Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Characterization of Hydrogen Embrittled Zircaloy-4 by Using a Van de Graaff Particle Accelerator[1] JOHN BUDD, Texas A&M University-Kingsville — On-site, dry cask storage was originally by the intended to be a short-term solution for holding spent nuclear fuel. Due to the lack of a permanent storage facility, the nuclear power industry seeks to assess the effective lifetime of the casks. One issue which could compromise cask integrity is Hydrogen embrittlement. This phenomenon occurs in the Zircaloy-4 fuel-rod cladding and is caused by the formation of Zirconium hydrides. Over time, thermal stresses caused by the heat from reactions of the stored nuclear fuel could result in significant breaches of the cladding. Our group at Texas A&M University- Kingsville is conducting experiments to aid in determining when such breaches will occur. We will irradiate samples of the alloy with protons of energies up to 400 keV using a Van de Graaff particle accelerator. Once irradiated, their properties will be characterized using scanning electron microscopy and Vickers hardness tests.

[1]TCUR

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Date submitted: 15 Jan 2013 Electronic form version 1.4