

Construction aspects of nuclear waste repositories layout

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The layout of nuclear waste repositories is influenced by a considerable number of parameters. Among others, type of waste to be stored, overburden, rock mass quality and structure in the repository level and above, as well as the size of the repository and the time of construction and operation until closure play a role.

The size of the storage galleries is dictated by the size of the containment plus required operation clearance, as well as by constructive issues. The distance between the single storage units depends on thermal and rock mechanical conditions.

The orientation of the underground openings is determined by the geometry of the available unit, but also by the anisotropy of the rock mass. Practice and theoretical studies have shown that the displacement characteristics and magnitude are significantly influenced by the relative orientation between underground opening and geological features, like bedding or foliation. Dominant mechanisms are shearing along the foliation and dilation perpendicular to the foliation. The foliation also influences the longitudinal displacement development. While for an orientation of the tunnel perpendicular to a steeply dipping foliation, displacement rates are relatively high near the face, but rapidly decrease, a considerable influenced length has to be expected in case of tunneling parallel to the foliation strike.

This again influences the required support and damage of the rock mass due to excavation.