

Radiological assessment of elevated uranium concentrations in groundwater and surface waters.

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Risk factors for health effects caused by the chemo-toxicity of uranium in water are in the literature reported clearly higher than the relevant radiological risk factors. However, it is mainly the radioactivity which is in public perception reflected as the real hazard of elevated concentrations of uranium in water. For communication with stakeholders, in particular with the local public at uranium mining sites, it is therefore necessary to have a scientifically based and generally accepted approach for the assessment of the radiological impact of uranium in water. This is also needed for the justification, limitation and optimisation of remedial measures in the frame of licensing procedures and the therefore needed discussions with the authorities.

The present paper describes the German approach for the assessment of elevated uranium concentrations in groundwater and surface waters and its application within the WISMUT Remediation Project. Starting from a review of monitoring data on uranium in groundwater and surface waters at former uranium mining and milling sites in East Germany, the relevant exposure pathways are described and the resulting effective doses are discussed. Application of the German guidelines on how to estimate radiation doses at mining sites (“Berechnungsgrundlagen Bergbau”) is demonstrated for typical scenarios at WISMUT. Furthermore, the paper shows how the results of exposure analysis for the water pathway are used for justification and optimisation of remedial measures within licensing procedures. Finally, the estimated doses are compared with other dose values caused by natural radionuclides at uranium mining sites, but also outside of uranium mining and milling.