

14. Elution Behavior of Arsenic in Excavated Rock - Considerations Based on Rock Observations, Laboratory Testing, and Water Balance -

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Those planning and implementing tunnel drilling are often required to accurately identify the short- and long-term elution characteristics of harmful heavy metals of natural origin within the ground in question. One effective approach is advection and diffusion analysis based on models of the physical and chemical behavior of heavy metals. To date, the common approach has been to determine the maximum likely amount of elution based on analysis of samples obtained before work begins. Efforts seeking to grasp overall elution behavior at actual sites are rare.

This report presents the results of our observations of core samples collected from a boring survey, arsenic elution testing, and investigations of the water balance at the project site. All these are factors required to create a model and to evaluate the form and elution characteristics of heavy metals and water behavior. The results failed to clarify tendencies in the distribution of rock species and particle size at the project site. We found arsenic can be present and adsorbed to clay minerals. An arsenic elution test showed that arsenic unevenly distributed in the ground was possibly diverged in the embankment during the process of drilling and transportation. An investigation of water behavior showed the site in question had regions of both very high and low water permeability, as well as volumes of retained water from rainfall.

Key words: natural heavy metals, arsenic, excavated rock, diffusion prevention measures,
elution amount