



Regulatory framework for the handling of radiologically relevant legacy sites in Germany

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History of radiologically relevant legacy sites in Germany

- 1954-1989: Large scale uranium mining in the former German Democratic Republic in Eastern Germany



[2] W. B. Wilson at en.wikipedia



Bundesarchiv, Bild 183-1090-1109-004
Foto: Kasper, Jan Peter | November 1990

[2] Bundesarchiv / J.P. Kasper

- After German reunification in 1990s beginning of remediation efforts



Past regulation on legacy sites

- Regulation for (general) legacy sites as a part of **soil conservation law**
 - Not specific to radionuclides / radiation exposures
 - Focus on chemical contaminations in the soil
- **Since 2019:** Additional regulations specifically for **radiologically relevant legacy sites**
 - Part of **radiation protection regulation**
- Radiation protection act
 - General framework for handling rad. legacy sites
- Radiation protection ordinance
 - Detailed regulation supplementing radiation protection act



Definition radiologically relevant legacy site

- Definition of a radiologically relevant legacy site
 - Through human action **contaminated pieces of land, buildings or water bodies**
 - **Reference level of 1 millisievert per year for members of the public**
- **Legacy sites can vary significantly** dependent on industry branches and individual circumstances (e.g. uranium mining, oil and gas, thorium processing industries)
 - **Fundamental principles** for exposure determination **as a part of the regulation**
 - **Supplementary guidelines document in preparation**



Requirements for estimating exposure

- Relevant for **determining the presence of rad. legacy site and in remediation process**
- **Realistic** exposure pathways
- Considering the declared (or likely) usage of the area concerned
- **Estimations for the exposure (also) for the future**
 - Not more than 1000 years
 - In general 200 years considered sufficient (or as far as reliably predictable)

Calculation Guide Mining

Calculation Guide for the Determination of Radiation Exposure due to Environmental Radioactivity Resulting from Mining

Department
Radiation Protection and Environment



Procedure for suspected rad. legacy site

- **Responsible:** (previous/current) owner, party in control of the contaminated area, party responsible for generating the contamination
- If responsible person suspects rad. legacy site, **report to competent authority**
- If competent authority has indications for rad. legacy sites, **preliminary investigation** is performed (supported by **guidance values**)
- If there is a **reasonable suspicion** for the presence of a legacy site, the **person responsible** can be **required to perform detailed investigations**



Measures regarding rad. legacy sites

- **Competent authority can require (remediation) measures**
 - **Investigations** for type, extent and caused exposure and possible remediation measures
 - **Performing remediation** and other protective **measures** to prevent or reduce exposure
 - **Emission/immission monitoring**
 - During remediation: short term increase of exposure up to 6 millisieverts per year considered acceptable
 - **Type, extent and duration of measures has to be optimised**



Optimisation of remediation measures (1)

- Requirements to be considered in the remediation process:
 - Properties of the legacy site and of the location including the use of the property,
 - **Current exposure** and prediction about **future development** of exposure
 - Possible reduction of exposure by performing (remediation) measures,
 - **Additional exposure for workers and the public caused by the measures,**
 - **Cost for the remediation and future maintenance cost,**



Optimisation of remediation measures (2)

- Possible **changes of or within the legacy site over time** that might affect remediation measures and consequences for the expected exposure and cost (mainly mining remediation sites),
- **Stability of the measures regarding insufficient or not performed maintenance** and possible resulting cost and exposure.
- **Longterm negative effects on the environment,**
- The effects of the measures on the concerns/affairs of affected people.
- **Method of optimisation:**
 - **Comparison of different remediation methods sufficient**



Remediation planning

- For „**complex**“ **legacy sites**: **formal remediation plan** can be required (similar plans exist in German soil conservation law)
- In general done **by person responsible** for legacy site, but can also be done by competent authority
- **Content Remediation plan (selection)**:
 - Details about **planned remediation measures** and disposal of materials / **schedule**
 - **Criteria for success** at the end of remediation
 - **Summary of optimisation process / criteria**



Further Requirements (1)

- Requirements for **notification**
 - Beginning/end of remediation measures and evidence for **effectiveness of measures**
 - If **changes** at the legacy site are planned **after remediation** measures have been performed
- Requirements for the **disposal of NORM residues** from the legacy site
- Competent authority
 - Informs public
 - **Keeps records on the location of legacy sites**



Further Requirements (2)

- Regulations for worker protection
- Regulations about the **application of radiation protection law in combination with other branches of law**, esp. soil conservation law in the context of **mixed legacy sites** (eg. chemical and radioactive contaminants)
- Regulations about financial responsibilities



Summary and Outlook

- In German legislation for the first time nationwide **comprehensive framework for the remediation of radioactive legacy sites**
- Connected to other branches of law, especially soil conservation law
- **Currently technical guideline document in preparation to address specific details to support the application of the new legislative framework**



Thank you for your attention!



References

- [1] Bundesarchiv, Bild 183-1990-1109-004 / Jan Peter Kasper / CC-BY-SA 3.0,
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