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OVERVIEW OF DECOMMISSIONING AND POTENTIAL REMEDIATION OF URANIUM OR RARE-EARTHS OPERATIONS

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ABSTRACT

Proper closure of mining/processing operations, allowing mitigation of associated risks, possibly even site re-use as well as minimization of costly aftercare, prevents the generation of legacies. Hence, decommissioning of facilities and remediation of sites have many aspects: technical – health – environmental – economic – stakeholder – social – political – legal etc. Moreover, having a preliminary closure plan can be a precondition in a much earlier phase, if already required for getting the mining/processing operation permitted.

If uranium or rare-earths production at mines, mills or refineries ceases, conditions of pre-production time will be re-established as far as reasonable. While site rehabilitation, also called reclamation or recultivation, is a usual approach also for conventional mines (i.e. earthworks and landscaping etc.), remediation involves clean-up of a sitewhich was incidentally contaminated.

Focusing on the technical fundament first step is a radiological screening survey both of facilities and the site. The screening can be supported by assessment of the operational history and selected environmental monitoring data to identify potentially suspicious areas. If the screening results are below defined limit values, no further specific action is required than conventional dismantling and rehabilitation. In addition, preparation for long-term safety of surficial dumpings like tailings impoundments can require particular measures.

However, should the screening reveal increased contamination levels a detailed survey will determine their spatial height. If indicated, numerical modeling supports the assessment of the resulting risk. While intervention levels derive also from international standards, radiological clean-up criteria/end-state definitions are usually based on national regulations.

Safe removal of contamination for decommissioning of equipment and facilities applies technologies, which range from manual/mechanical preparation over abrasive treatment to more complex processes like (electro) chemical decontamination. For remediation of radioactively contaminated sites, in particular for cleaning of environmental media like soil or groundwater similar or adapted technologies are in use as for remediation of conventionally contaminated sites: e.g. soilwater extraction, soil washing/separation and active or passive treatment of water and seepage.

As a result decommissioning and remediation generate conventional waste as well as radioactive (NORM) waste, which require to be managed (e.g. treated/back-filled/disposed off in landfills). If complete removal of radioactive contamination can be verified (by adequate repetition of the radiological survey), spent equipment is fragmented and facilities are conventionally dismantled. The site is prepared for conventional rehabilitation.

Finally, a post-closure environmental monitoring programme secures the success of decommissioning and remediation in the longer term.

Keywords: Closure, Decommissioning, Remediation, Uranium, Rare-Earths, NORM, Contamination, Radiological Survey, Environmental Monitoring, Decontamination, Waste Management