Evaluation and survey of NORM legacy sites in Austria

Fabian Rechberger
Department of Technical Radiation Protection

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Historical Usage of Uranium

- Discovery of radioactivity → uranium ore/pitchblende residues
- Austria: Joachimsthal mine (CZ)
- Marie Sklodowska Curie: discovery of radium and polonium in the tailings of the uranium colour production in Joachimsthal
- Pitchblende → production of Radium
- Ra-226 + progeny
  - –Rn-222
  - –Pb-210 and Po-210

Historical Usage of Thorium

- Monazite sands → production of Thorium
- Carl Auer von Welsbach inventor of the incandescent light mantle
  – also called the 'Welsbach mantle'
- Th-232 + progeny
  - Ra-228
  - Rn-220 (Thoron)
- Several production sites in Austria (Vienna)

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Anton on wikipedia.de

Regulatory Limits in Austria

Dose limits:	
Individual members of the public:	1 mSv/a
Occupationally exposed worker category A:	20 mSv/a
Occupationally exposed worker category B:	6 mSv/a

- Guidance Level for natural sources of radiation

<1 Bq/g for all radionuclides: dosage for public <1 mSv/a	>1 Bq/g for any radionuclide → exposure scenario

Initial Situation in Austria

- Bullet points according to EU-BSS
  (Section 6, Art. 100/101/102)
- Member States shall assign responsibilities for:
  - Implementation of strategies for the management of existing exposures
  - Coordination between relevant parties
  - Evaluation of remedial and protective measures
  - Provide information to exposed populations on potential health risks

Plan of action

1. Identification of NORM legacy sites
2. Characterization of the legacy sites
3. Secure/decontaminate the site
4. Waste management strategy

Identification

- Competent authority: BMLFUW (Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management)
- Identification of legacy sites (research) → legacy catalogue
- Prioritizing based on radiological risk for population
- Confirmation of contamination and evaluation of its extent (AGES)

Characterization

- Characterization
  - Nuclides (Th/U)
  - Allocation
  - Exposure scenario (if necessary: simulations)
- Cooperation with specialists for chemical legacy sites
- Correlation between chemical and radiological contamination?

Remediation of contaminated sites

Secure ⟷ Decontaminate

- Indoor /outdoor, size of the area, solubility of material, etc.
- Secure: preservation of evidence (continuous sampling), stable contamination profile

Remediation of contaminated sites

- Dose assessment (risk based)
- Ensuring radiation protection
  during remediation actions for participants
- Cooperation with decontamination experts
- Confirming success of remediation
  (comprehensive sampling: soil, water, air, etc.)
- Waste disposal

Waste Disposal

- Activity concentration >1 Bq/g →
- Dose assessment
- NORM waste (disposable) ⟷ radioactive material
- Case by case decision → finding a suitable landfill for NORM
- Adopted NORM waste strategy for existing exposure will be developed (EU-BSS Art. 102)
- Necessity of a NORM landfill / usage of existing landfills

Summary

- How does the survey of legacy sites work in Austria?