

Conception and Methodology of a Prospective Safety Report for Uranium Mills Tailings Ponds

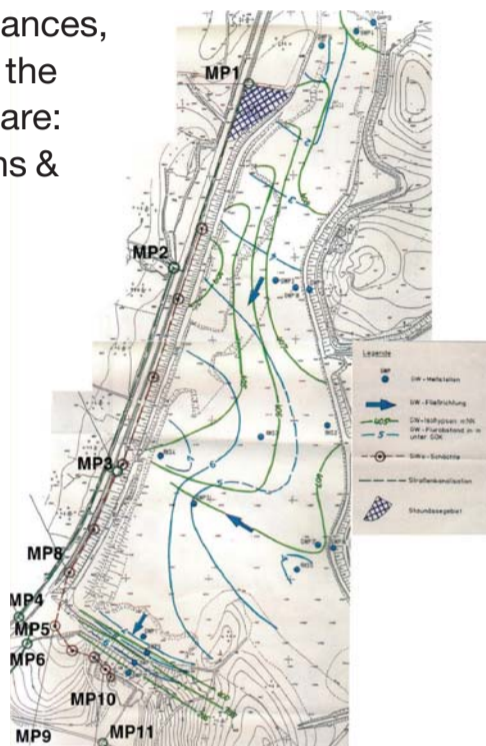
(D. Weiss, J. Larue, K. Fischer-Appelt)

Uranium mill tailings ponds (MTP) stand for the highest potential risk of all legacies from uranium milling. The overall objective of this work was to develop a standardised application document and a working tool for responsible authorities to conduct a continuous safety status description and assessment as well as a prognosis of the respective tailings pond site.

> Safety Assessment Principles

are based on guide and control values specified in or derived from laws, guidances, norms or standards for the main components who are:

- technical installations & geo-mechanics,
- radioactivity,
- chemical-toxic pollutants.



Groundwater and seepage water monitoring points

> Data Base

- Monitoring data (ground- and seepage water)
- Radon in near bottom air
- Data and information from expertises, reports and technical documents
- Site specific data and information (data base A.LAS.KA. / FbU)

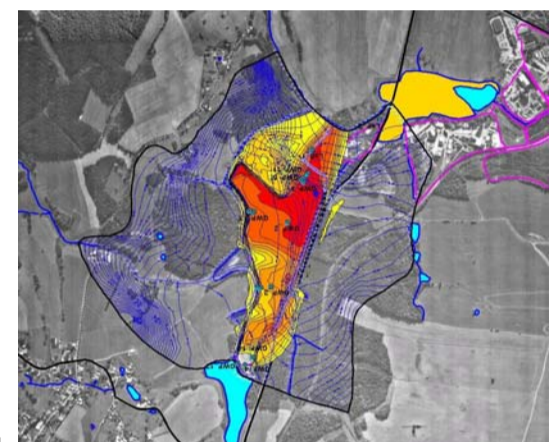
> Application case MTP „Lengsfeld“

> Exposure Pathways Analysis

- Determination of the radiation exposure to members of the public of different age caused by radioactivity discharges from the tailings pond by means of an authorized calculation procedure.
 - 0.1 to 0.3 mSv/yr with a predominant contribution of ingestion of drinking water (about 80 %)
- Determination of the hazard resulting from chemical-toxic pollutants according to German regulations.
 - Only relevance of Arsenic via seepage water path

> Forecast of Contaminant Propagation via Groundwater

A three dimensional site specific model was generated to forecast the contaminant distribution in the downstream groundwater flow by means of the available monitoring data.



Groundwater isohypses and uranium distribution pattern 50 years later resulting from the 3D transport modelling

> Safety Assessment

- The present status of the tailings pond „Lengsfeld“ was evaluated as to be safe for all three risk components and therefore it is no need for short-term measures to minimize hazards or to reduce the contaminants spreading via groundwater.
- The geochemical environment of the tailings can be regarded as steady, but they are hydraulically tensed by overlaying spar cover.
- The low permeability of the tailings prevents a significant vertical transport of contaminants into the underground.

> Conclusions

- Based on the results of the safety analysis it can be estimated that some kind of in-situ remediation represents the best suited option.
- Due to the system stabilising features the spar cover must be preserved.
- The seepage water flowing out at the main dam has to be collected.
- The tailings pond should be replanted. The surface of the pond should be adopted to the former site morphology.

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