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PREFACE

In 1982 plans were taken up by the GSF-Institut für Tieflagerung (IfT) to carry out an in-situ experiment in the Asse salt mine in Germany. The experiment was meant to develop and test safe methods for the final disposal of vitrified High-level waste (HLW) in deep geological salt formations.

The partners of the IfT in this project, co-sponsored by the national governments and the European Commission (EC) were the French Agence nationale pour la gestion des déchet radioactifs (ANDRA), the Energieonderzoek Centrum of the Netherlands (ECN), and the Spanish Empresa Nacional de Residuos Radiactivos, S.A. (ENRESA).

Besides the development of a transport and emplacement system for HLW-canisters and the investigation of the response of the host rock to the thermal load of HLW, the effects of γ-radiation in natural rock salt represented a major issue of the project.

It was planned, therefore, to emplace thirty vitrified highly radioactive radiation sources spiked with Cs137 and Sr90 in six underground boreholes in the Asse salt mine. On top of each stack of five radiation sources a dummy canister containing salt samples was to be placed. The samples in the dummy canisters should have been irradiated in order to study the radiolytic effects in the salt as a function of temperature, irradiation dose and dose rate.

Unfortunately, due to licensing uncertainties the radiation sources were never emplaced in the Asse salt mine and, hence, the in situ irradiation experiments never took place. The originally planned accompanying laboratory irradiation experiments at Saclay (France) and Petten (the Netherlands) were therefore significantly extended. The understanding of the radiolytic processes in natural rock salt has been significantly extended thanks to the many results obtained in these irradiation experiments.

The chemical conditions under which different gases are produced or released from the salt samples subject to the effect of heat and gamma radiation are now essentially known. Under