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Application of environmental radiation measurement equipment in remediation projects

In the decades after the Second World War, numerous Uranium mines, many of them small, were opened up all over Europe and in other parts of the world. For strategic reasons, these mines were highly focused on production and hardly considered environmental aspects. For a large number of these, remediation is still pending. At many of the more than 87 tailing sites, leaching and milling residues exist, presenting a potential hazard for local population and remediation workers. Exposure pathways include contaminated groundwater, rivers as well as direct exposure to Uranium, Thorium and their decay products, for personnel as well as the local population. Additional exposure risks exist during remediation activities, e.g. from dust and material movement. Similar considerations also apply to active mines, where NORM materials are either mined directly or exist as by-product.

Nationwide monitoring networks already exist in almost every country concerned with remediation, to measure environmental radiation. Such stations usually record the ambient equivalent gamma dose rate (GDR), often enhanced with spectroscopic abilities to discriminate isotopes. The same type of equipment can be used to monitor a large number of NORM-related activities, including the remediation of mines, with no or only minor adjustments. In addition to the above-mentioned station types, mobile assessments and especially underwater measurements in groundwater or rivers are often carried out. The operation of such local, dense surveillance networks hardly differs from the large and sparse nationwide networks. A major aspect here is the gapless documentation. Such monitoring as described above therefore not only increases acceptance of the project by the local population, but also helps disputing unsubstantiated claims and thereby increases the return on investment of remediation projects.

This talk demonstrates the application of environmental radiation measurement equipment to NORM-related activities with focus on remediation projects. Targeted adaptions to the stations are outlined and new developments like asymmetric nuclide deconvolution for increased detection probability are discussed.

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