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Interpretation and Modelling of Data from Site Investigations for a Geological Disposal facility located in the UK

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The Radioactive Waste Management Directorate (RWMD) of the Nuclear Decommissioning Authority (NDA) has been given the responsibility for implementing geological disposal in the United Kingdom. The implementation process envisaged is that once a candidate site or sites for a geological disposal facility have been identified, NDA-RWMD will undertake surface-based investigations at the site or sites.
The information acquired through these investigations would be used as an input to the development of the safety case, for engineering design of the disposal facility and to demonstrate confidence to the key stakeholders that the potential disposal facility site is adequately understood.
NDA-RWMD proposes to develop and present the information derived from site characterisation activities in the form of a single integrated Site Descriptive Model, i.e. a description of the geometry, properties of the bedrock and water, and the associated interacting processes and mechanisms, which will be used to address the information requirements of all the end users (including the safety case).
It is anticipated that, in a similar way to the approach adopted by international radioactive waste programmes led by SKB (Sweden) and Posiva (Finland), the integrated Site Descriptive Model will be divided into parts comprising clearly defined disciplines which may form either chapters or discipline-based models such as:
• Geology;
• Hydrogeology;
• Hydrochemistry;
• Geotechnical;
• Radionuclide Transport Properties;
• Thermal Properties; and
• Biosphere.
The integrated Site Descriptive Model will evolve as understanding of the particular site advances and will describe the current understanding of a specific site and, where relevant, the historical development of conditions at the site where this supports the conceptual understanding. The Site Descriptive Model will not include prediction of the future evolution of the conditions at the site: this will be an important component of the safety assessment within the environmental safety case.
In preparing for these surface-based investigations at a site or sites, NDA-RWMD has explored the processes and tools that have been used in overseas radioactive waste management programmes for processing, interpreting and modelling the various data acquired through site characterisation. This research will inform the scope and approach to site characterisation proposed by NDA-RWMD when a site(s) is selected for a geological disposal facility in the future.
This paper discusses the work that has been undertaken to increase the understanding for the interpretation and modelling for each of the Site Descriptive Model disciplines identified. Where appropriate reference will be made to experience from other international radioactive waste management programmes.