

Experience of the authorities in the execution of the radiation protection legislation in the NORM industries – Experience in Austria

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Actual situation

- **Where we are**
- **What we have to do and where we should go**
- **Outlook and Results**

Basic background of legislation

- **Directive (Richtlinie) 96/29/EURATOM**
- **Austrian Radiation Protection EU-adoption law (Strahlenschutz-EU-Anpassungsgesetz 2004**
- **Austrian Radiation Protection Law (Strahlenschutzgesetz) (StrSchG) [BGBl 227-1969] [BGBl 137-2004]**

- **General Austrian Radiation Protection Ordinance (Allgemeine Strahlenschutzverordnung) (AllgStrSchV) [BGBl 169-2006]**
- **Austrian Radiation Protection Ordinance for air crews (Strahlenschutzverordnung fliegendes Personal) [BGBl 235-2006]**

- **Austrian Radiation Protection Ordinance for naturally terrestrial materials containing naturally occurring radionuclides (in preparation); Verordnung über Maßnahmen zum Schutz von Personen vor erhöhter Exposition durch terrestrische natürliche Strahlenquellen (NatStrSchV) [in Ausarbeitung]**

Basic background of legislation– StrSchG

- **Handling with radioactive sources and materials**
 - Handling and operation of radioactive sources (sealed/unsealed sources; X-ray equipment,)
 - Handling and work with radioactive materials, which will be used cause it is containing radionuclides
 - Regulated by Austrian Radiation Protection Law (StrSchG), Medical Austrian Radiation Protection Ordinance (MedStrSchV) and the General Austrian Radiation Protection Ordinance (AllgStrSchV)

Basic background of legislation– StrSchG

Working with naturally occurring radioactive sources and materials

- Handling and work activities with materials, containing naturally occurring radionuclides, which might cause, due to that work, higher doses, than the natural backgrounddose, to the workers and the environment (Basic regulations and definitions in the Austrian Radiation Protection Law (StrSchG))
- Till now no **Austrian Radiation Protection Ordinance for naturally terrestrial materials containing naturally occurring radionuclides (in preperation) - (NatStrSchV)**

Basic background of legislation– StrSchG

Part 3b of the Austrian Radiation Protection Law (StrSchG) Protection due to work activities involving materials containing naturally occurring radionuclides

■ § 36d Dosisbegrenzung

Wer eigenverantwortlich Arbeiten ausübt oder ausüben lässt, bei denen mit erhöhten ²²²Radon-Expositionen bzw. mit **erhöhten Expositionen durch Uran oder Thorium und deren Zerfallsprodukte ohne Radon** bzw. mit Expositionen durch kosmische Strahlung (fliegendes Personal) zu rechnen ist, hat dafür zu sorgen, dass die **Expositionen jenen Wert, der der maximal zulässigen Exposition beruflich strahlenexponierter Personen der Kategorie A entspricht, nicht übersteigt.**

■ § 36e Dosisminimierung

Wer eigenverantwortlich **Arbeiten gemäß §36d sowie Arbeiten, bei denen überwachungsbedürftige Rückstände anfallen**, durch deren Verwertung oder Beseitigung für Einzelpersonen der Bevölkerung die Exposition jenen Wert übersteigt, der für Einzelpersonen der Bevölkerung zulässig ist, ausübt oder ausüben lässt, hat **geeignete Maßnahmen zu treffen, um unter Berücksichtigung aller Umstände des Einzelfalles die Exposition so gering wie möglich zu halten.**

■ § 36f Anforderungen bei Arbeiten unter Einwirkungen terrestrischer Strahlung

Die Behörde hat durch Verordnung jene Arbeitsbereiche festzulegen, bei denen ... mit erhöhten Expositionen ... zu rechnen ist.

Austrian Radiation Protection Ordinance for naturally terrestrial materials containing naturally occurring radionuclides (in preperation)

■ Part 1: General Regulations

which gives the scope and the jurisdiction, the responsibilities, the doses, the optimisation, maximum permissible dose for the population and the exposed workers, the monitoring (doses) authorities, radiation protection rules and procedures and radiation protection of the environment

■ Part 2: Work with naturally terrestrial materials

Duties of the responsible persons, examination of dose; medical examinations, data-transfer to the central doseregister

Austrian Radiation Protection Ordinance for naturally terrestrial materials containing naturally occurring radionuclides (in preperation)

■ Part 3: Protection of the population in relation with higher expositions with naturally terrestrial materials

residues, contaminated material, control of material, temporary storage, release of the material out of control, remove of contaminated material, handling of contaminated material as radioactive waste, effluents of natural radioactive material, licensing of effluents, control of materials other than in jurisdiction lined out in § 2

