

Temporary storage and naturally mixed masses

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Black shale

Black shales such as alum shale can give acid rock drainage (ARD) with low pH and high levels of radionuclides and metals. Planned construction activities in Oslo will excavate more potentially acid producing rock than the capacity of the current disposal sites.



Fig. 1: Construction work in black shale area.

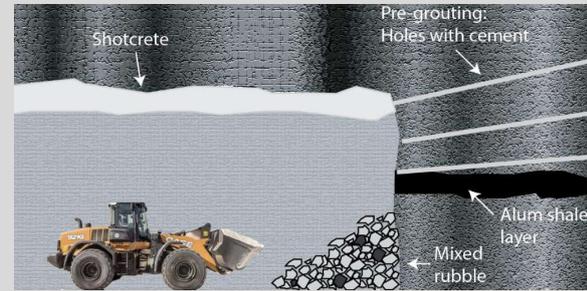


Fig. 2: Naturally mixed masses with black shale.

Temporary storage of black shale is often logistically necessary, but should not lead to increased risk of ARD. Separating black shales from surrounding rock may be difficult. Such **naturally mixed masses** has an uncertain potential for ARD, and large amounts of potentially safe masses are transported to disposal sites.

Experimental setup: containers and columns

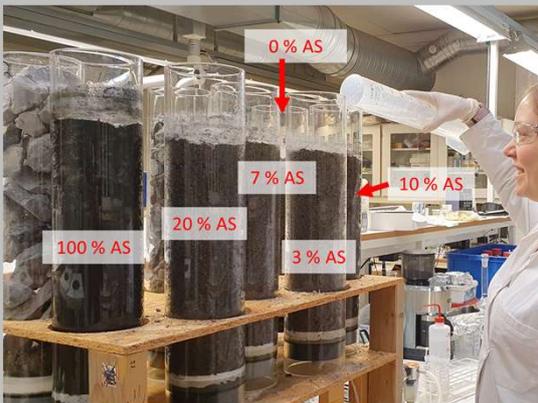


Fig. 3: Column experiments investigating leaching from mixed masses in controlled laboratory conditions.

Fig. 4: Container experiments with black shale investigating temporary storage and leaching from mixed masses in natural weather conditions. Containers from SVV from 2014 and 2015 provides long-time data and time series.



Naturally mixed masses

After 1.5 years, all containers have a neutral leachate pH, while lab column experiments show pH 2.5 for 100 % black shale column and neutral pH for other mixes. Leaching of metals and uranium increases with increasing black shale content.

As a part of SFI earthresQue, experiments will continue until 2028 to get long time series showing which mixes give ARD.

Temporary storage

Based on these results and collection of other data, **the new recommendation for temporary storage is prolonged from maximum two months to six months, including temporary storage at the disposal site.**

Acknowledgements

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P.S.! The best handling of black shale is leaving it in the ground...