## SCOPE AND OBJECTIVES OF THE WORKSHOP

This workshop is the second in a series dealing with geosphere stability for various host rock types (i.e. crystalline rocks, argillaceous rocks and evaporites). It focused on crystalline rock – a term that, in this context, is meant to include all types of hard, fractured rock – i.e. those not otherwise planned to be covered by the other workshops in the series focused on clay or salt environments. In particular, this workshop was designed to include the various hard rocks being investigated by the USA and Japan as potential host environments for geological disposal, e.g. tuffs. An important objective of the overall "geosphere stability" initiative under the NEA IGSC is to ensure that the views of the broader scientific community are taken into account in developing an understanding of geosphere stability that can be applied to the management of radioactive waste.

Among the favourable properties often quoted to support the choice of crystalline rocks as host formations for disposing of long-lived radioactive waste are their:

- Low permeability.
- Resistance to deformation and erosion.
- Geomechanical properties that afford long-term protection of engineered barrier systems;
- Geochemical conditions that favour low radionuclide solubilities and low degradation of engineered barrier systems.
- Good engineering properties.

The workshop focused on issues related to crystalline rock in the context of host formations for geological disposal and in particular on:

- The multiple lines of evidence to support the stability, buffering properties and robustness of crystalline rock over long timescales.
- The resilience of the favourable properties of crystalline rock to natural perturbations.

A further important objective was to evaluate the extent to which we may be confident about the required level of stability, whether we know what we are looking for, and if we have the necessary tools to carry out the investigations (i.e. related to the level of predictability that is necessary). Repository-induced effects (e.g. thermal loading, radiolysis, and migration of alkaline plumes) were, however, generally excluded from the remit of this workshop – although some of these effects, in particular thermal loading, were referred to in relation to their impact on the stability of the rock mass in the near-field.

As explained in the introduction, the stability of the geosphere and the events and processes of interest were those over the period of up to one million years into the future, but with greater emphasis on considerably shorter times.

The synthesis aims to summarise the oral and poster presentations given at the workshop, as well as the outcomes of the workshop discussions. It does not aim at providing a detailed overview of the state-of-the-art in all the geoscientific disciplines that were considered during the workshop. Rather it focuses on providing, to the extent possible, some insights that could be helpful in developing supporting arguments for building confidence in the stability of the geosphere for deep repositories – notably through answering the key questions that were set by the workshop Scientific Programme Committee.

The synthesis is completed by a compilation of technical papers supporting the oral and poster presentations (Annex A). The list of participants is given in Annex B.

Nearly 60 participants from the academic community, research and development institutions, national waste management organisations and regulatory authorities in 11 NEA member countries attended the workshop.

## TABLE OF CONTENTS

**Session IV**

**Response and Resilience of Crystalline Rock to Natural Perturbations and Geosphere Evolution (buffering)**



**Poster Session**