

**Public Abstract**

First Name:John

Middle Name:C.

Last Name:Kennedy

Adviser's First Name:Gary

Adviser's Last Name:Solbrekken

Co-Adviser's First Name:

Co-Adviser's Last Name:

Graduation Term:SP 2012

Department:Mechanical &amp; Aerospace Engineering

Degree:MS

**Title:HYDRO-MECHANICAL ANALYSIS OF LOW ENRICHED URANIUM FUEL PLATES FOR UNIVERSITY OF MISSOURI RESEARCH REACTOR**

As part of the Global Threat Reduction Initiative (GTRI) Reactor Conversion program, work is underway to analyze and validate a new fuel assembly for the University of Missouri Research Reactor (MURR). The Low Enriched Uranium (LEU) design currently under investigation is a significant departure from the current High Enriched Uranium (HEU) design. Changes in the fuel design include a significant thinning of the fuel plates, as well as a change to a monolithic foil based fuel. These changes increase the potential for coolant flow induced deflection of the fuel plates which could lead to fuel plate failure.

With the continued advancement of computational codes, new options are emerging to assess structural stability. This research explores using explicitly coupled fluid-structure interaction (FSI) numeric modeling. Work was completed to evaluate a method for coupling a computational fluid dynamics (CFD) code with a finite element analysis (FEA) code. Additionally, research was completed on methods to improve the stability and efficiency of coupled simulations. This research has successfully provided a way to analyze the complex interactions of fluid and structural systems. These techniques will be invaluable in evaluating the proposed LEU fuel plate structure for MURR.