Results
Case shown here for extreme dimensions case of 44-mil-convex, 56-mil-concave flow channel (U44-L56) with 8 m/sec water flow.

- The pressure drop across the channel is about 100 psi which in agreement with true value of recorded at HFIR.

- Cross section velocity contour at mid-plane indicate faster flow profile on the narrower side (convex side).

- 7-mil maximum deformation occurs close to the leading edge.

- Flow streamlines over fuel plate deformed surface for steady-state solution.

Summary & Conclusions
The FSI-segregated solver is used to simulate the water flow over a long and thin involute-shaped aluminum plate. A multi-step solution approach is implemented. This approach has improved the solution convergence rate and physics variables toward a mesh-converged solution. The maximum deflection, occurs at or close to the leading edge of the fuel plate in all cases. These exploratory and preliminary results for extreme case U44-L56 indicate a maximum magnitude of the deflection to be approximately 7 mil (0.007 in), which is approximately 14% of the nominal channel thickness of 50 mil.

Acknowledgements:
This work was supported in part by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Visiting Faculty Program (VFP).

References: