objectives and they need to be transparent in how they do so.*

# Addressing Regulatory Principles

Justification:

- Do our radiological assessments present the harm avoided (or not) by alternative remediation options?

Optimisation:

- Do our assessments present the likelihood of exposure, the number exposed and the individual dose distribution in the exposed population?

Individual dose limits and constraints:

- Is legacy management a planned or existing exposure situation? Does that affect how we assess the dose?

*Even if our assessments cannot address everything in detail, we should at least pay some attention to all aspects…*

# Legacies management and remedial actions may involve

- Worker protection in normal and accident situations
- Public protection in normal and accident situations
- Effluent discharges during remedial actions
- Clearance of nominally radioactive material from the site as non-radioactive waste
- Clearance of radioactively contaminated land
- Disposal of radioactive waste, off site
- Disposal of radioactive waste, on site
- As well as other chemical and physical hazards!

*Assessments which seek to justify a management program can involve many topics.*

# Developments in requirements affecting legacy management

New requirements for solid radioactive waste disposal from IAEA

- Individual dose and risk constraints for natural processes
- Dose range for human intrusion

New regulations on control of radioactive materials in UK, France, Russia, with a lot of emphasis on NORM and TENORM

*All these developments affect regulations for legacy sites; however, regulation supervision of legacy sites should be developed and applied coherently, not one issue at a time.*

# Assessment developments:

- Progress with GAMP!!!
- IAEA guides on waste management close to publication
- National level equivalent being developed in many countries in parallel with regulatory requirements
- Opportunities to confirm assessment assumptions from the history of site monitoring should be taken full advantage of
- Protection during remediation is important, but assessments also need to demonstrate longer-term safety, to help design any necessary continuing monitoring programme, and to have confidence that long-term protection objectives are being met rather than creation of a new legacy.
- This is especially important when disposal takes place at the legacy site.

# Scientific inputs

- Assessments need to be supported by scientific information on how the environment will evolve, how radionuclides move within that evolving environment, and how humans and other biota interact with it.

- The possibilities for environmental change within the regulatory timeframes are of growing importance, as recognised in EMRAS II WG3, and are important for regulatory supervision of NORM and legacy sites.

- Radon is a major issue at many legacy sites, but it can be hard to tell if radon is present due to the legacy or if radon is present naturally. Since protection objectives show a trend to differentiate the sources of radon, this becomes an important scientific issue to resolve.

# Scientific inputs (2)

- The migration and accumulation of radionuclides, and disequilibrium of the decay chains is very complex, especially when it is to be evaluated over hundreds of years.
- Support from research into radioactive waste disposal may be of value in this context.
- Equally, information from legacy sites about how radionuclides have behaved in those environments may be helpful in supporting the validation of assessment models used for radioactive waste disposal.

# Conclusions: Assessment should be able to:

- Demonstrate that a proposed remediation plan will do more good than harm.
- Address a wide range of exposure situations, addressing initial assessment of a newly identified legacy, operation period and the period after work is complete.
- Address radiological impacts for the more likely exposure situations, but also to consider accidents during operations, and unlikely, but potentially significant disturbance of a site after work is complete.
- Provide results for radiological impacts which can be used coherently alongside other safety and environmental assessments relevant to NORM and legacy site management.