Preface

Following two highly successful Workshops in this series in Europe (Cadarache, 2001 and Nice 2004, France), the Third International Workshop on the Prediction of Long Term Corrosion Behaviour in Nuclear Waste Systems was organized in the Pennsylvania State University, University Park, PA 16802, USA over May 14–18, 2007. More than 30 oral presentations were distributed among the seven sessions dealing with corrosion issues (I & II), localized corrosion, passivity (I & II) and predictive modeling (I & II). The objective of the event was to bring together scientists and engineers from various countries, who are developing high level nuclear waste disposal technologies, with the goal of promoting scientific and technical exchanges concerning long term behaviour of metallic containment materials and engineered barrier systems. In particular, the workshop was an opportunity to compare the approaches that are being developed worldwide for predicting long term corrosion phenomena, including corrosion strategies for interim storage and geological disposal. Some of the specific topics of debate included:

- Prediction philosophy: empiricism versus determinism.
- Development of models for predicting the accumulation of corrosion damage in HLNW isolation systems over millennia.
- Specification of the Corrosion Evolutionary Paths from the present state to the performance horizon for various repository concepts in terms of those parameters that significantly impact the accumulation of damage.
- Definition of 'performance', 'failure', and 'containment'.
- Geochemical factors, particularly as related to defining the near-field environment.
- Archaeological artifacts, the information that they contain and their uses.
- Localized corrosion (pitting, crevice corrosion) versus general corrosion.

The organizers of the workshop would like to thank the attendees for their active participation and the authors who presented and have written papers of outstanding scientific and technical content, taking into account the discussions and the questions raised during the workshop. They hope that this special issue will be useful to scientists and engineers who are developing appropriate technologies for high level nuclear waste isolation and that it will also be valuable to operating nuclear waste authorities and regulators who evaluate possible solutions to nuclear waste disposal issues.

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