

EGU22-9127, updated on 18 Aug 2022

<https://doi.org/10.5194/egusphere-egu22-9127>

EGU General Assembly 2022

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Natural Analogues – A proposed strategy for implementation within the Nuclear Waste Services (NWS), UK, programme of geological disposal

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A proposed strategy for the use of natural analogue (NA) studies in Nuclear Waste Services¹ (NWS) UK geological disposal facility programme and safety case has been developed based on an extensive review of past and current international practices. In the review, it was found that information on the strategic implementation of NA information is not readily available. This may be partly due to lack of strategic planning for the utilisation of NAs, or simply because waste management organisations do not generally publish internal strategic discussions. Nevertheless, it is seen of importance that the topic is discussed in public to increase the visibility of NA information and its implementation in geological disposal programmes. Another main conclusion concerns the cultural aspects of treatment of NAs in international fora, which seems to set NA information in the category of complementary/alternative evidence rather than equal part of the knowledge base. Often, the emphasis is set on the uncertainties and qualitative nature of NA. However, this ignores the fact that uncertainties are also present in laboratory, URL (underground rock laboratory) and modelling studies: for example, NA uncertainties are related generally to ill-defined boundary conditions, while short term experiments have uncertainties in both spatial and temporal scales. When NAs are used only as “alternative” lines of evidence, there is a risk that the information is devolved from the other evidence and this creates a risk of over or underestimating processes if extrapolated.

The strategy presented highlights the importance of:

- knowledge management and systematic approaches to the use of data from the broadest range of sources (i.e. laboratory, URL, modelling and NA) possible
- the continuous review of existing NA information
- the potential benefits of new NA projects in the future national programme
- the significance and experience of communication with NA information (at various levels across a broad range of stakeholder groups)

The strategic study also includes an update of RWM's NA catalogue (Milodowski et al. 2015), a starting point of the NWS's NA knowledge base. Development of a strategic approach to utilise NA

information naturally leads to activities to be undertaken in the immediate future and one of the activities emphasised is the potential use of regional (or self) analogues in support of the site characterisation programme. The emphasis and requirements for NA research will evolve and change as the focus of the geological disposal programme develops naturally as the programme matures so, for example, preliminary discussion on the operational phase is also included.

References

Milodowski, A.E., Alexander, W.R., West, J.M., Shaw, R.P., McEvoy, F.M., Scheidegger, J.M. & Field, L.P., 2015. A Catalogue of Analogues for Radioactive Waste Management. BRITISH GEOLOGICAL SURVEY COMMISSIONED REPORT CR/15/106. Keyworth, Nottingham British Geological Survey 2015. 1849p.

¹ Following a merger with Low Level Waste Repository Limited, Radioactive Waste Management (RWM) is now part of Nuclear Waste Services (NWS)