Estimation of low temperature cladding failures during an RIA transient: Phase II Validation with HERA results

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ABSTRACT:

Project Objective:

Phase I of the project focused on developing a failure criterion that accounted for cladding embrittlement caused by a crucial aspect of cladding failure, that is, the redistribution of hydrogen in the cladding during service driven by temperature gradients. This redistribution can create very high local hydrogen concentrations that can cause early cladding failure and that are now to be implemented in the BISON hydrogen model. We propose to apply the newly developed physically based failure criterion and analysis methodology to simulate the High-burnup Experiments in Reactivity Initiated Accidents (HERA) experiments at INL with the aim of predicting their failure strains, thus validating the effort and thus improving the accuracy of the BISON RIA simulations. The work will be performed in close collaboration with our INL partners on Phase II and will have EPRI in an advisory capacity.