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**Completion of the Preliminary Safety Analysis Report
for the Conversion of the NBSR to LEU Fuel**

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ABSTRACT

The NIST Center for Neutron Research (NCNR) submitted its Preliminary Safety Analysis Report (PSAR) for the conversion of the NCNR test reactor, the NBSR, to the U.S. Nuclear Regulatory Commission (NRC) on December 30, 2014. The report, following the NRC guidelines set forth in NUREG-1537, represents the culmination of several years of analysis performed in the Nuclear Science and Technology Department at Brookhaven National Laboratory (BNL). It was the first submittal to the NRC by one of the U.S. High Performance Research Reactors planning to use U-10Mo monolithic foil fuel. The PSAR contains details of the neutronics analysis, the thermal hydraulic design and a complete safety analysis of accident scenarios (due to a reactivity insertion, loss of flow or loss of coolant). The report shows that results with low enriched uranium fuel are similar to those with high enriched uranium and no credible reactor accident will lead to fuel damage. Conversion of the NBSR will not occur until the U-Mo fuel is qualified by the Department of Energy and approved for use in the reactor by the NRC.