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From Theory to Practice: Nuclear Safety in High-Grade Uranium Mines

Wednesday 11 June 2025 14:15 (30 minutes)

This presentation bridges the gap between theoretical nuclear physics and the practical realities of ensuring worker safety in high-grade uranium mines. High-grade uranium ore presents unique challenges in radiation protection due to gamma radiation, radon gas, and long-lived radioactive dust (LLRD). This necessitates a multi-faceted approach to radiation protection, combining sophisticated modelling with robust engineering and administrative controls.
We will explore the key radiation hazards encountered in high-grade uranium mining, focusing on the physics underpinning their behaviour and impact. This includes a discussion of gamma radiation fields, radon emanation from ore bodies and surrounding rock formations, and the decay chains contributing to LLRD exposure.

The presentation will detail the strategies employed to mitigate these hazards. This covers predictive modelling of radon and gamma radiation, the application of advanced engineering controls such as raiseboring and jet boring techniques designed to minimize exposure, and the implementation of rigorous controls including radiation work permits and a comprehensive code of practice. We will demonstrate how these controls, used in conjunction with comprehensive dosimetry monitoring and a robust radiation protection program, maintain worker doses well below regulatory limits.

This presentation offers a real-world perspective on applying health physics in one of the most regulated industries.

Keyword-1

Radiation

Keyword-2

High Grade Mining

Keyword-3

Health Physics

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