



Interim BWR RIA Pulse Width Issues

Test Plan

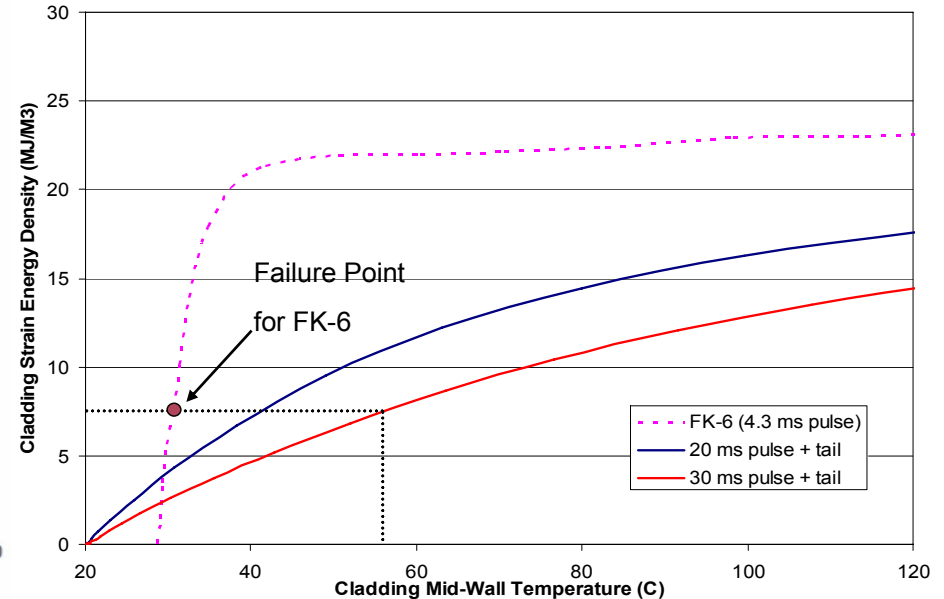
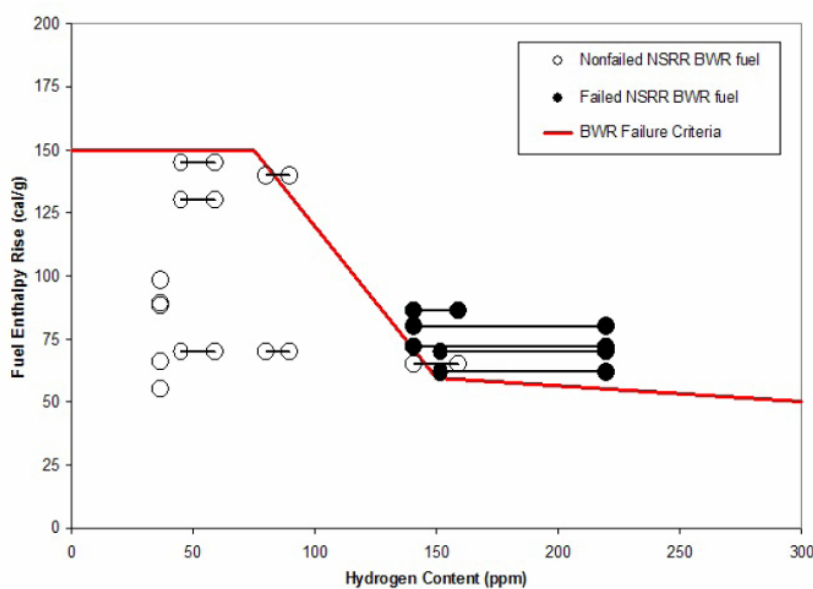
NRC RIA Public Workshop

