

## CRITICALITY SAFETY FOR FINAL DISPOSAL IN EURAD-2

MADALINA WITTEL<sup>1</sup>, ANNA ALVESTAV<sup>2</sup>, TAMARA BALDWIN<sup>3</sup>, PETER BUDAY<sup>4</sup>, ADRIEN FEUERLE<sup>5</sup>, PAULI JUUTILAINEN<sup>6</sup>, SILJA HÄKKINEN<sup>6</sup>, ROBERT KILGER<sup>7</sup>, LIAM PAYNE<sup>8</sup>, DIMITRI ROCHMAN<sup>9</sup>, VIRGINIE SOLANS<sup>10</sup>, NADJA ŽELEZNIK<sup>11</sup>, BARBARA HORVAT<sup>11</sup>

<sup>1</sup>NAGRA, <sup>2</sup>SKB, <sup>3</sup>GSL, <sup>4</sup>PURAM, <sup>5</sup>ANDRA, <sup>6</sup>VTI, <sup>7</sup>GRS, <sup>8</sup>NWS, <sup>9</sup>PSI, <sup>10</sup>NAGRA, <sup>11</sup>EIMV

Criticality safety of a final disposal facility is a safety requirement in all countries that have to dispose of high-level radioactive waste, such as irradiated nuclear fuel. Dedicated measures, e.g. limiting the amount of fissile material per waste package, can be defined, further optimised and implemented to ensure criticality safety of deep geological repositories, in accordance with national requirements and final disposal concepts. However, assessing the performance of the adopted measures requires a dedicated approach. This is due to the very long-time frames defined for criticality safety assessments in the repository post-closure phase, i.e. orders of magnitude larger than any other stage of the fuel cycle. In the second phase of the European Joint Programme on Radioactive Waste Management (EURAD-2), a work package (WP-17) was defined to carry out research, development and demonstration (RD&D) work focused on criticality safety for final disposal of radioactive waste. With 23 contributing organisations from 13 countries, this RD&D work package represents the realisation of the first world-wide scientific and research programme dedicated to supporting national programmes in ensuring and demonstrating criticality safety for final disposal concepts. Key research areas of the work package include: (i) validation of long-term evolution scenarios for post-closure criticality safety assessments, (ii) verification of model definition and implementation for post-closure criticality safety assessments, (iii) developing approaches to assessing repository long-term evolution scenarios from a criticality safety perspective, (iv) developing methodologies to derive fissile mass limits per waste package, (v) exploring the experimental basis for validation of depletion and criticality codes used in criticality safety assessments (including performing a gap analysis), (vi) researching methods for criticality consequence assessments in the repository post-closure phase. This conference contribution provides a technical overview of the RD&D activities underway in WP-17 and will summarise the first preliminary results, achieved within the first few months after the start of the EURAD-2 programme.

030\_abstract