■ Part 4: Final Regulations

gender agreement, temporary arrangements

What we have to think about new regulations ? (laws and ordinances)

- New laws and regulations are bearing unfounded fears and insecurities
>>> every type of radioactivity = special hazard >>>
- We must eliminate the fears and insecurities of the people and bring in a consciousness of the dubiousness (problems)
- Many of these firms and plants, especially their management, do have only little or no experience in radiation protection
- Apart from some few work activities or fields the potential of hazard will be small or even negligible
- The risk will be minimised to a justifiable dimension through to preventive actions
- Till now there are only few investigations and research work in the field of work activities involving materials containing naturally occurring radionuclides in Austria, except Radon and drinking water (well-springs)
- Taking into account the results, conclusions and recommendations of the 9th EAN Workshop in Augsburg

Potential of Hazards

- **Stochastic Effects**
 - Carzinogenese as also possible Hereditary Effects (radiation damage)
 - **The real danger is reduced probably on some few workingareas and fields**
- **External Radiation**
 - Mainly caused by γ -radiation exposure
 - Strahlenexposition zeitlich und räumlich begrenzt
- **Internal Radiation**
 - Mainly caused by α - und β -radiation exposure
 - Radioactive substance in dust, aerosol, Dämpfen, fume and gas
 - Radionuclides reach the body versus incorporation
 - The main pathway of incorporation is versus the respiratory tract
 - Longtime disposal in the body (lung, liver, skeleton,...)
 - Or Excretion after a specific time of remaining in the different parts of the body
 - Longtime exposure after an incorporation

Potential of Hazards

- Main hazards as a result of
 - External radiation because of a **large amount** of radioactive material
 - External radiation cause **of enrichment of high concentrations** of radioactive material
 - **Inhalation of Radon** on the workplaces
 - **Inhalation of radioactive aerosoles in dustintensive** workplaces
- Long during exposition with α -Radiation → high local doses
- Damage of surface areas of the respiratory tract by inhalation
- Accumulation (enrichment) of radionuclides in specificiel target organs and continuous exposition
 - Radon and his progeniencs and other radioactive particles → lungcancer
 - Thorium on the surface of bones → leukämia

Workplaces with possible higher expositions

Industriebereich	Problembereiche und -stoffe	Gefährdung durch
Bergbau und Verarbeitung von Erzen und Sanden	Seltene Erden, Thorium, Kupfer, Phosphat, Kohle, Zirkon, Monazit, ...	Radon, Stäube, Reststoffe, Abfallprodukte, Abraum, externe Strahlung
Thoriumindustrie	Gasglühstrümpfe, Schweißelektroden,...	Stäube, Reststoffe, externe Strahlung
Erdöl- und Erdgasindustrie	Gewinnung, Verarbeitung und Weiterleitung	Th, Ra, Pb und Po Ablagerungen in Anlagenteilen
Metallerzeugung	Zinn, Blei, Bauxit,...	Anreicherung in Schlacke und Stäuben

Workplaces with possible higher expositions

■ Weitere Arbeitsbereiche

- **Natursteinindustrie** (stone industry)
- **Thoriumindustrie** (thorium industry)
- **Farbstoffindustrie** (pigment industry)
- **Phosphatindustrie** (phosphate industry) (fertilizer)
- **Schwefelsäureproduktion** (sulphuric acid industry)
- **Schleifmittel und Keramikherstellung** (grinding and abrasive industry)
- **Kalorische Kraftwerke** (thermal powerstations)
- **Recycling und Beseitigung** (recycling and clearance)
- ...

Estimation of the dose due to the work activities

- Details given by the lecture by A. BRANDL/A. HEFNER and al. on
- „Assessment of workers exposed by NORM_implementation and first experiences of the ÖNORM S 5223“
- Determination of the external dose commitment
 - Measurement of the personal dose, local areadose or ambientdose and ambientdoserate
 - [Thermolumineszenz-Dosemeter](#)
- Determination of the internal dose commitment
 - [Analysis of the working \(handling\) materials](#)
 - [Static- and personal airsampling \(room and-inhalationaircontrol\)](#)
 - Determination of the airsamples and the filters
 - Determination of Radon concentration
 - [Timerecord and work-analysis](#)
 - Measurement of whole body- and partial body activity
 - Excretion analysis



We thank You very much for listening and the interest, giving us the possibility to explain our situation in the field of the radiation protection law in the NORM industry and his coming into force in Austria!