Washington DC

September 25, 2008

BWR RIA Pulse Width Issues

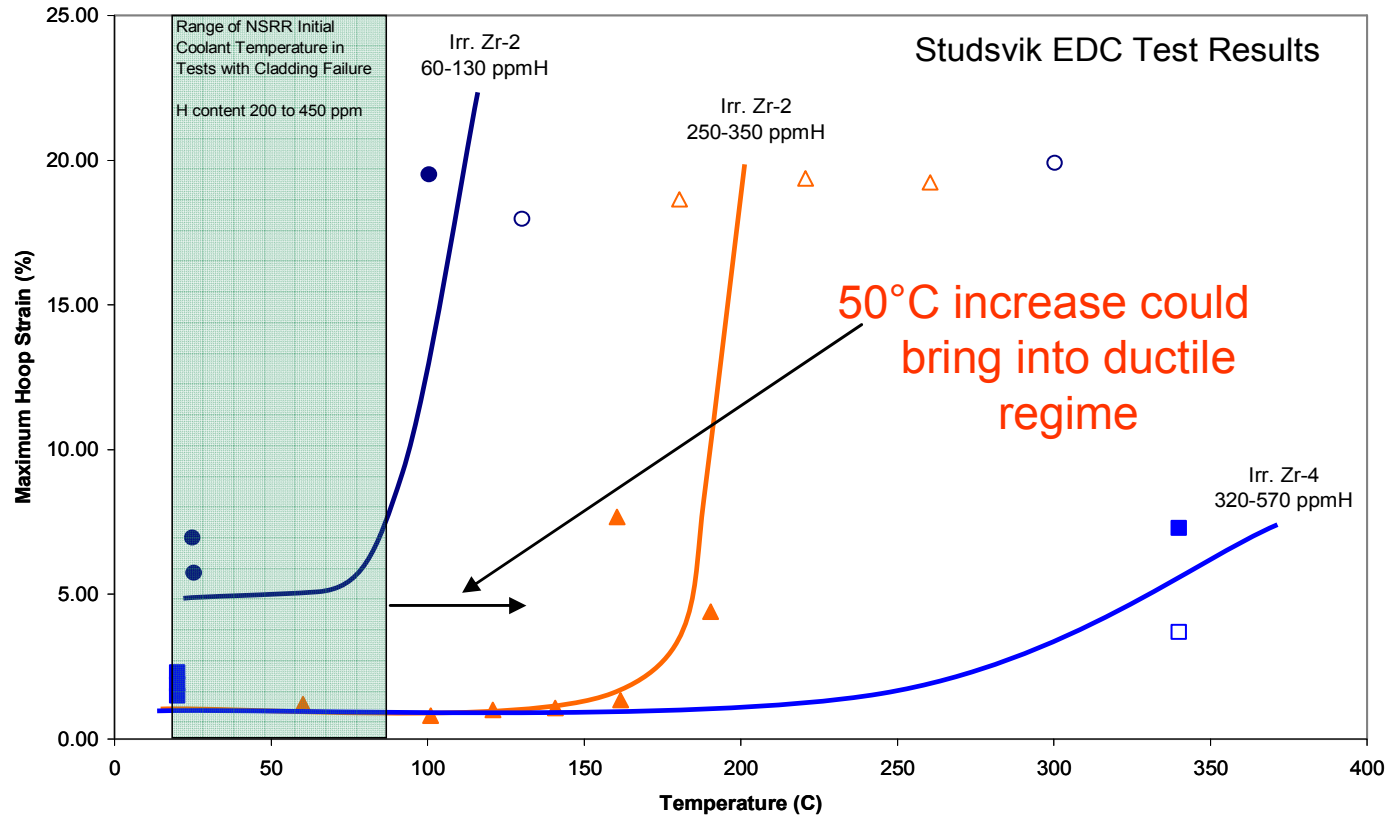
- Interim failure criterion uses lower bound unadjusted NSRR test data on BWR rods
 - No consideration of pulse width differences (4 ms versus 30 ms) between experiments and postulated rod drop accident



- Ignores heat conduction, temperature increase and loading rate impacts on cladding properties

BWR RIA Pulse Width Issues

- NRC assumes mechanical properties freeze at initial test temperature, assumption not proven for hydride effects
 - Temperature increase during RIA may bring clad to ductile region

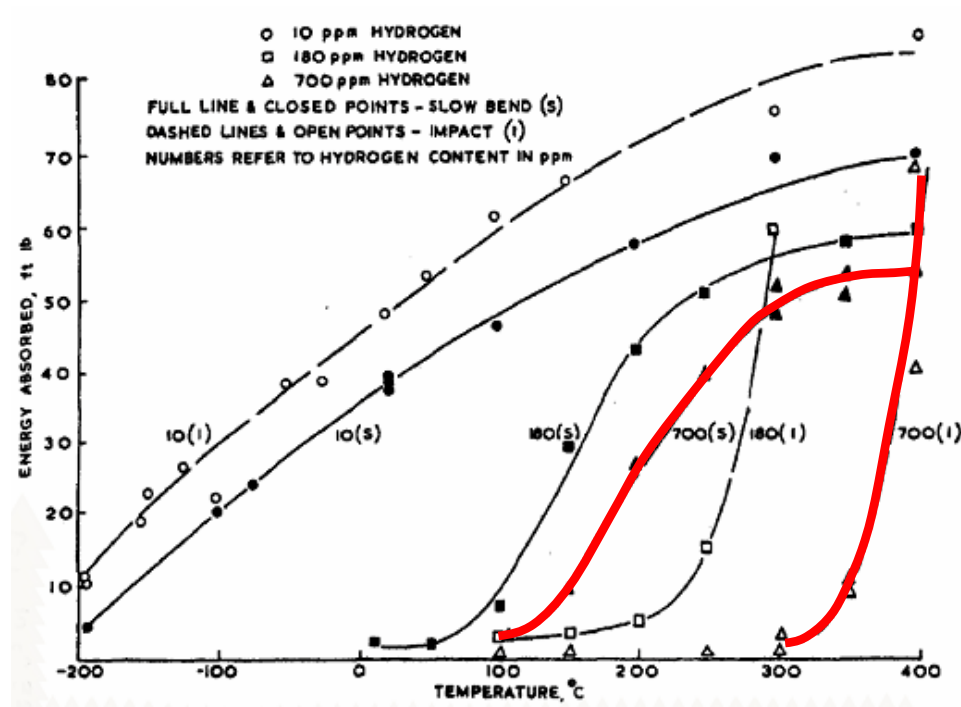


BWR RIA Pulse Width Issues

- Rapid heating/loading scoping test plan
 - Non-irradiated Zircaloy-2 channel material pre-charged with 500-700 ppm of hydrogen
 - High hydrogen content needed to generate sharp transition in non-irradiated materials
 - Load sample to failure in less than 100 ms
 - Synchronize heating with loading
 - Measure load versus cross-head movement
 - Three types of test at five different temperatures
 - Static temperature and normal loading
 - Static temperature and rapid loading
 - Rapid heating and rapid loading

BWR RIA Pulse Width Issues

- Ductile-to-Brittle transition behavior for non irradiated Zircaloy-4



- Test goal is to show if similar behavior is true for short exposures at test temperatures, such as expected in a RIA event



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