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Liquid Nitrogen Historical and Current Usage of the Central Helium Liquefier at SNS

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The main cryogenic system for the Spallation Neutron Source (SNS) is comprised of a 4 K cold box, a 2 K cold box, six warm compressors, and ancillary support equipment. This system has been cold and operating with little disruption since 2006. Design and operation of Liquid Nitrogen (LN₂) supplied from a single 20,000 gallon supply dewar will be discussed. LN₂ used to precool the 4 K cold box heat exchanger started to increase around 2011. Consumption during 2012 and 2013 was almost double the nominal usage rate. Studies of this data, plant parameter changes to respond to this information, and current interpretations are detailed in this paper. The usage rate of LN₂ returned to normal in late 2013 and has since remained there. Future study plans to understand potential causes of this including contamination migration within the 4 K cold box will also be addressed.

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