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2K Pump Down Studies at SNS

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The Spallation Neutron Source (SNS) linear accelerator consists of 81 superconducting radio frequency (SCRF) cavities cooled to 2.1K by a cryogenic refrigeration system. The 2.1 K cold box consists of four stages of cold compressors with LN2 cooled variable speed motors. Transitioning from 4K operation to 2.1K operation in the cryomodules involves pumping the cryomodules down from approximately 1 atm to 0.040 atm. This effort is conducted by use of several sequences developed as a collaborative effort between Jefferson Laboratory (JLab) and SNS personnel during the original commissioning of the SNS cryogenic system. Over the last ten years, multiple lessons have been learned since then about VFD behavior, thermal stability, procedural development and refining the sequence. In 2014, there were multiple pump down iterations that were not successful. Studies have been conducted to determine the cause of these unsuccessful iterations. The results of these studies including components replaced and aspects that have not yet been solved are presented in this paper. Future plans to refine the sequence and determine the cause of unsuccessful pump downs will also be presented.

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