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November 23, 2017

McMaster Journal of Engineering Physics
1280 Main Street W,
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Dear Dr. Turak,

Please consider the attached manuscript, “Simulated Heat Transfer out of a Metallic Cruciform CANDU Fuel Element” for publication in the McMaster Journal of Engineering Physics.

The manuscript introduces the reader to important metrics for nuclear fuel thermal analysis and gives a concise primer on irradiation swelling, thermal characteristics, crystallography, and historical approaches for metal nuclear fuel. A hydraulic and heat transport model is created for a CANDU pressure tube fuelled with metal fuel bundles, and a novel relation for extrapolating perforated twisted tape friction factor enhancement to high Reynolds numbers is proposed. The thermohydraulic model was used to create boundary conditions for a FlexPDE simulation of temperature distribution in a metal cruciform fuel element cross section.

The submitted research paper communicates exciting findings in regards to large increases in thermal margins, and potential power up-rates for CANDU-6 reactors based on metal nuclear fuel currently moving towards commercialization in the United States. The international nuclear reactor industry is highly competitive, and this work will serve as an early simulation analysis that may give Canadian reactor vendors and operators a technical path towards major fuel innovation.

Thank you for your consideration,

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