

Abstract Submitted  
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**Initial Lithium Capabilities for NSTX-U and Plans for Mitigating Associated Risks**<sup>1</sup> R. KAITA, W. BLANCHARD, D. CAI, M. JAWORSKI, R. LUNSFORD, A.L. ROQUEMORE, H. SCHNEIDER, PPPL, L. CADWALLADER, INL — The effect on plasma performance of lithium plasma-facing components (PFCs) is an important research focus on NSTX-U. Lithium evaporators (LITERs) are mounted at two upper dome locations to evaporate lithium onto the lower divertor region. The introduction of lithium into NSTX-U will also be conducted by the injection of small granules from a lithium granule injector (LGI). The main risk for the LITERs and the LGI is commensurate to the state of the lithium. The lithium used in the LGI is in the form of solid, micron-sized granules, and relatively few granules would enter NSTX-U should any possible failure modes occur. Each LITER, however, can operate with up to 80 grams of liquid lithium. The PFC water-cooling lines will thus be emptied during lithium operations, to prevent exposure of liquid lithium to water if there is a simultaneous LITER structural failure and a water leak. If there is a simultaneous LITER structural failure and a large air leak, the graphite PFCs could then be subject to high heat from rapid lithium oxidation. The likelihood that it would cause serious PFC damage is being evaluated. A mitigation scheme is a gas purge system that fills the vacuum vessel with argon should there be a significant pressure excursion when the lithium is at elevated temperature.

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